MUSWELLBROOK COAL COMPANY

# 2022
# ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

| | |
|---|---|
| Name of Leaseholder: | **Muswellbrook Coal Company Limited** |
| Name of Mine: | **Muswellbrook Coal** |
| Titles/Mining Leases: | **Consolidated Coal Lease 713**<br>**Mining Lease 1304**<br>**Mining Lease 1562** |
| AEMR Commencement Date:<br>AEMR End Date: | **1 January 2022**<br>**31 December 2022** |
| Reporting Officer: | **Julie Thomas** |
| Title: | **Environmental Superintendent** |
| Signature: |  |
| Date: | **23 March 2023** |

# TABLE OF CONTENTS

1.0 INTRODUCTION ..... 1
1.1 STRUCTURE OF THIS REPORT ..... 1
1.2 CONSENTS, LEASES AND LICENCES ..... 1
1.3 MINE CONTACTS ..... 4
1.4 EMPLOYEE LEVELS ..... 4
1.5 ACTIONS REQUIRED FROM PREVIOUS AEMR REVIEW ..... 4
1.6 COMPLIANCE STATUS ..... 4
2.0 ACTIVITIES DURING THE REPORTING PERIOD ..... 5
2.1 EXPLORATION ..... 5
2.2 LAND PREPARATION ..... 5
2.3 CONSTRUCTION ..... 5
2.4 MINING ..... 5
2.5 MINERAL PROCESSING ..... 7
2.6 WASTE MANAGEMENT ..... 7
2.7 PRODUCT COAL AND TRANSPORT ..... 8
2.8 PRODUCTION SUMMARY ..... 9
2.9 HAZARDOUS MATERIALS MANAGEMENT ..... 9
2.10 WATER MANAGEMENT ..... 9
2.11 OTHER INFRASTRUCTURE MANAGEMENT ..... 11
3.0 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE ..... 12
3.1 ENVIRONMENTAL MANAGEMENT ..... 12
3.2 METEOROLOGICAL ..... 12
3.3 AIR QUALITY MANAGEMENT ..... 14
3.4 GREENHOUSE GAS ..... 19
3.5 EROSION AND SEDIMENT CONTROL ..... 20
3.6 SURFACE WATER MANAGEMENT ..... 21
3.7 GROUNDWATER MANAGEMENT ..... 28
3.8 CONTAMINATED LAND ..... 35
3.9 FLORA AND FAUNA MANAGEMENT ..... 35
3.10 WEEDS, PEST AND FERAL ANIMALS ..... 35
3.11 BLASTING ..... 36
3.12 NOISE MANAGEMENT ..... 40
3.13 VISUAL AMENITY, LIGHTING AND LANDSCAPING ..... 45

3.14 ABORIGINAL HERITAGE ..... 45
3.15 EUROPEAN HERITAGE ..... 46
3.16 SPONTANEOUS COMBUSTION ..... 46
3.17 BUSHFIRE ..... 48
3.18 HYDROCARBON CONTAMINATION ..... 48
3.19 METHANE DRAINAGE/VENTILATION ..... 49
3.20 PUBLIC SAFETY ..... 49
3.21 OTHER ISSUES AND RISKS ..... 49
4.0 COMMUNITY RELATIONS ..... 50
4.1 ENVIRONMENTAL COMPLAINTS ..... 50
4.2 COMMUNITY LIAISON, SPONSORSHIPS AND DONATIONS ..... 52
4.3 COMMUNITY CONSULTATIVE COMMITTEE ..... 52
5.0 ANNUAL REHABILITATION REPORT ..... 53
5.1 SURFACE DISTURBANCE AND REHABILITATION ACTIVITIES DURING THE ANNUAL REPORTING PERIOD ..... 53
5.2 PLAN 1 – STATUS OF MINING AND REHABILITATION AT THE COMPLETION OF THE ANNUAL REPORTING PERIOD ..... 56
5.3 DISTURBANCE AND REHABILITATION STATISTICS ..... 58
5.4 REHABILITATION MONITORING AND RESEARCH FINDINGS ..... 59
6.0 REHABILITATION FORWARD PROGRAM ..... 64
6.1 THREE YEAR FORECAST – SURFACE DISTURBANCE ACTIVITIES ..... 64
6.2 THREE YEAR REHABILITATION FORECAST ..... 65
6.3 REHABILITATION RESEARCH AND TRIALS ..... 65
6.4 REHABILITATION MAINTENANCE AND CORRECTIVE ACTIONS ..... 66
6.5 REHABILITATION SCHEDULE ..... 66
6.6 SUBSIDENCE REMEDIATION FOR UNDERGROUND OPERATIONS ..... 67
6.7 PLAN 2 – MINING AND REHABILITATION THREE YEAR FORECAST ..... 67
6.8 PROGRESSIVE MINING AND REHABILITATION SCHEDULE ..... 67
7.0 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD ..... 71

## LIST OF TABLES

Table 1: Consents, Authorisations and Licences ..... 2
Table 2: Mine Contacts ..... 4
Table 3: Employee Levels ..... 4
Table 4: Waste Stream Generation ..... 7
Table 5: Key Production Milestones/Material Production ..... 9

Table 6: Stored Water ..... 10
Table 7: Groundwater Extraction ..... 10
Table 8: Site Water Balance ..... 11
Table 9: Rainfall Data ..... 13
Table 10: Temperature Data ..... 14
Table 11: Long Term Particulate Matter Criteria ..... 15
Table 12: Short Term Particulate Matter Goal ..... 15
Table 13: Atmospheric Gas Content Criteria ..... 15
Table 14: Real-Time $PM_{10}$ Averages ..... 15
Table 15: Comparison of Real-Time $PM_{10}$ Results (Sites 7 and 9) ..... 17
Table 16: Summary of Gas Data Results ..... 19
Table 17: Trigger Values for Muscle Creek Water Quality ..... 21
Table 18: Groundwater Monitoring Trigger Levels ..... 29
Table 19: Comparison of Underground Working Results (Bore RDH650) ..... 29
Table 20: Blast Criteria ..... 36
Table 21: Blast Monitoring Network ..... 36
Table 22: Comparison of Blasting Results ..... 40
Table 23: Noise Monitoring Network ..... 40
Table 24: Comparison of Average $LA_{eq}$ Noise Results ..... 42
Table 25: Comparison of Average $LA_{max}$ Noise Results ..... 42
Table 26: Spontaneous Combustion Report Summary ..... 46
Table 27: Summary of Spontaneous Combustion Affected Areas Without Active Control ..... 47
Table 28: Summary of Complaints ..... 50
Table 29: Key Production Milestones/Material Production ..... 56
Table 30: Status of Disturbance and Rehabilitation at End of Reporting Period ..... 58
Table 31: Rehabilitation KPIs at End of Reporting Period ..... 58
Table 32: Proportion of Established Rehabilitation for Final Land Use Classifications at End of Reporting Period ..... 58
Table 33: Rehabilitation Woodland Completion Criteria Targets and 2022 Results ..... 62
Table 34: Rehabilitation Woodland Foliage Cover Completion Criteria Target and 2002 Results ..... 62
Table 35: Rehabilitation Pasture Site Completion Criteria Targets and 2022 Results ..... 62
Table 36: Rehabilitation Pasture Weeds Criteria Target and 2022 Results ..... 62
Table 37: Woodland and Pasture Rehabilitation Site Completion Criteria Target for Erosion and Landform Stability and 2022 Results ..... 62
Table 38: List of Active Rehabilitation Research and Trials ..... 63
Table 39: Material Production Schedule During the Next Three Years ..... 65
Table 40: Predicted Cumulative Disturbance and Rehabilitation Progression During the Next Three-Year Term ..... 67
Table 41: Progressive Rehabilitation Key Performance Indicators (KPIs) During the Next Three-Year Term ..... 67

## LIST OF FIGURES

Figure 1: Status of Mining and Rehabilitation at End of Reporting Period ..... 6
Figure 2: Annual Total Waste to Landfill ..... 8
Figure 3: Waste Recycled Yearly ..... 8

Figure 4: Quarterly Wind Roses ..... 12
Figure 5: Rainfall Graph ..... 13
Figure 6: Temperature Graph ..... 14
Figure 7: Air Quality Monitoring Locations ..... 16
Figure 8: Site 7 $PM_{10}$ Results ..... 17
Figure 9: Site 8 $PM_{10}$ Results ..... 18
Figure 10: Site 9 $PM_{10}$ Results ..... 18
Figure 11: Water Monitoring Locations ..... 23
Figure 12: Monthly Surface Water Monitoring Results – pH ..... 24
Figure 13: Quarterly Surface Water Results – pH ..... 24
Figure 14: Comparison of pH results to Historical Results ..... 25
Figure 15: Monthly Surface Water Results – Electrical Conductivity ..... 25
Figure 16: Quarterly Surface Water Monitoring Results – Electrical Conductivity ..... 26
Figure 17: Comparison of EC results to Historical Results ..... 26
Figure 18: Monthly Surface Water Results – Total Suspended Solids ..... 27
Figure 19: Quarterly Surface Water Monitoring Results – Total Suspended Solids ..... 27
Figure 20: Comparison of TSS results to Historical Results ..... 28
Figure 21: Water Level for Underground Workings ..... 30
Figure 22: Water Quality Data in Underground Workings ..... 30
Figure 23: Water Level for Onsite Groundwater Monitoring ..... 31
Figure 24: Sandy Creek Groundwater Depth ..... 32
Figure 25: Sandy Creek Water Quality – pH ..... 32
Figure 26: Sandy Creek Water Quality – Electrical Conductivity ..... 33
Figure 27: Comparison of Depth to Historical Results – Sandy Creek ..... 33
Figure 28: Comparison of pH Results to Historical Results – Sandy Creek ..... 34
Figure 29: Comparison of EC Results to Historical Results – Sandy Creek ..... 34
Figure 30: Blast Monitoring Locations ..... 37
Figure 31: Queen Street Blast Monitoring Results ..... 38
Figure 32: School Blast Monitoring Results ..... 38
Figure 33: 99 Queen Street Blast Monitoring Results ..... 39
Figure 34: Nisbet Blast Monitoring Results ..... 39
Figure 35: Noise Monitoring Locations ..... 41
Figure 36: R13 Sandy Creek Road Noise Monitoring Results ..... 43
Figure 37: R15 Queen Street Noise Monitoring Results ..... 43
Figure 38: R17 Queen Street Noise Monitoring Results ..... 44
Figure 39: R25 Sandy Creek Road Noise Monitoring Results ..... 44
Figure 40: R32 Muscle Creek Road Noise Monitoring Results ..... 45
Figure 41: Complaint Summary ..... 51
Figure 42: Complaint History ..... 51
Figure 43: Areas Proposed to be Rehabilitated During the Reporting Period ..... 54
Figure 44: Plan 1 – Status of Mining and Rehabilitation at Completion of Annual Reporting Period ..... 57
Figure 45: Plan 2A – Mining and Rehabilitation Year 1 (2023) ..... 68
Figure 46: Plan 2B – Mining and Rehabilitation Year 2 (2024) ..... 69
Figure 47: Plan 2C – Mining and Rehabilitation Year 3 (2025) ..... 70

# LIST OF APPENDICES

Appendix 1: Air Quality Monitoring Results
Appendix 2: Water Monitoring Results
Appendix 3: Blast Monitoring Data
Appendix 4: Noise Monitoring
Appendix 5: Complaints Summary

# 1.0 INTRODUCTION

Muswellbrook Coal Company (MCC) is a wholly owned subsidiary of the Idemitsu Kosan Company Ltd. Group. MCC has a long association with coal mining at Muswellbrook, with underground coal mining commencing in 1907 and open cut operations in 1944. The mine is located on Muscle Creek Road, approximately 3 kilometres to the north-east of Muswellbrook.

On 1 September 2003, Development Consent for DA 205/2002 was granted by Muswellbrook Shire Council (MSC) to extend the former MCC No.1 Open Cut. The No.1 Open Cut Extension commenced operations in March 2005 and has a capacity to produce up to 2,000,000 tonnes coal per annum. This approval has subsequently been modified on several occasions with the latest modification granted in 2016 to allow mining in an area known as the "Continuation Project" and to extend the life of the mining operations to 2022. Rehabilitation activities will continue past this date.

A modification to the approval was granted on 20 December 2022 to allow the storage, handling and transport of coal to continue until the end of March 2023. Other active consents are ID721 – Operation of Washery, and DA 18-88 – Coal Haulage. Both consents are issued by MSC.

The current mine life at MCC is zero years. Mining operations ceased in 2022, with coal storage, handling and transport continuing until the end of March 2023.

## 1.1 STRUCTURE OF THIS REPORT

The structure of this report incorporates the reporting requirements stipulated in the MCC Development Consent, specifically Condition 42. This report also incorporates the reporting requirements in MCC's water licences.

This Annual Environmental Management Report (AEMR) provides a summary of activities, environmental management and performance at MCC from 1 January 2022 to 31 December 2022 (herein referred to as the 'reporting period').

In accordance with the Development Consent, copies of this AEMR will be made available to:

- Muswellbrook Shire Council (MSC),
- Resources Regulator (RR),
- DPE – Office of Environment, Energy and Science (formerly OEH),
- DPE – Water,
- Environment Protection Authority (EPA), and
- MCC Community Consultative Committee (CCC).

A copy of the report is also available on MCC's website:
https://www.idemitsu.com.au/operations/muswellbrook-coal/approvals-plans-reports/

## 1.2 CONSENTS, LEASES AND LICENCES

MCC operates under a number of development consents issued by Muswellbrook Shire Council (MSC). The primary consent is DA 205/2002, which was approved by MSC in 2003 for the operation of the Open Cut 1 extension. This DA has been modified on several occasions with the most recent modification being in 2022. Other active consents are ID712 – Operation of Washery, and DA 18-88 – Coal Haulage. Both consents are issued by MSC.

Mining activities at MCC are carried out wholly within Consolidated Coal Lease 713, Mining Lease 1562 and Mining Lease 1304. An Ancillary Mining Application (AMA 1013) has been submitted to cover the Eastern Out of Pit Emplacement Area and mine water management dams near the Coal Handling and Preparation Plant (CHPP).

In addition to the above approvals MCC operates under the following licences:

- Environmental Protection Licence (EPL) 656 issued under the Protection of the Environment Operations Act 1997.
- Water Licences WAL39806, WAL41503, and WAL41521, issued under the Water Management Act 2000.

During the reporting period, MCC's development consent DA 205/2002 was modified to allow for the storage, handling and transportation of coal to continue until the end of March 2023. This modification was supported by a Modification Report that was submitted to Muswellbrook Shire Council (MSC). MSC sought feedback from other regulatory agencies and the public before approving this modification.

An additional application was provided to MSC during the reporting period to vary the development consent to tidy up conditions relating to rehabilitation management. Approval of this modification was still pending at the end of the reporting period.

During the reporting period, new mining lease conditions were received for CCL713, ML1304 and ML1562. These conditions were received as part of changes made to Mining Regulation 2016.

Relevant consents, authorisations and licences are summarised in **Table 1**.

**Table 1: Consents, Authorisations and Licences**

| Approval | Description | Consent Authority | Date Granted | Expiry/ Renewal Date |
|---|---|---|---|---|
| DA 205/2002 (MSC) | Approval for Extension of MCC Open Cut 1 | Muswellbrook Shire Council | 1 Sep 2003 | Mining to 31 Dec 2022 and storage, handling and transport to end of March 2023<br>No end date to approval |
| DA 205/2002 (MSC) – Amendment to Condition 1.1 | Power line relocation and additions to Workshop | Muswellbrook Shire Council | 19 Dec 2005 | |
| DA 205/2002 (MSC) Amendment to 1.1 and 11.3 | Relocate office buildings, workshop and bathhouse | Muswellbrook Shire Council | 13 July 2009 | |
| DA 205/2002 (MSC) Amendment to 11.1 | Extension of mining into Area C | Muswellbrook Shire Council | 23 Dec 2010 | |

| Approval | Description | Consent Authority | Date Granted | Expiry/ Renewal Date |
|---|---|---|---|---|
| DA 205/2002 (MSC) Amendment to 1.1(a), 31, 33, 39, 45 and 58. | Revision to Mining Infrastructure Building Requirements and Rehabilitation Plan Revision to permit the continuation of mining operations for an additional 5 years. | Muswellbrook Shire Council | 29 Oct 2013 | |
| DA 205/2002 (MSC) Amendment to 1.1, 1.2 & 6.3.2 and additional conditions 59 & 60. | Modification to Permit the Continuation of Mining Operations at Muswellbrook Coal Mine for an Additional Five (5) Years- Multiple Allotments- Coal Road Muswellbrook. | Muswellbrook Shire Council | 12 Dec 2013 | |
| DA 205/2002 (MSC) General revision of consent conditions | Modification to allow mining operations to mine additional areas and to extend the mine life to 2022. | Muswellbrook Shire Council | 26 Oct 2016 | |
| DA 205/2002 Conditions 2, 4 and 8 and Appendix A | Modification to allow the storage, handling and transportation of coal until the end of March 2023 | Muswellbrook Shire Council | 20 Dec 2022 | |
| Consolidated Coal Lease 713 | Mining Lease | NSW Resources Regulator | 5 May 1990 | 24 Nov 2024 |
| Mining Lease 1304 | Mining Lease | NSW Resources Regulator | 12 Jan 1993 | 24 Nov 2024 |
| Mining Lease 1562 | Mining Lease | NSW Resources Regulator | 16 Feb 2005 | 16 Feb 2026 |
| AMA 1013 | Ancillary Mining Activity | NSW Resources Regulator | Application submitted 15 November 2017 | Pending approval |
| Environmental Protection Licence 656 | Environmental Licence | Environmental Protection Authority | 6 Dec 2000 | Not applicable |
| WAL39806 | Water Licence | WaterNSW | 3 Nov 2016 | Continuing |
| WAL41503 | Water Licence | WaterNSW | 25 Oct 2017 | Continuing |
| WAL41521 | Water Licence | WaterNSW | 4 Nov 2019 | Continuing |

## 1.3 MINE CONTACTS

The names and contacts of site personnel responsible for mining, rehabilitation and environmental management, planning and support functions are shown in **Table 2**.

**Table 2: Mine Contacts**

| Name | Position | Contact Number |
|---|---|---|
| Brett O'Kane | Acting General Manager | (02) 6542 2300 |
| Julie Thomas | Environmental Superintendent | (02) 6542 2300 |
| Rod Gallagher | Operations Manager<br>Mine Manager | (02) 6542 2300 |

## 1.4 EMPLOYEE LEVELS

The number of employees and full-time equivalent contractors at MCC for this reporting period is shown in **Table 3**, along with a comparison to the numbers from previous reporting periods.

**Table 3: Employee Levels**

| Year | Employees | Full-Time Equivalent Contractors |
|---|---|---|
| 2022 | 8 | 32 |
| 2021 | 55 | 71 |
| 2020 | 62 | 82 |
| 2019 | 65 | 93 |
| 2018 | 67 | 77 |

## 1.5 ACTIONS REQUIRED FROM PREVIOUS AEMR REVIEW

Neither the RR or MSC conducted an AEMR inspection or provided feedback on the AEMR, so there are no actions arising from the previous AEMR.

## 1.6 COMPLIANCE STATUS

### 1.6.1 REPORTABLE INCIDENTS

During the reporting period, there were no reportable environmental incidents at MCC.

### 1.6.2 COMPLIANCE REVIEW

In accordance with the requirements of Condition 42 (a) of the development consent, a detailed compliance review of the performance of the project against conditions of this consent and statutory approvals was undertaken at the end of the reporting period. MCC were compliant with the conditions of consent and statutory approvals during the reporting period, except for the following:

- The updated Rehabilitation Management Plan was not approved by the Resources Regulator as required by condition 17 of the Development Consent. This was due to changes in the Resources Regulator guidelines and the Resources Regulator no longer approving Rehabilitation Management Plans.

### 1.6.3 REGULATOR SITE INSPECTIONS

On 22 March 2022, the Regulator's Mining Act Inspectorate conducted a planned inspection of areas of erosion that had been identified in a previous inspection (conducted with Muswellbrook Shire Council on 21/04/21) and during an Independent Environmental Audit (IEA), (field component

conducted on 15/11/21). This planned inspection was undertaken to follow up on erosion repair works and issues raised by the independent environmental audit in relation to the rehabilitation on site.

During the inspection, the Regulator raised concerns about ongoing erosion at MCC and following this inspection, MCC received a s240 notice (under the *Mining Act 1992)* to engage a suitably qualified expert to undertake an assessment of the long term erosional stability of the approved final landforms as part of the rehabilitation of the mine using an industry accepted Landform Evolution Model appropriate to the risk and scale of the landform of the site to determine the long-term landscape erosion behaviour.

A consultant has been engaged to prepare this model and associated report, and this is due to be completed in the next reporting period. The outcomes from this report will be incorporated into relevant site documentation.

# 2.0 ACTIVITIES DURING THE REPORTING PERIOD

## 2.1 EXPLORATION

Previous exploration has provided a good understanding of the resources in the area. For this reason, no additional drilling or other exploration activities were done during the reporting period.

## 2.2 LAND PREPARATION

No further disturbance for mining was undertaken during the reporting period.

### 2.2.1 TOPSOIL MANAGEMENT

Previously stripped topsoil is stockpiled in locations around the site for use and will be used in future rehabilitation activities. Topsoil stockpiles have been sampled by an agronomist and analysed to determine suitability for use in rehabilitation. The stockpiled topsoil was found to have suitable chemical properties for use. The volume of topsoil remaining is very limited.

## 2.3 CONSTRUCTION

During the reporting period no construction activities occurred.

## 2.4 MINING

All mining activities this reporting period have occurred in Open Cut 1. Mining is achieved through open cut methods using excavators, front-end loaders and rear dump trucks.

The Open Cut 1 mining schedule continued within the Northern section of the approved area during the year, mining down through the seam sequences as they present from the Fleming through to the Loder seam.

The final coal was removed from MCC in November 2022 and no further coal mining activities are proposed at MCC.

The status of mining and rehabilitation at the end of the reporting period is shown in **Figure 1**.

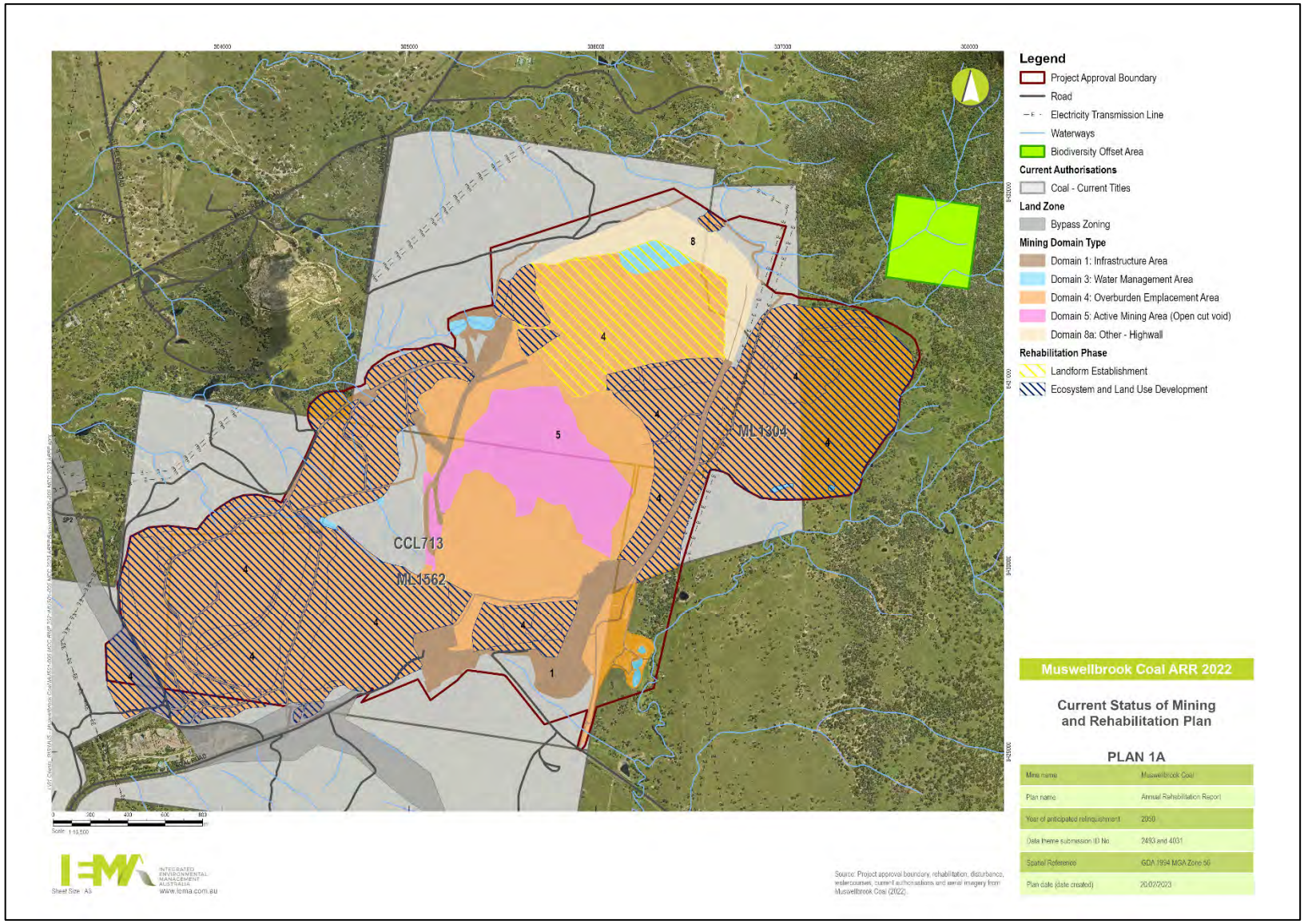


**Figure 1: Status of Mining and Rehabilitation at End of Reporting Period**

## 2.5 MINERAL PROCESSING

MCC produces thermal coal for the export market. High ash coal is mined, crushed and washed through the Coal Preparation Plant (CPP) while low ash coal is crushed and by-passes the CPP directly to the product stockpile.

Coal from Open Cut 1 requires washing by the CPP as a result of dilution associated with mining of the underground roadways. The CPP uses a jig as the main method of separation and has a capacity of approximately 240 tonnes per hour. The CPP is used on an 'as required' basis.

The CPP uses a belt press filter to treat the fines or tailings component of the coal feed. Both coarse and fine reject material will be trucked back to the open cuts for disposal. This material is quite dry and able to be handled in the same manner as overburden material. Disposal of carbonaceous material is undertaken in accordance with the Spontaneous Combustion Management Plan (SCMP).

Coal processing at MCC was finalised during December 2022. Demolition of the CPP will commence during the next reporting period.

## 2.6 WASTE MANAGEMENT

During the reporting period MCC continued to maintain a Total Integrated Waste Management Service to manage all waste streams generated on site. This includes general waste, cardboard and paper recycling, timber, waste oil, and steel. MCC continue to separate and recycle waste materials, when possible, to assist in reducing the amount of waste going to the local landfill.

**Table 4** shows the amount of waste that was removed from site during the reporting period. There has been a decrease in the total waste removed from site during this reporting period due mining operations slowing down. MCC has maintained a high percentage of waste recycled during the period.

**Table 4: Waste Stream Generation**

| Month | Total Waste Removed (tonnes) | Total Waste to Landfill (tonnes) | Percentage Reused/ Recycled |
|---|---|---|---|
| January | 86.46 | 3.62 | 95.81 |
| February | 82.74 | 2.25 | 97.29 |
| March | 84.72 | 5.75 | 93.21 |
| April | 64.05 | 2.97 | 95.36 |
| May | 52.06 | 1.66 | 96.81 |
| June | 48.06 | 3.59 | 92.53 |
| July | 81.07 | 10.770 | 86.72 |
| August | 122.96 | 2.477 | 97.99 |
| September | 61.83 | 3.248 | 94.75 |
| October | 78.64 | 3.330 | 95.77 |
| November | 45.22 | 2.62 | 94.21 |
| December | 21.01 | 3.08 | 85.32 |
| **Total** | **828.85** | **45.37** | **94.53** |

**Figure 2** compares the annual total waste to landfill for this reporting period to previous reporting periods.

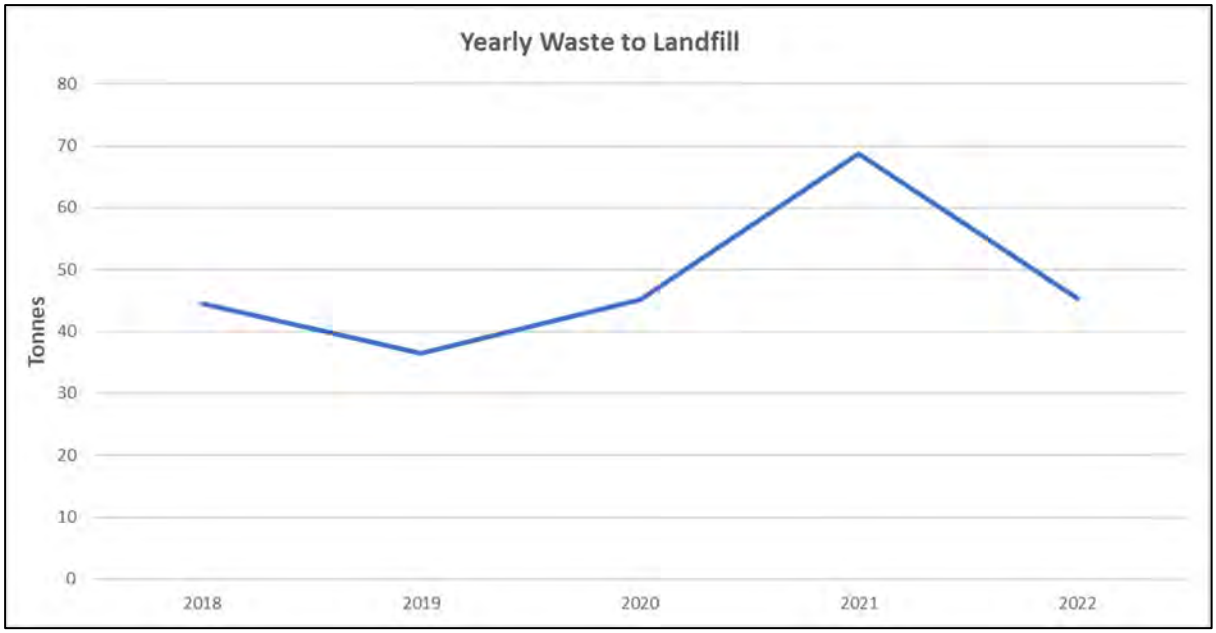


**Figure 2: Annual Total Waste to Landfill**

**Figure 3** compares the percentage of recycled waste during this reporting period to previous reporting periods.

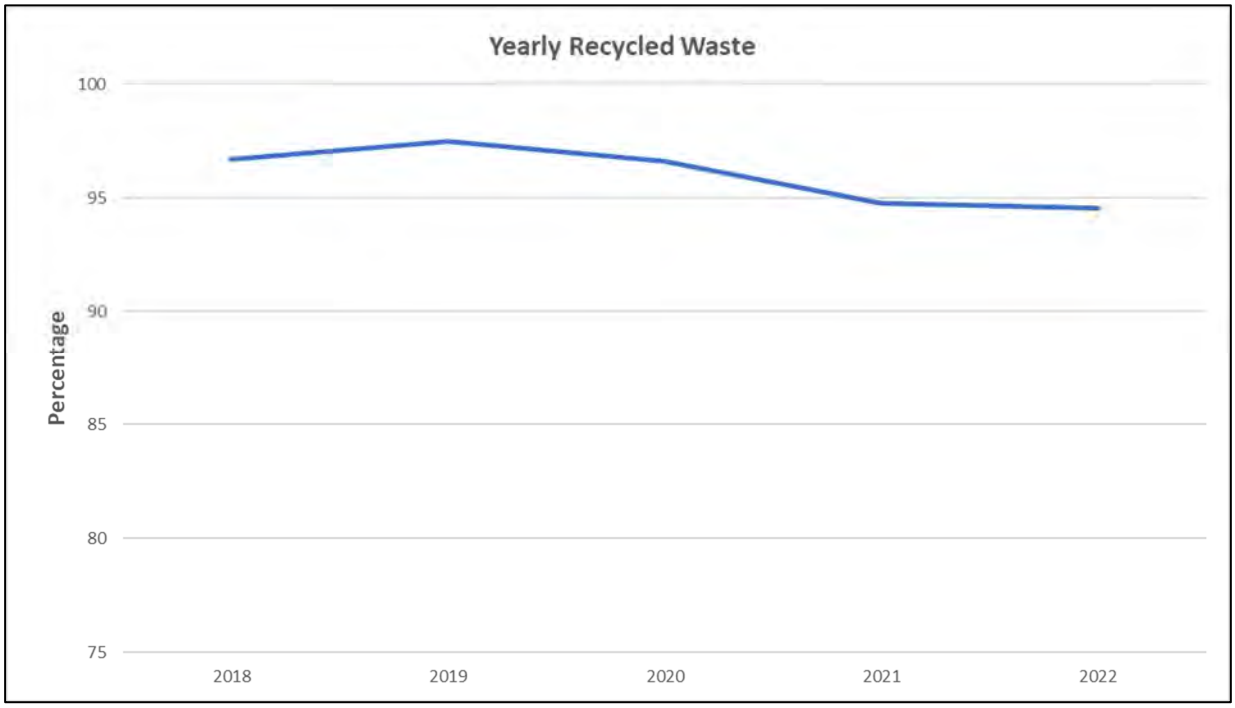


**Figure 3: Waste Recycled Yearly**

## 2.7 PRODUCT COAL AND TRANSPORT

Product coal is hauled from the product bin by truck to the stockpiles. Five product stockpiles have a total capacity of 100,000 tonnes. Product coal is trucked off site via Muscle Creek Road and the New England Highway to the Ravensworth Coal Terminal (RCT) for train loading. This coal is then transported to the Port of Newcastle.

## 2.8 PRODUCTION SUMMARY

The key production milestones and material production achieved during the reporting period are shown in **Table 5**.

**Table 5: Key Production Milestones/Material Production**

| Material | Unit | This Report |
|---|---|---|
| Stripped topsoil | $m^3$ | 0.00 |
| Overburden | $m^3$ | 1,774,000 |
| ROM coal extracted | Mt | 1.313 |
| Reject material | Mt | 0.206 |
| Product | Mt | 1.130 |

## 2.9 HAZARDOUS MATERIALS MANAGEMENT

### 2.9.1 FUEL STORAGE

Diesel fuel is stored in three Class C1 above ground, self-bunded tanks, with a capacity of 105,000L each. The tanks are located 50m from any major buildings.

### 2.9.2 EXPLOSIVES

Storage of explosives is in two external magazines and an above ground tank for raw materials with 30,000L capacity. Bulk explosive product can also be stored on the mobile processing unit with a capacity of 8,000L but it is not common practice to do so as this is only used on an as needs basis. Blasting contractors are employed to carry out total loading service on site.

All dangerous goods on the premises are listed under MCC's Notification of Hazardous Chemicals which was last updated 4 August 2021 (HazNot0001071).

## 2.10 WATER MANAGEMENT

The primary objective of the Water Management Plan (WMP) is to enable the effective management of on-site water to minimise the impact of mining operations on surface and ground water resources, both on and adjacent to the mine site. No changes were made to the water management system during the reporting period.

The objectives of the WMP are to:

- Meet the water supply needs of the project,
- Separate clean water runoff produced by undisturbed catchments from dirty (sediment-laden) and contaminated runoff from disturbed catchments,
- Use appropriate sedimentation controls for dirty water,
- Where possible, recycle and reuse dirty and contaminated mine water for dust suppression and wash down activities,
- Allow clean water to flow through the catchment and use clean water for firefighting supplies (firefighting system uses raw mine water) and sensitive equipment where required and allowed by harvestable rights,
- Where possible, and where mine safety permits, use disused open cuts and underground mines as mine water storages,
- Have nil discharge of saline mine water by containing all saline mine water on site and minimising the risk of accidental off-site discharge, and
- Monitor surface and groundwater to determine significant impacts to water quality or beneficial use and undertaking remedial action where required.

### 2.10.1 WATER STORAGE

Volumes of stored water available at MCC are provided in **Table 6**.

**Table 6: Stored Water**

| VOLUMES ($m^3$) | START REPORTING PERIOD | END REPORTING PERIOD | STORAGE CAPACITY |
|---|---|---|---|
| **DIRTY WATER** | | | |
| Brickworks Dam 1 | 4,300 | 9,500 | 30,000 |
| Brickworks Dam 2 | 2,300 | 4,300 | 20,000 |
| Dam 3 | 18,900 | 10,400 | 30,000 |
| **SALINE OR MINE WATER** | | | |
| Dam1 | 27,500 | 22,300 | 30,000 |
| Dam 2 | 15,800 | 14,000 | 20,000 |
| Final Settling Pond | 7,300 | 6,500 | 10,100 |

### 2.10.2 GROUNDWATER EXTRACTION

MCC holds three licences to extract ground water. The volumes of groundwater extracted in this reporting period are shown **Table 7**. No new bores were constructed during the reporting period. No changes were made to groundwater extraction entitlements during the reporting period.

**Table 7: Groundwater Extraction**

| Licence No. | Source | Water Sharing Plan | Volume Extracted (ML) | Extraction Entitlement (ML) |
|---|---|---|---|---|
| WAL39806 (small borehole) | Sydney Basin-North Coast Groundwater Source | North Coast Fractured and Porous Rock Groundwater Sources 2016 | 57.21 | 1,000 |
| WAL41503 (large borehole) | Sydney Basin-North Coast Groundwater Source | North Coast Fractured and Porous Rock Groundwater Sources 2016 | 243.46 | 2,200 |
| WAL41521 (open cut voids) | Sydney Basin-North Coast Groundwater Source | North Coast Fractured and Porous Rock Groundwater Sources 2016 | 99.60 | 1,400 |

### 2.10.3 WATER BALANCE

The calculated water balance for the reporting period is provided in **Table 8**. The water balance indicates a water surplus for the year. Extra water has been stored in on-site surface and underground water storages.

The water balance model was last updated in 2015 as part of the most recent DA modification. Each year inputs and outputs are measured or estimated based on the water balance developed for the site.

There are no predictions from the 2016 SEE to compare the water balance data to, however the SEE notes that the site generally operated in water deficit up until the 2014 water balance. The water balance is now generally in surplus due to lower volumes of water being used for dust suppression spontaneous combustion management as the mining areas are condensed into smaller areas. This is consistent with the smaller operational mining area.

**Table 8: Site Water Balance**

| **INPUTS** | **ML/year** |
|---|---|
| Ground Water Seepage | 100.0 |
| Surface Water Runoff and Dam Capture | 241.6 |
| Entrainment in Coal | 98.5 |
| Potable Water | 3.3 |
| Underground Workings – Dewatering Bores | 400.3 |
| **TOTAL** | **843.7** |
| **OUTPUTS** | **ML/year** |
| Entrainment in Coal | 99.1 |
| Discharge Off Site | 0.0 |
| Spontaneous Combustion Management – water infusion and sprays | 8.4 |
| Dust Suppression – water carts | 100.4 |
| Evaporation from Dams | 113.3 |
| Septic Pump Out | 0.6 |
| **TOTAL** | **321.8** |
| **Balance** | **521.9** |

## 2.11 OTHER INFRASTRUCTURE MANAGEMENT

MCC maintains Muscle Creek Road as per the requirements of the Development Consent and in accordance with a Routine Maintenance Annual Plan (RMAP), which has been approved by MSC.

# 3.0 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

## 3.1 ENVIRONMENTAL MANAGEMENT

To measure compliance with the management plans, the development consent and various licences, MCC undertakes a comprehensive monitoring program. Details on the individual monitoring programs are provided in the following sections.

## 3.2 METEOROLOGICAL

During the reporting period, MCC continued to maintain a Meteorological Monitoring Station (MMS) on rehabilitated land to the immediate west of Open Cut 1. The MMS provides 10m elevation wind speed and direction, 2m and 10m elevation air temperature, rainfall, humidity, barometric pressure, sigma theta and stability class.

Meteorological data provided in this report was sourced from the MMS. Wind data, rainfall and temperature results are summarised below. Data recovery for the monitoring period was 100.0%.

### 3.2.1 WIND SPEED AND DIRECTION

Quarterly wind roses are provided in **Figure 4**. These results are generally consistent with the predominant wind patterns in the Hunter Valley.

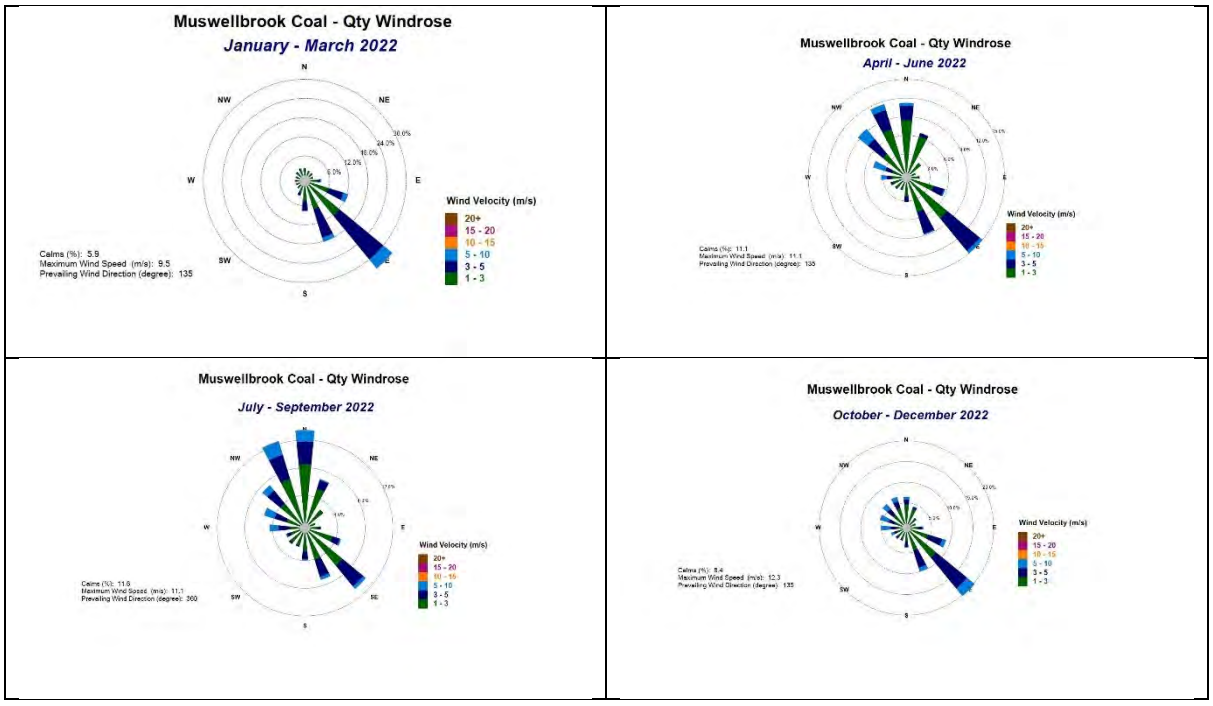


**Figure 4: Quarterly Wind Roses**

### 3.2.2 RAINFALL

Total rainfall recorded during the reporting period was 988.0mm, which is significantly above the long-term average recorded onsite since 2005 of 602.2mm. This year has been the third year in a row of above average rainfall. A summary of rainfall during the reporting period, compared to the long-term average recorded onsite since 2005, is provided in **Table 9** and **Figure 5**.

**Table 9: Rainfall Data**

| Month | Muswellbrook Coal Actual (mm) | Muswellbrook Coal Average (mm) |
|---|---|---|
| January | 75.6 | 60.7 |
| February | 55.2 | 71.7 |
| March | 227.8 | 63.6 |
| April | 26.6 | 36.4 |
| May | 40.0 | 26.1 |
| June | 13.6 | 58.2 |
| July | 142.0 | 32.4 |
| August | 80.4 | 32.6 |
| September | 108.2 | 30.7 |
| October | 128.0 | 44.4 |
| November | 79.4 | 80.4 |
| December | 11.2 | 65.1 |
| **Total** | **988.0** | **602.2** |

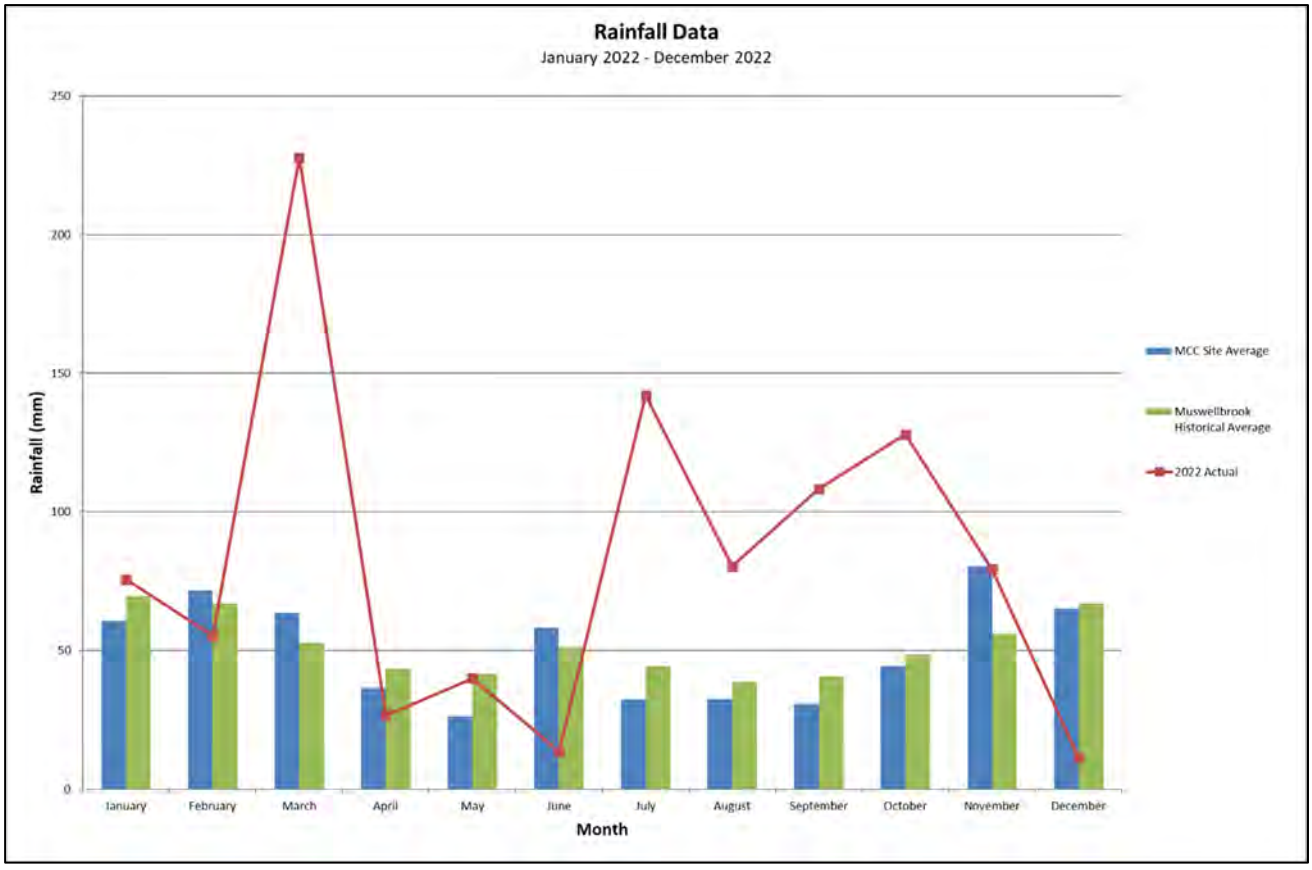


**Figure 5: Rainfall Graph**

### 3.2.3 TEMPERATURE

Maximum temperature recorded during the reporting period was 39.7°C and the minimum recorded was -1.6°C. A summary of minimum, maximum and average monthly temperatures during the reporting period is provided in **Table 10** and **Figure 6**.

**Table 10: Temperature Data**

| Month | Minimum Temperature (°C) | Average Temperature (°C) | Maximum Temperature (°C) |
|---|---|---|---|
| January | 14.4 | 23.3 | 35.6 |
| February | 11.2 | 21.8 | 37.2 |
| March | 11.2 | 20.1 | 32.8 |
| April | 7.3 | 17.5 | 29.8 |
| May | 2.4 | 13.9 | 27.3 |
| June | -0.4 | 9.9 | 20.0 |
| July | -1.0 | 10.3 | 20.3 |
| August | 2.2 | 12.2 | 24.2 |
| September | 3.5 | 14.0 | 25.2 |
| October | 5.1 | 16.9 | 28.0 |
| November | 3.6 | 18.1 | 32.4 |
| December | 7.6 | 20.2 | 35.8 |
| **Summary** | **-1.0** | **16.5** | **37.2** |

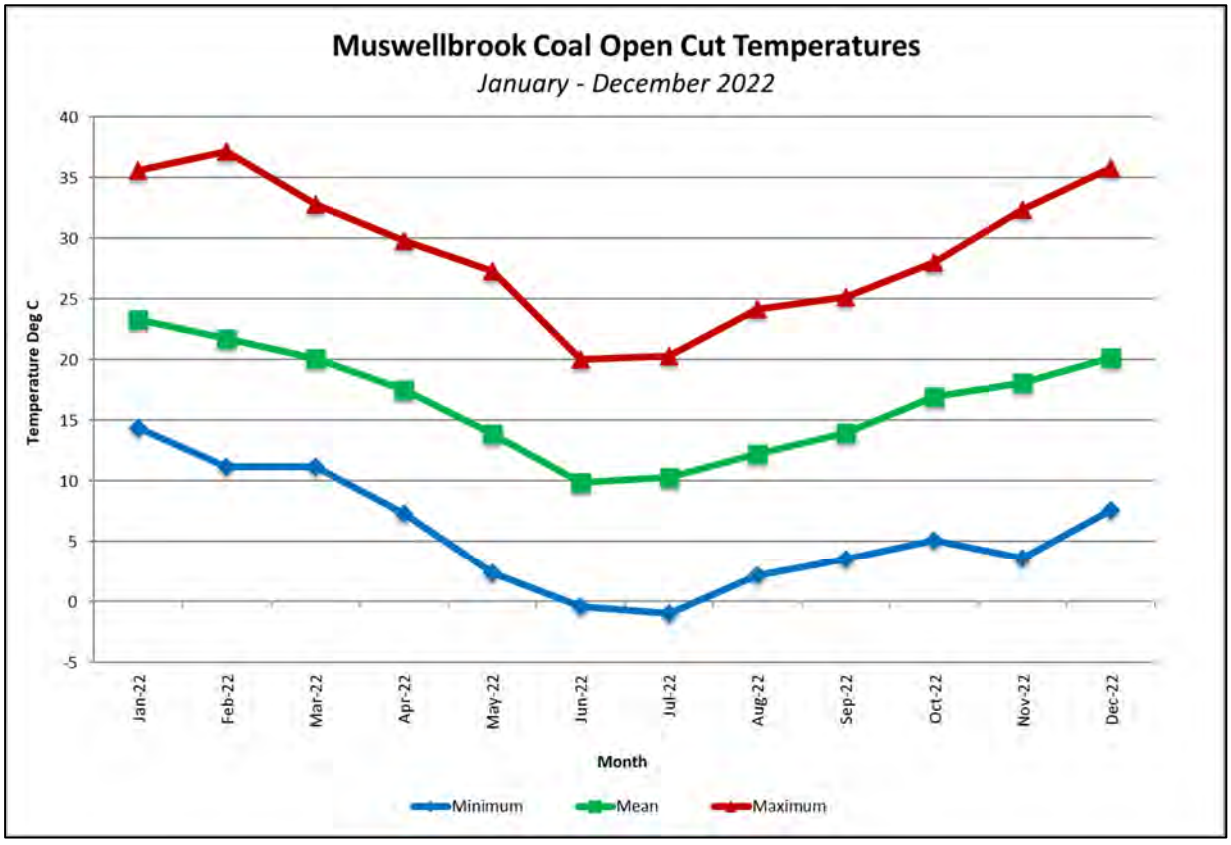


**Figure 6: Temperature Graph**

## 3.3 AIR QUALITY MANAGEMENT

### 3.3.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to operate in accordance with the approved Air Quality Management Plan (AQMP). The primary objective of air quality management at MCC is to manage and minimise the impact of dust from the operations on the environment and nearby residences. MCC utilise a daily dust forecasting tool to assist with managing dust emissions from the site.

### 3.3.2 AIR QUALITY MONITORING

The air quality criteria that apply to MCC are shown in **Table 11** to **Table 13**.

**Table 11: Long Term Particulate Matter Criteria**

| Pollutant | Standard / Goal |
|---|---|
| Particulate Matter <10µg ($PM_{10}$) | 30µg/$m^3$ (annual mean) |

**Table 12: Short Term Particulate Matter Goal**

| Pollutant | Standard/Goal |
|---|---|
| Particulate Matter <10µm ($PM_{10}$) | 50µg/$m^3$ (24-hour average) |

*Table 17 and 18 Note: • Total impact (i.e., incremental increase in concentrations due to the development plus background concentrations due to all other sources); • Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, (but not Spontaneous Combustion within the mine) or any other activity agreed by Council.*

**Table 13: Atmospheric Gas Content Criteria**

| Pollutant | Criterion | |
|---|---|---|
| Sulphur Dioxide ($SO_2$) | 80ppb (24-hour average) | 200ppb (1 hour average) |
| Hydrogen Sulphide ($H_2S$) | 100ppb (24-hour average) | 500ppb (1 hour average) |

*Note:*

- *Total impact (i.e., incremental increase in concentrations due to the development plus background concentrations due to all other sources).*
- *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, (but not Spontaneous Combustion within the mine) or any other activity agreed by Council*

The air quality monitoring sites are displayed in **Figure 7**.

***Particulate Matter <10µg ($PM_{10}$)***

MCC operate three real-time $PM_{10}$ monitoring units with all three units continuously relaying data to a password protected website that is accessible by MCC personnel.

The $PM_{10}$ units are continuous electronic monitoring systems that are subject to equipment faults, communication losses, power outages and maintenance downtime. High data recovery is considered essential and data recovery levels obtained during the reporting period were 98.4% across the three units. The losses of data were due to equipment calibrations and minor malfunctions.

The criteria in the development consent apply to $PM_{10}$ levels at residential locations and as monitoring location Site 8 is used as a management tool, it is not subject to the criteria in the development consent. There were no days during the reporting period where the 24-hour $PM_{10}$ results were exceeded above the 24-hour criteria of 50µg/$m^3$ at the compliance-based monitoring locations.

The annual average PM10 did not exceed the 30µg/$m^3$ annual criteria during the reporting period. **Table 14** displays the average PM10 value at each site during the reporting period with the results graphically presented in **Figure 8** to **Figure 10**. A table of comprehensive PM10 results is provided in **Appendix 1**.

**Table 14: Real-Time $PM_{10}$ Averages**

| Site Number | Annual Average $PM_{10}$ Concentration (µg/$m^3$) | Annual Average Criteria (µg/$m^3$) | Data Recovery % |
|---|---|---|---|
| 7 | 13.05 | 30 | 99.5 |
| 8 | 27.73 | NA | 96.7 |
| 9 | 13.10 | 30 | 99.2 |

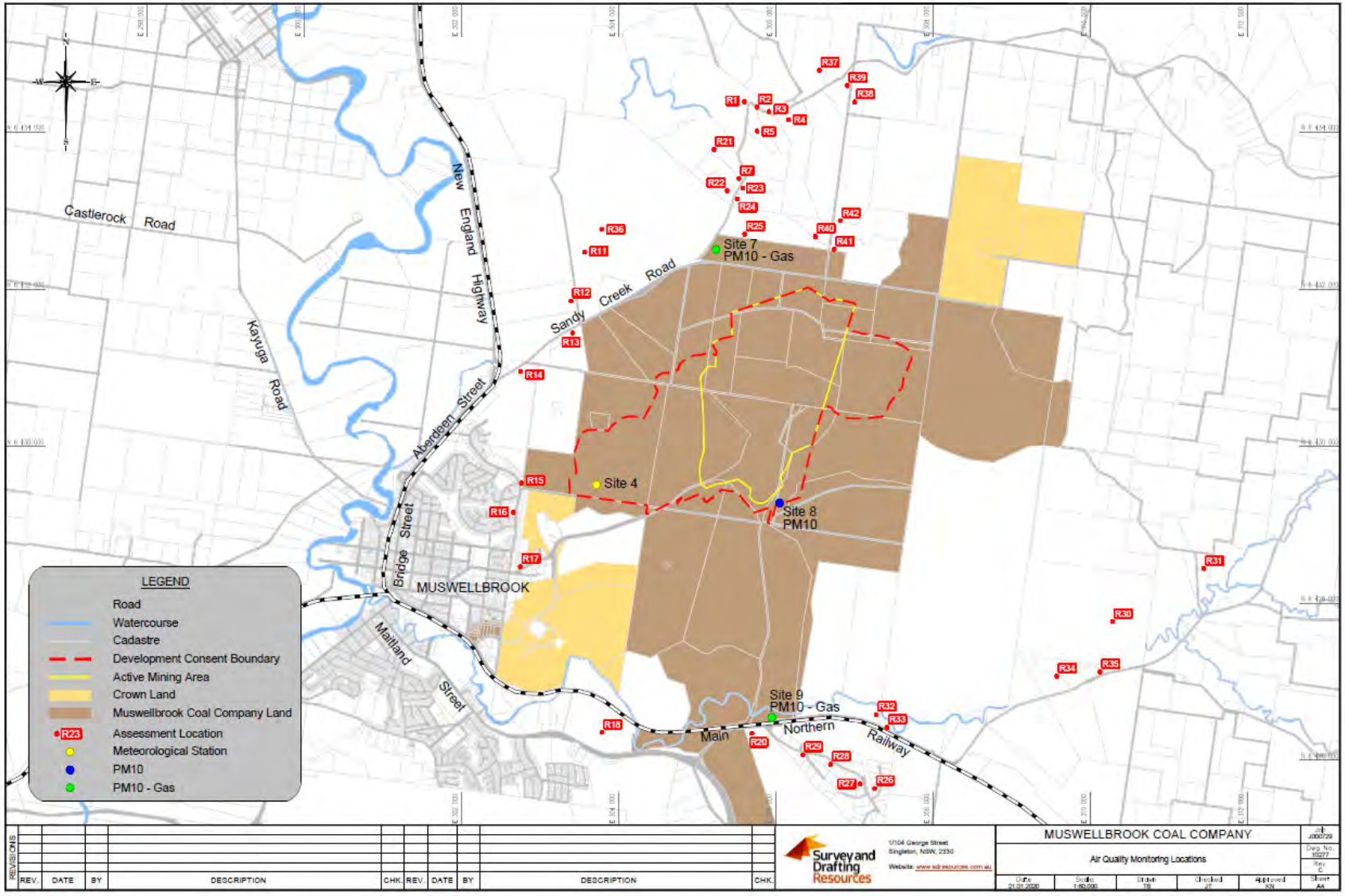


**Figure 7: Air Quality Monitoring Locations**

**Table 15** compares the results from Sites 7 and 9 for this reporting period, background results and predictions made in the 2016 Statement of Environmental Effects (SEE). The results this reporting period are lower than the background levels and the predicted results in the SEE.

**Table 15: Comparison of Real-Time $PM_{10}$ Results (Sites 7 and 9)**

| Year | Monitoring Results (µg/m³) | | Background Results (µg/m³) | | SEE Predicted Results (µg/m³) | |
|---|---|---|---|---|---|---|
| | Site 7 | Site 9 | Site 7 | Site 9 | Site 7 | Site 9 |
| 2022 | 13.1 | 13.1 | 16.9 | 16.9 | 23.0 | 17.0 |
| 2021 | 13.1 | 14.1 | 16.9 | 16.9 | 23.0 | 17.0 |
| 2020 | 17.1 | 18.1 | 16.9 | 16.9 | 23.0 | 17.0 |
| 2019 | 26.7 | 24.2 | 16.9 | 16.9 | 23.0 | 17.0 |
| 2018 | 20.2 | 17.8 | 16.9 | 16.9 | 23.0 | 17.0 |

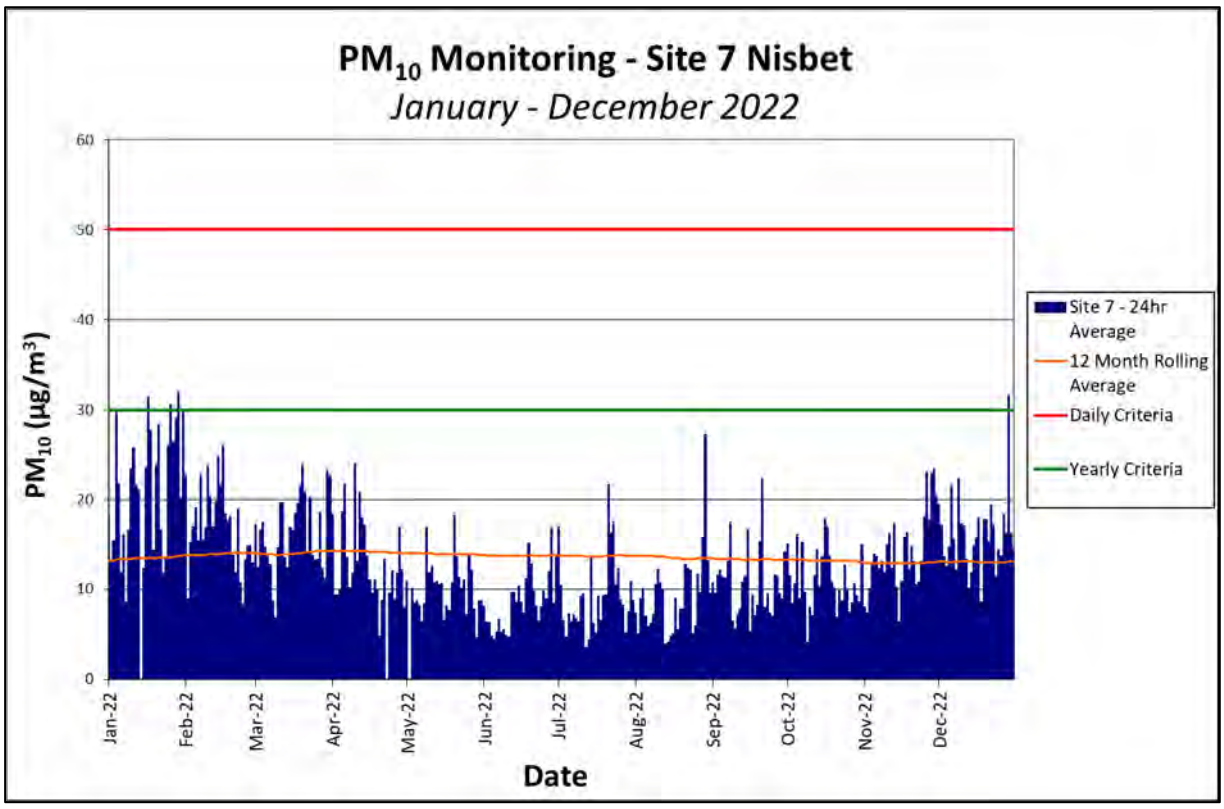


**Figure 8: Site 7 $PM_{10}$ Results**

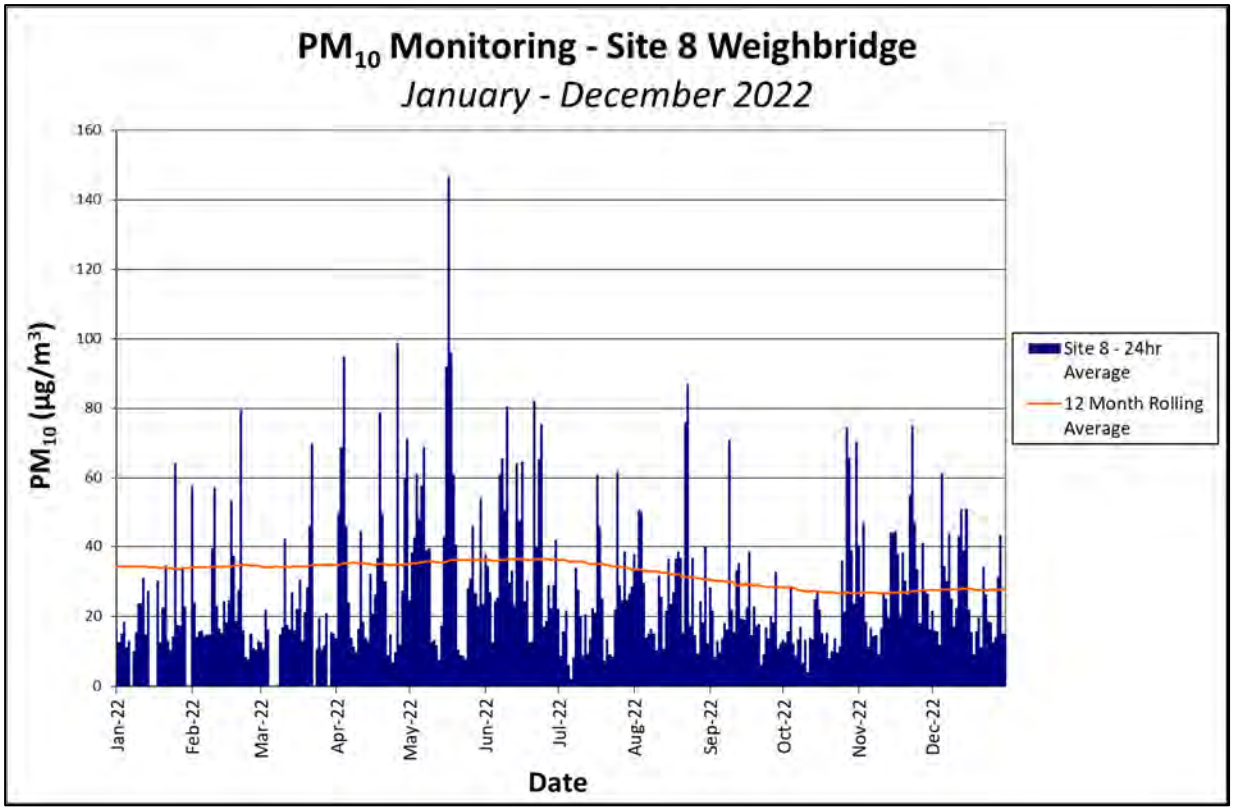


**Figure 9: Site 8 $PM_{10}$ Results**

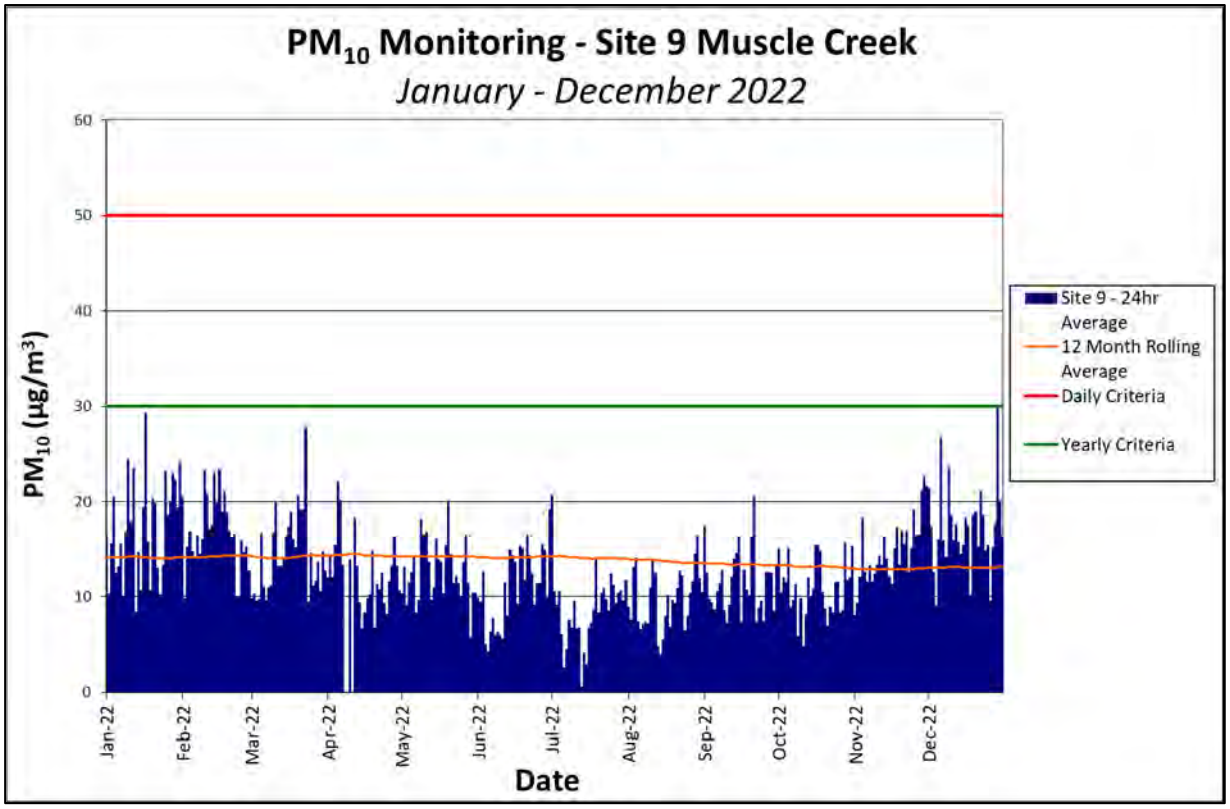


**Figure 10: Site 9 $PM_{10}$ Results**

***Gas Monitoring (Hydrogen Sulphide and Sulphur Dioxide)***

MCC operate two real-time gas monitors that measure Hydrogen Sulphide ($H_2S$) and Sulphur Dioxide ($SO_2$). The locations of these monitors are shown in **Figure 7**.

The criteria for $H_2S$ and $SO_2$ are shown in **Table 13**. A summary of the monitoring results is shown in **Table 16** and this shows that there were no results above these criteria during the reporting period.

**Table 16: Summary of Gas Data Results**

| Month | Highest $H_2S$ 1-hour result (ppb) | Highest $H_2S$ 24-hour result (ppb) | Highest $SO_2$ 1-hour result (ppb) | Highest $SO_2$ 24-hour result (ppb) |
|---|---|---|---|---|
| **Site 7 – Nisbet** | | | | |
| January | 5.8 | 2.8 | 58.3 | 12.2 |
| February | 8.7 | 3.7 | 30.4 | 8.1 |
| March | 12.3 | 4.2 | 59.0 | 11.8 |
| April | 9.8 | 3.3 | 56.3 | 13.7 |
| May | 9.1 | 3.4 | 109.9 | 9.9 |
| June | 5.5 | 2.7 | 33.1 | 3.8 |
| July | 7.9 | 3.9 | 8.6 | 3.6 |
| August | 11.7 | 3.7 | 18.1 | 4.3 |
| September | 15.1 | 4.1 | 32.5 | 7.8 |
| October | 12.5 | 5.4 | 47.9 | 4.9 |
| November | 8.2 | 2.9 | 30.2 | 3.9 |
| December | 12.9 | 4.0 | 28.0 | 6.3 |
| **Site 9 – Muscle Creek** | | | | |
| January | 5.4 | 3.0 | 105.8 | 20.9 |
| February | 4.4 | 2.0 | 94.6 | 9.8 |
| March | 20.2 | 5.1 | 88.7 | 15.0 |
| April | 40.1 | 3.7 | 84.3 | 19.6 |
| May | 96.3 | 10.3 | 89.3 | 7.1 |
| June | 40.0 | 4.6 | 41.0 | 4.1 |
| July | 36.5 | 4.0 | 10.5 | 2.1 |
| August | 56.2 | 5.8 | 59.6 | 6.2 |
| September | 32.8 | 5.5 | 31.1 | 5.5 |
| October | 80.9 | 9.7 | 33.7 | 5.2 |
| November | 34.0 | 5.7 | 32.0 | 5.2 |
| December | 19.1 | 5.4 | 16.2 | 4.8 |

### 3.3.3 ACTIVITIES NEXT REPORTING PERIOD

MCC will continue to manage and monitor air quality impacts in accordance with the AQMP. The AQMP will be updated during the next reporting period to confirm the management and monitoring requirements associated with the rehabilitation of the site.

## 3.4 GREENHOUSE GAS

No methane drainage or ventilation issues were associated with the Open Cut operations during this reporting period. Several boreholes intersect the underground workings that are used for gas and water monitoring. These boreholes are capped and opened only for monitoring purposes.

MCC supply data to Idemitsu for their corporate reporting requirements for the National Greenhouse and Energy Reporting (NGER's) process.

## 3.5 EROSION AND SEDIMENT CONTROL

### 3.5.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage erosion and sediment in accordance with the approved Water Management Plan (WMP) prepared in accordance with condition 25 of the DA.

The key considerations for erosion and sediment control at MCC include:

- restricting the extent of disturbance to the minimum that is practical and in accordance with the Rehabilitation Management Plan,
- progressive rehabilitation of disturbed land, where possible, and the construction of drainage controls to improve the stability of rehabilitated land,
- protection of natural drainage lines and watercourses by the construction of erosion control devices such as diversion banks and channels and sediment retention dams as necessary,
- restriction of access to rehabilitated areas,
- management of erosion and sediment control of affected surface watercourses/water bodies, including creek lines within or adjacent to the development consent boundary,
- regular inspection of dams to monitor their efficiency and any required maintenance, and
- inspection and maintenance, if required, of sediment and erosion controls including dams and drainage lines following storm events.

Two main natural catchments exist around the mining area, associated with Muscle and Sandy Creeks. The area contains undisturbed land surfaces that drain towards Sandy Creek. However, some of the runoff is captured by dams. Water from undisturbed catchments is diverted around mining operations by diversion banks and channelled into adjacent watercourses.

Drainage from the coal crushing plant and stockpile area is collected in a dam and re-used for dust suppression. All disturbed or newly rehabilitated areas contain diversion banks (major and minor graded banks) to control the flow of water from catchment areas and to contain dirty runoff on the mine site.

During the reporting period MCC maintained water management structures to contain any potentially contaminated water on site. This work included desilting of dams to maintain capacity and drain cleanout to remove blockages.

An assessment of surface water obligations relating to mine closure was undertaken during the reporting period. This assessment included consideration of erosion and sediment control and made recommendations to be implemented as part of mine closure activities. These recommendations included review of erosional stability of the rehabilitation areas.

### 3.5.2 EROSION AND SEDIMENT CONTROL MONITORING

Erosion and sediment control monitoring is conducted as part of the surface water monitoring program. Surface water monitoring is discussed in **Section 3.6**.

### 3.5.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, MCC will continue to manage and monitor erosion and sediment impacts in accordance with the WMP. Recommendations from the mine closure study will start to be implemented during the next reporting period.

The WMP will be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

## 3.6 SURFACE WATER MANAGEMENT

### 3.6.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage surface water impacts in accordance with the approved Water Management Plan (WMP) prepared in accordance with condition 25 of the DA.

An assessment of surface water obligations relating to mine closure was undertaken during the reporting period. This assessment included consideration of surface water quality and management and made recommendations to be implemented as part of mine closure activities. These recommendations included changes to the surface water monitoring program.

The trigger values for water quality in Muscle Creek are presented in **Table 17**. If monitored conditions are outside the upper or lower trigger levels for 3 continuous monthly results, MCC will investigate the results. There are no surface water quality limits defined in the EPL.

**Table 17: Trigger Values for Muscle Creek Water Quality**

| Site | pH 20th/80th Percentile Trigger Values | EC (µS/cm) 80th Percentile Trigger Values | TSS (mg/L) 80th Percentile Trigger Values |
|---|---|---|---|
| SW07 – Muscle Creek – Upstream | 7.7–8.0 | 4,048 | 13 |
| SW08 – Muscle Creek – Downstream | 7.8–8.0 | 5,136 | 10 |

### 3.6.2 SURFACE WATER MONITORING

MCC undertake a surface water monitoring program that consists of monthly, quarterly and annual monitoring. The locations of the surface water monitoring sites are shown in **Figure 11**. The data and the annual comprehensive surface water monitoring results are provided in **Appendix 2**.

***pH***

The pH levels at surface water monitoring sites were within the recommended ecosystem pH levels of 6.5–9.5 throughout the reporting period (**Figure 12** and **Figure 13**). As shown in **Figure 14,** the results from this reporting period are consistent with the results from previous reporting periods. There are no predictions to compare these results to.

***Electrical Conductivity (EC)***

Typically, EC levels for mine water are greater than 4,000µS/cm (**Figure 15** and **Figure 16**). EC levels in water courses surrounding the mining operation are influenced by rainfall and runoff. They are lower during periods of high rainfall and higher during periods of low rainfall.

A comparison of EC results from the reporting period to previous reporting periods is shown in **Figure 17**. There are no predictions to compare these results to.

***Total Suspended Solids (TSS)***

The results from this reporting period are shown in **Figure 18** and **Figure 19.** A comparison of TSS results from the reporting period to previous reporting periods is shown in **Figure 20**. TSS results can be highly variable with disturbance from desilting works and runoff from heavy rainfall causing short-term increases before conditions return to normal. There are no predictions to compare these results to.

### 3.6.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, MCC will continue to manage and monitor surface water quality impacts in accordance with the WMP. The surface water monitoring program will be updated during the next reporting period to incorporate recommendations made in the mine closure study.

The WMP will also be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

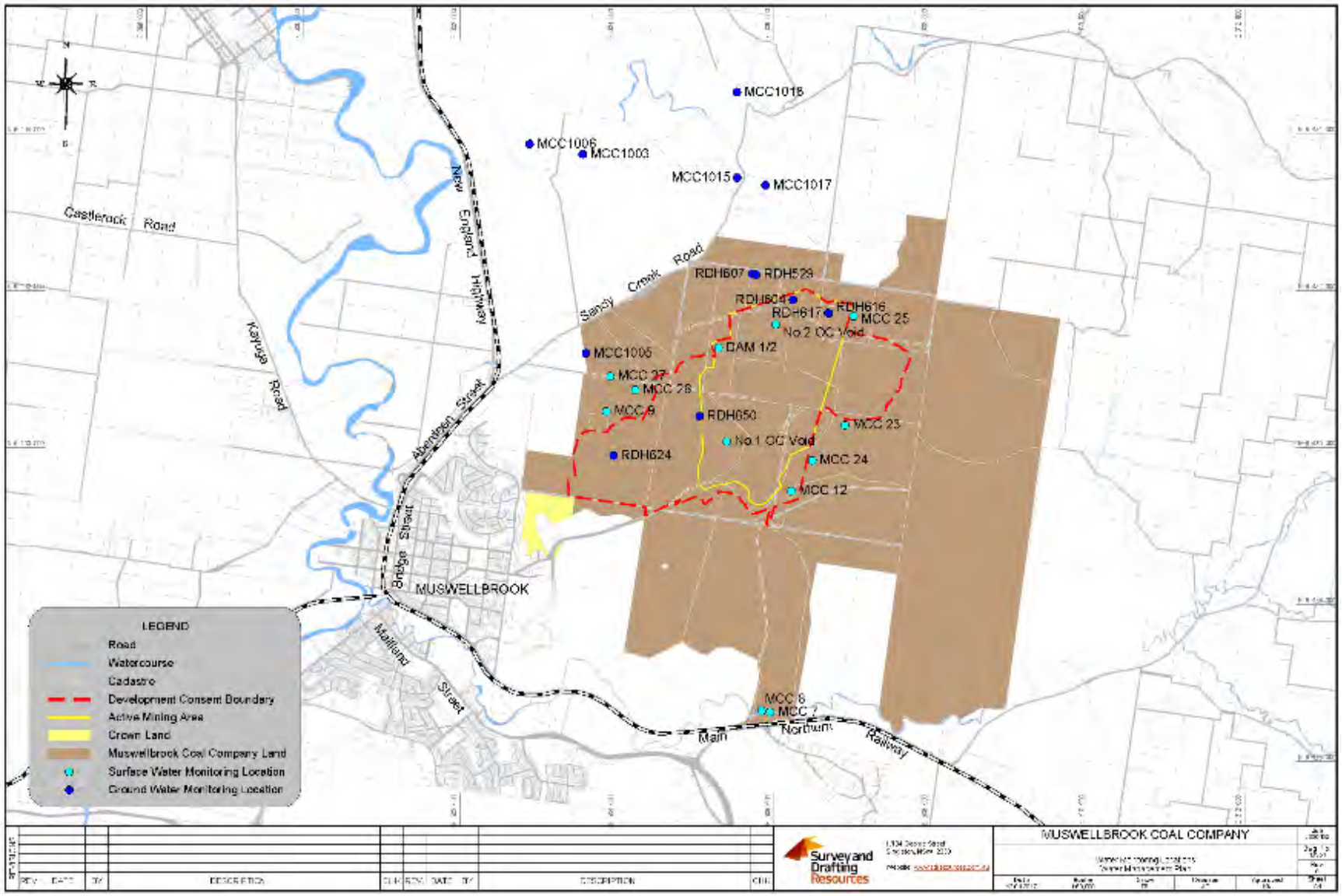


**Figure 11: Water Monitoring Locations**

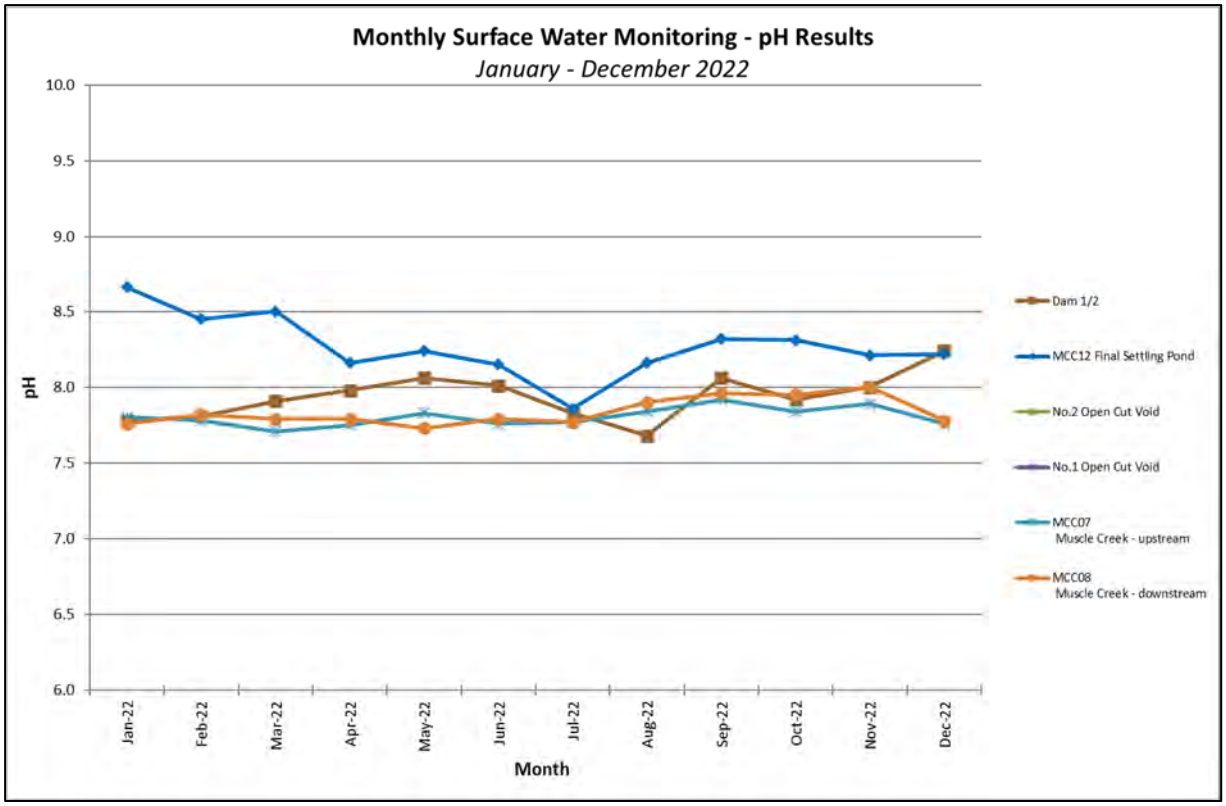


**Figure 12: Monthly Surface Water Monitoring Results – pH**

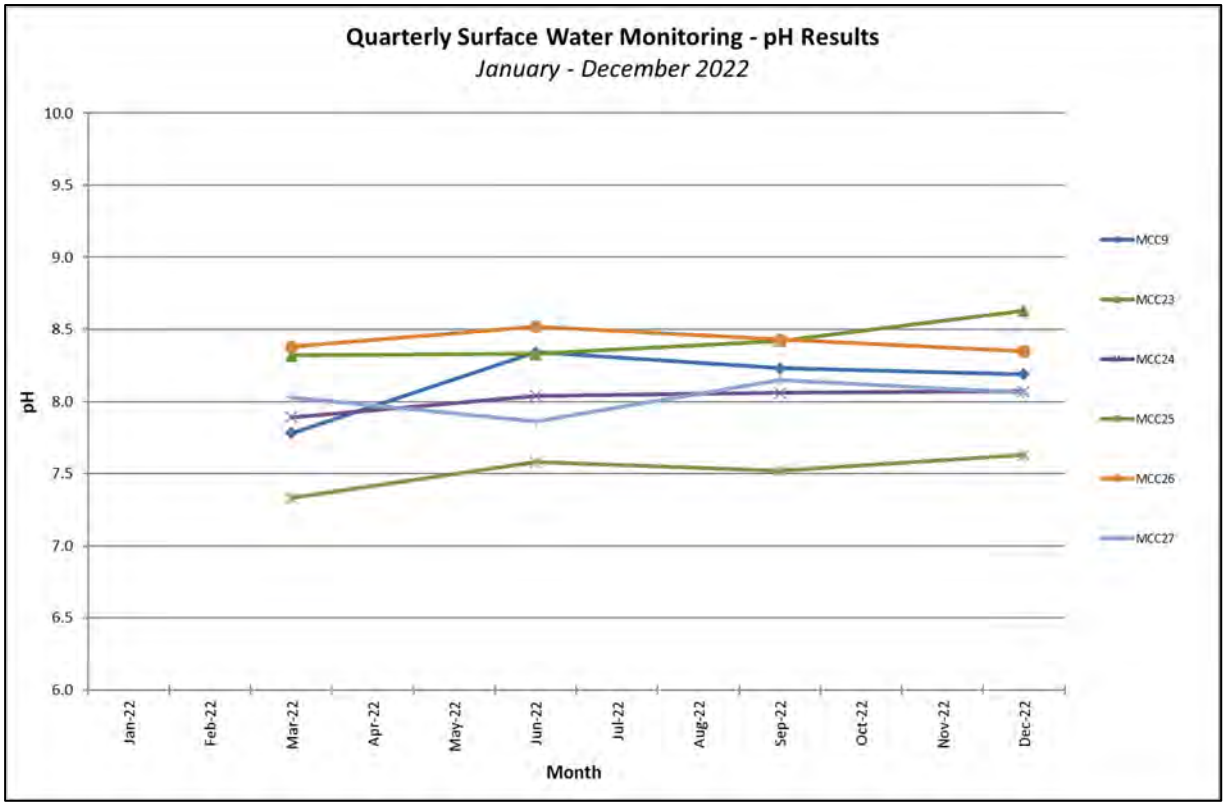


**Figure 13: Quarterly Surface Water Results – pH**

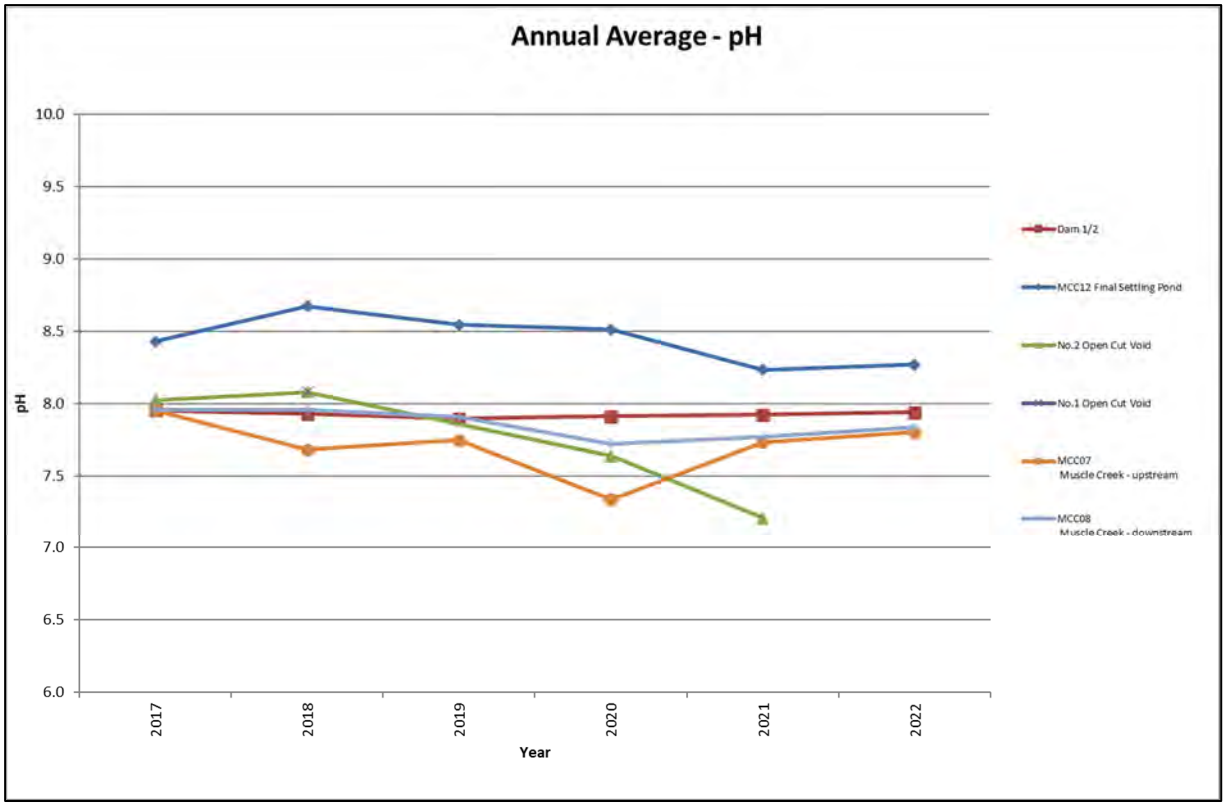


**Figure 14: Comparison of pH results to Historical Results**

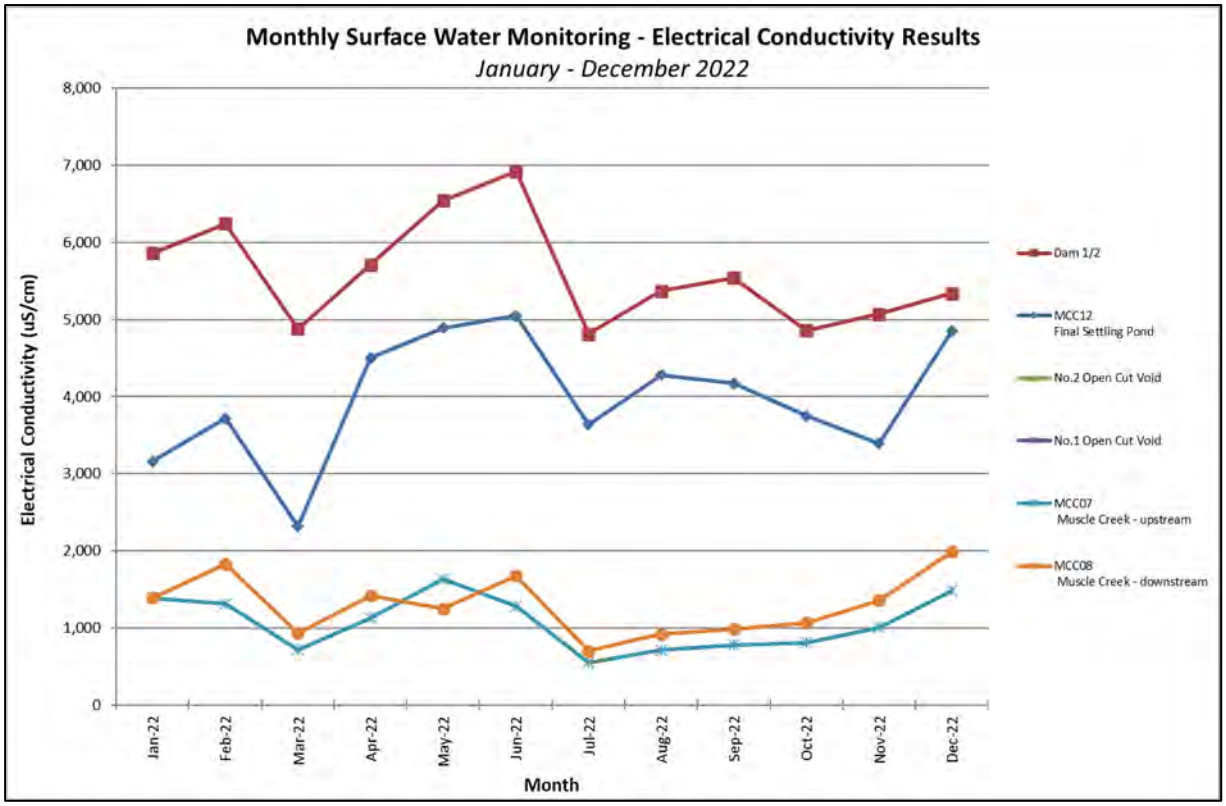


**Figure 15: Monthly Surface Water Results – Electrical Conductivity**

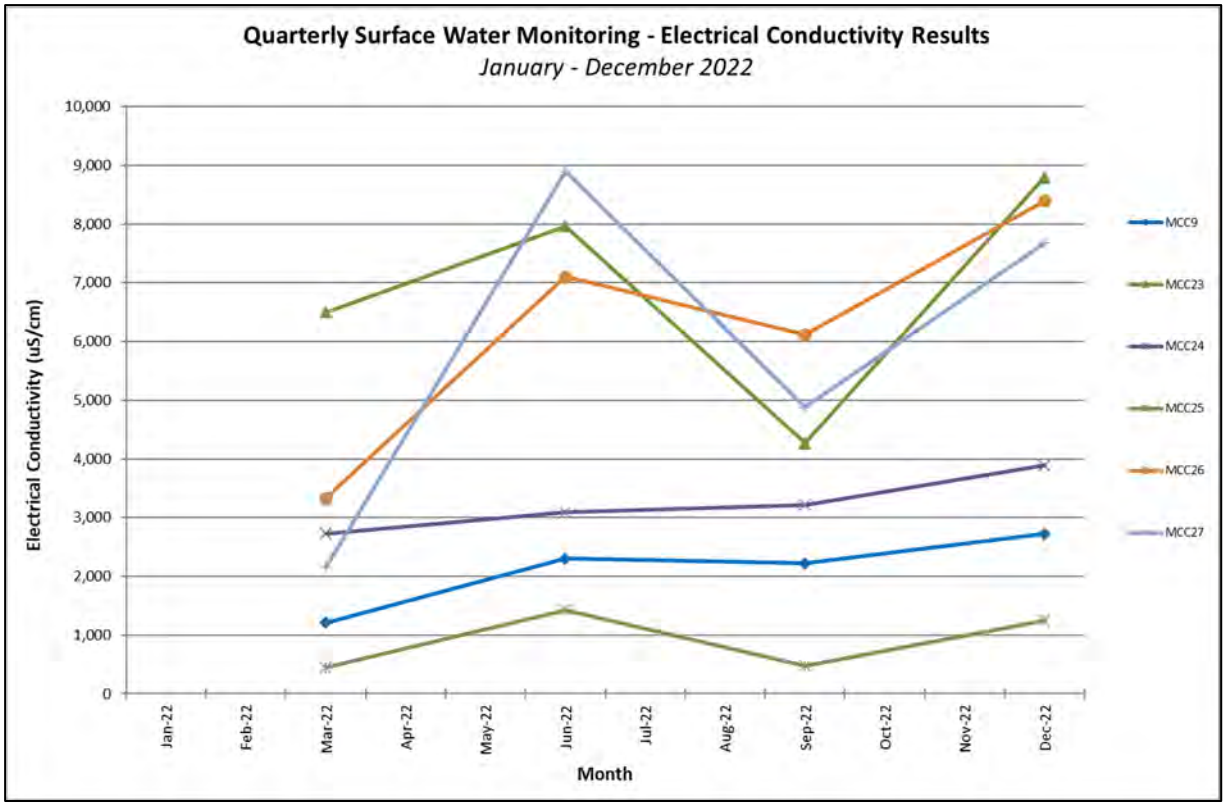


**Figure 16: Quarterly Surface Water Monitoring Results – Electrical Conductivity**

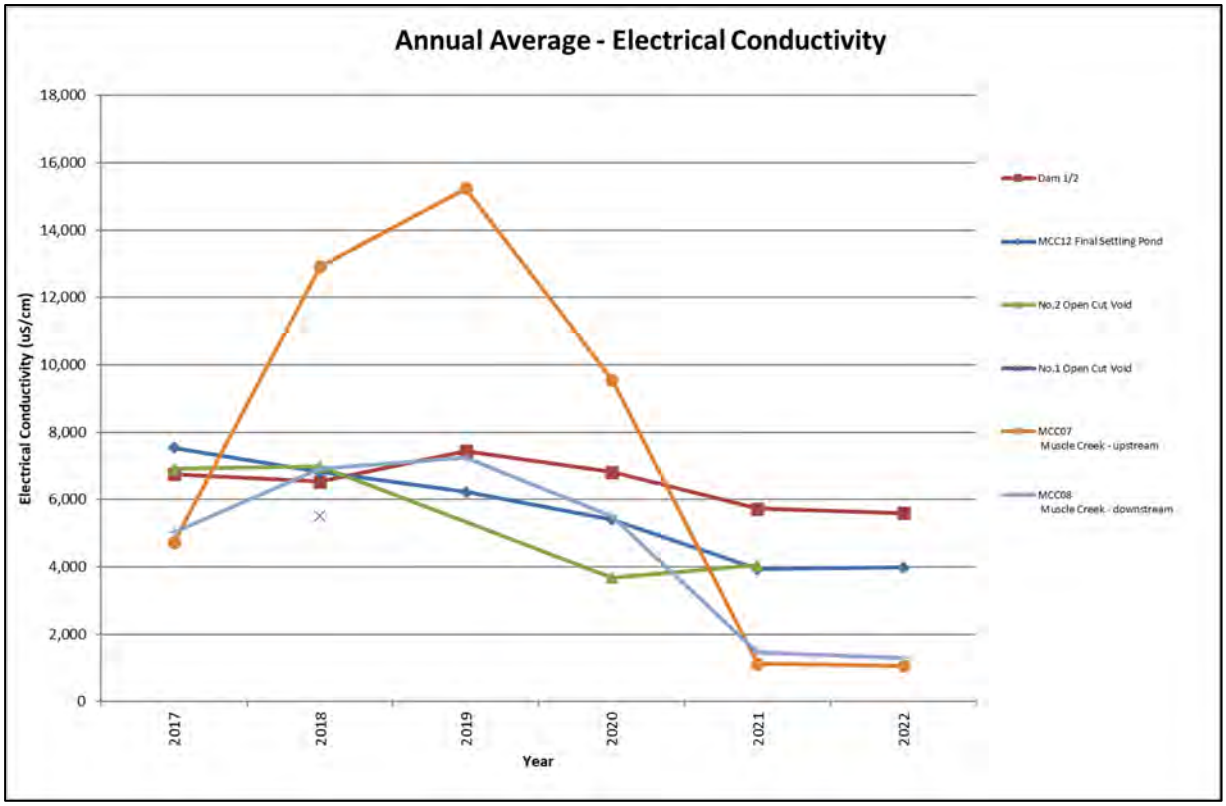


**Figure 17: Comparison of EC results to Historical Results**

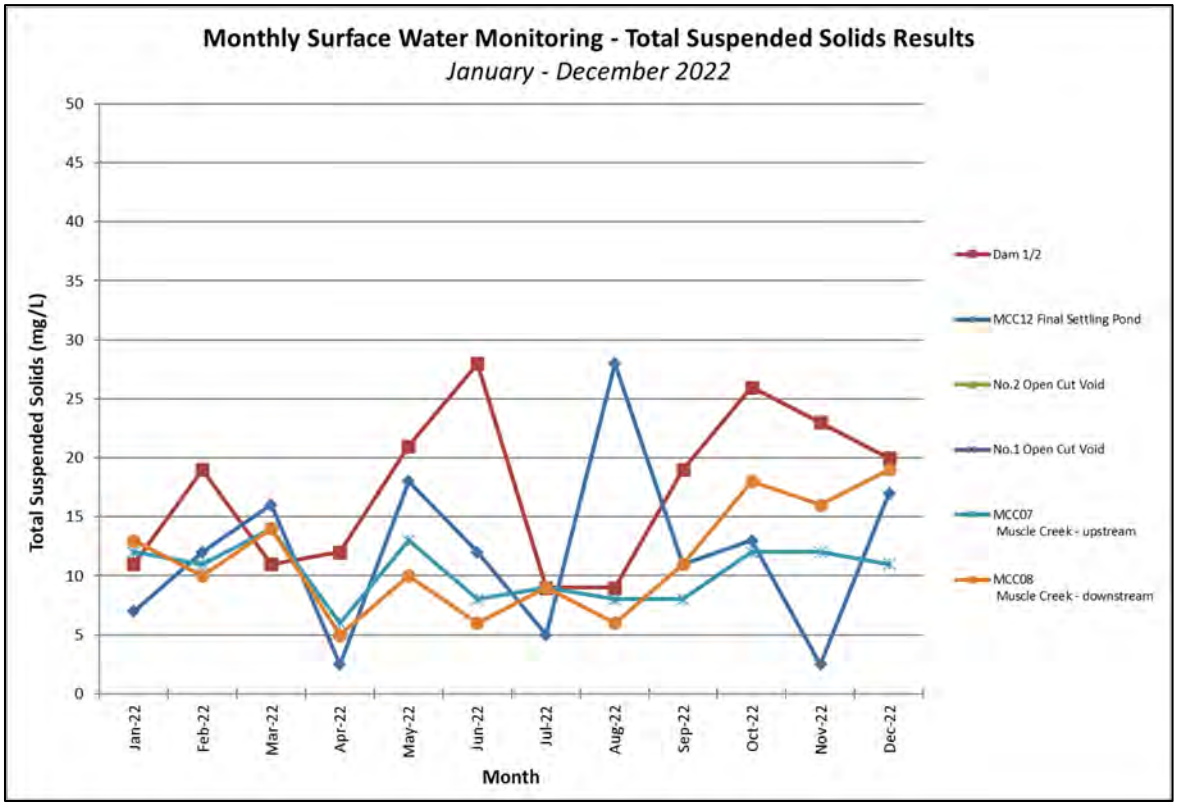


**Figure 18: Monthly Surface Water Results – Total Suspended Solids**

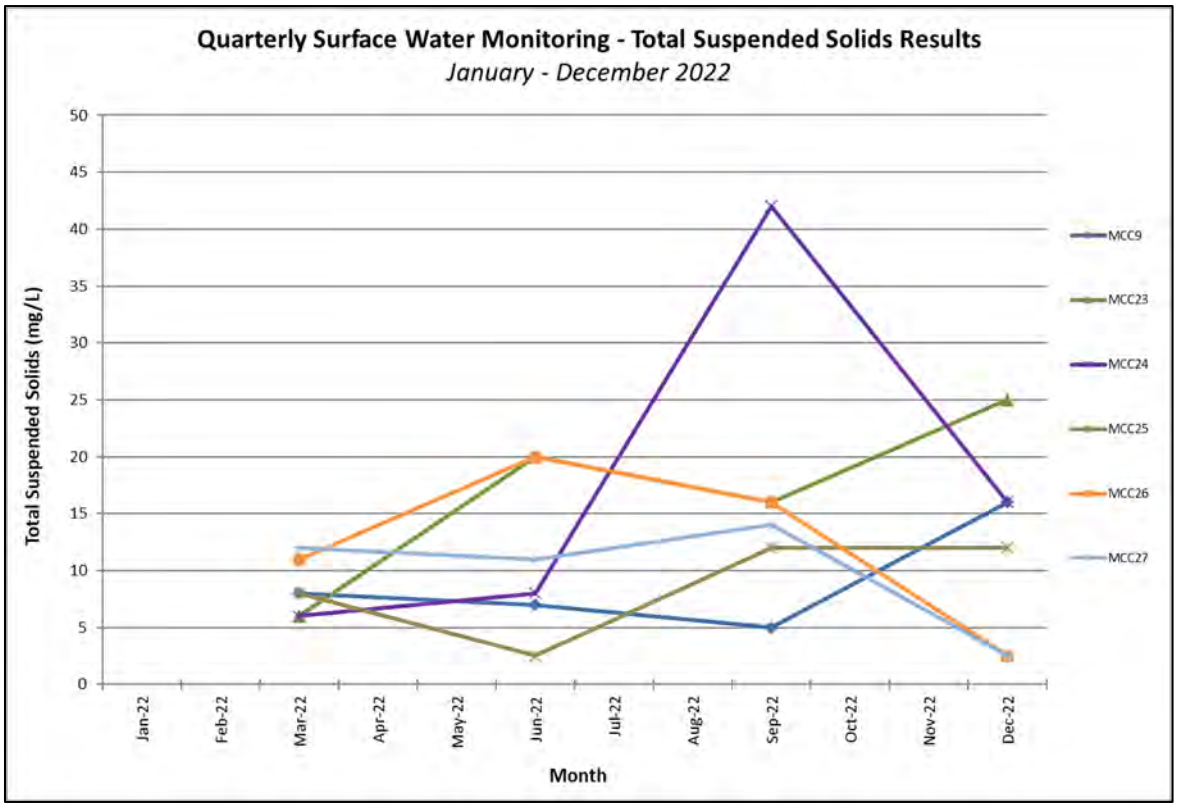


**Figure 19: Quarterly Surface Water Monitoring Results – Total Suspended Solids**

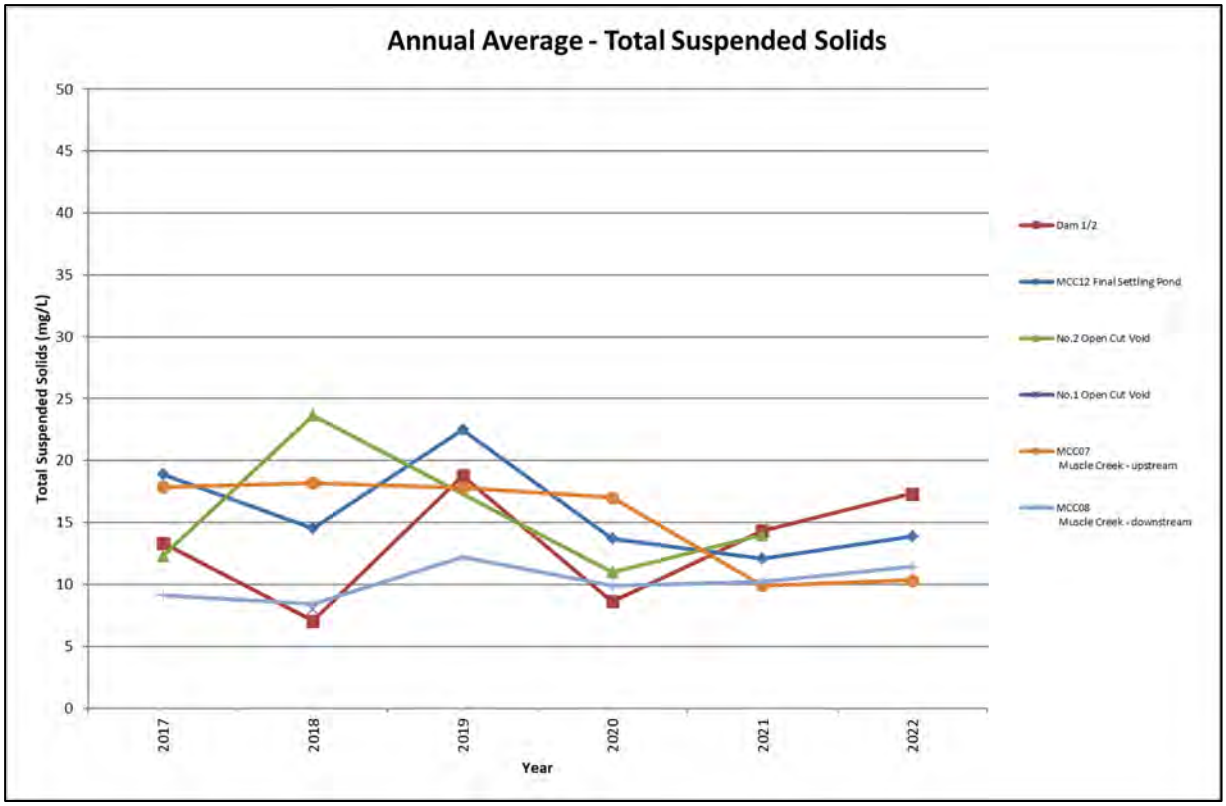


**Figure 20: Comparison of TSS results to Historical Results**

## 3.7 GROUNDWATER MANAGEMENT

### 3.7.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage groundwater impacts in accordance with the approved Water Management Plan (WMP) prepared in accordance with condition 25 of the DA.

An assessment of groundwater obligations relating to mine closure was undertaken during the reporting period. This assessment included consideration of groundwater quality and management and made recommendations to be implemented as part of mine closure activities. These recommendations included changes to the groundwater monitoring program.

Groundwater trigger levels have been established for selected sites with the trigger levels shown in **Table 18**. If monitored conditions are outside the upper or lower trigger levels for 3 continuous monthly results, MCC will investigate the results.

**Table 18: Groundwater Monitoring Trigger Levels**

| WATER LEVELS | | | |
|---|---|---|---|
| **Bore/Well** | **Aquifer** | **Lower Trigger Level (m) BTOC** | **Lower Trigger Level (m) AHD** |
| MCC1003 | Alluvial | 8.6 | 146.5 |
| MCC1005 | Alluvial | 11.3 | 138.9 |
| MCC1006 | Alluvial | 10.3 | 144.6 |
| MCC1017 | Hardrock | 18.1 | 180.7 |
| MCC1018 | Hardrock | 19.0 | 181.9 |
| **pH** | | | |
| **Bore/Well** | **Aquifer** | **Lower Trigger pH** | **Upper Trigger pH** |
| MCC1003 | Alluvial | 7.1 | 7.3 |
| MCC1005 | Alluvial | 6.9 | 7.2 |
| MCC1006 | Alluvial | 7.1 | 7.4 |
| **ELECTRICAL CONDUCTIVITY** | | | |
| **Bore/Well** | **Aquifer** | **Upper Trigger EC** | |
| MCC1003 | Alluvial | 1,666 | |
| MCC1005 | Alluvial | 5,584 | |
| MCC1006 | Alluvial | 1,152 | |

### 3.7.2 GROUNDWATER MONITORING

MCC undertake a groundwater monitoring program that consists of monthly and annual monitoring. The locations of the groundwater monitoring sites are shown in **Figure 11**.

***Ground Water Monitoring Results – Mining Operations***

The water level, pH and Electrical Conductivity of the underground working for this reporting period are shown in **Figure 21** and **Figure 22**. The water levels in groundwater monitoring wells located on site are shown in **Figure 23**. These results show that water levels in the underground workings have stayed relatively consistent during the reporting period. The regional monitoring has shown that there is no impact on alluvial water sources from the water level in the underground workings. The data and the annual comprehensive groundwater monitoring results are provided in **Appendix 2**.

As shown in **Table 19** the pH and Electrical Conductivity results from this reporting period are consistent with previous years. There are no predictions to compare these results to.

**Table 19: Comparison of Underground Working Results (Bore RDH650)**

| Year | Average pH | Average EC *(µS/cm)* | Relative Level (RL) *(AHD metres)* |
|---|---|---|---|
| 2022 | 7.0 | 6,338 | 107 |
| 2021 | 7.0 | 6,306 | 106 |
| 2020 | 7.1 | 6,098 | 106 |
| 2019 | 7.3 | 6,265 | 104 |
| 2018 | 7.0 | 5,965 | 107 |
| 2017 | 7.5 | 6,455 | 114 |

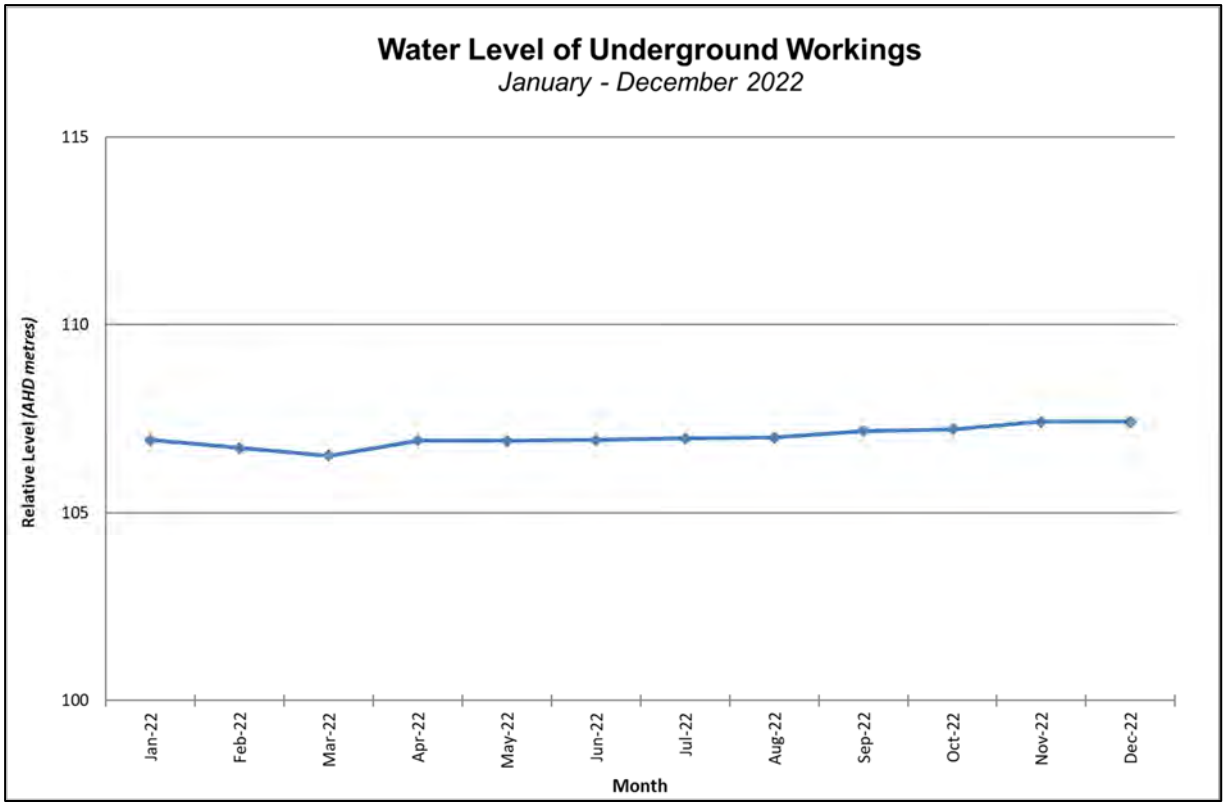


**Figure 21: Water Level for Underground Workings**

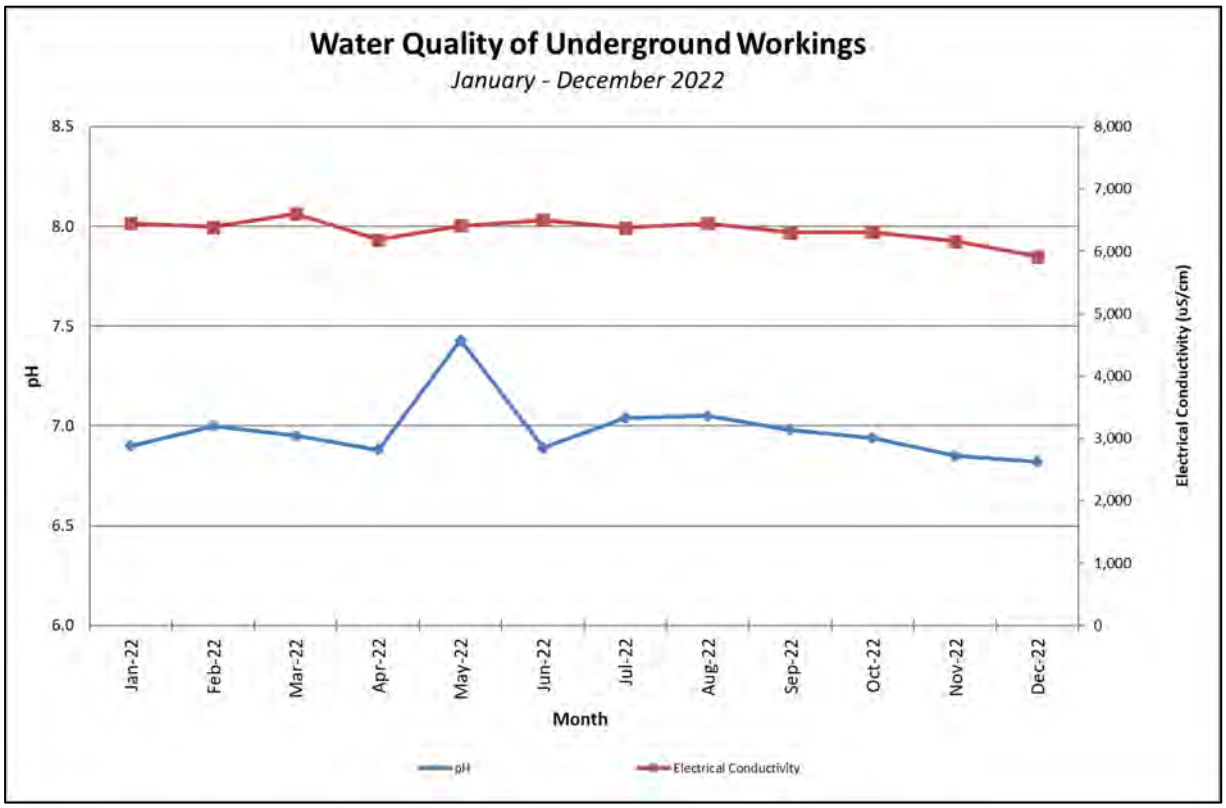


**Figure 22: Water Quality Data in Underground Workings**

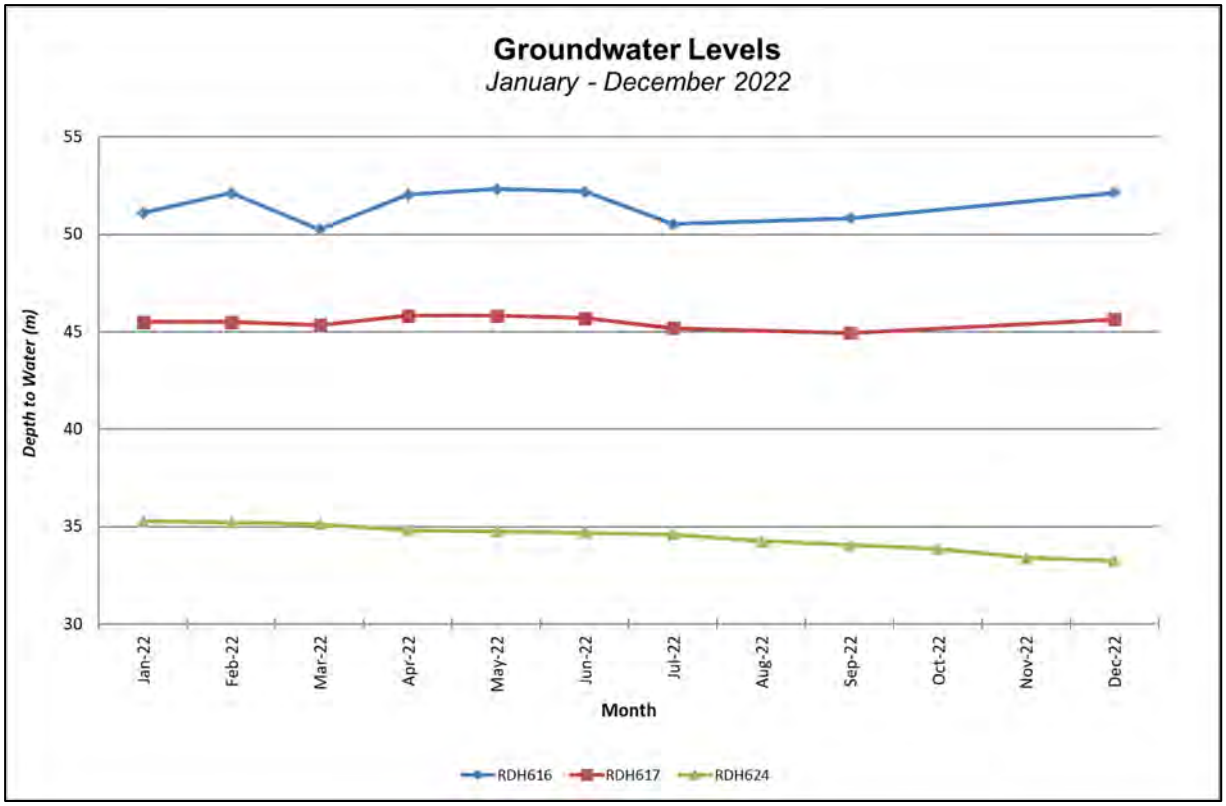


**Figure 23: Water Level for Onsite Groundwater Monitoring**

***Ground Water Monitoring Results – Sandy Creek Area***

The alluvial and hard rock aquifers in the Sandy Creek area are a significant lateral distance from the open cut footprint and no impacts have been determined. Ground water depths and quality results for the reporting period are presented in **Figure 24** to **Figure 26**. The data and the annual comprehensive groundwater monitoring results are provided in **Appendix 2**.

As shown in **Figure 27** to **Figure 29**, the results from this reporting period are generally consistent with the results from previous reporting periods. There are no predictions to compare these results to.

### 3.7.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, MCC will continue to manage and monitor groundwater quality impacts in accordance with the WMP. The groundwater monitoring program will be updated during the next reporting period to incorporate recommendations made in the mine closure study.

The WMP will also be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

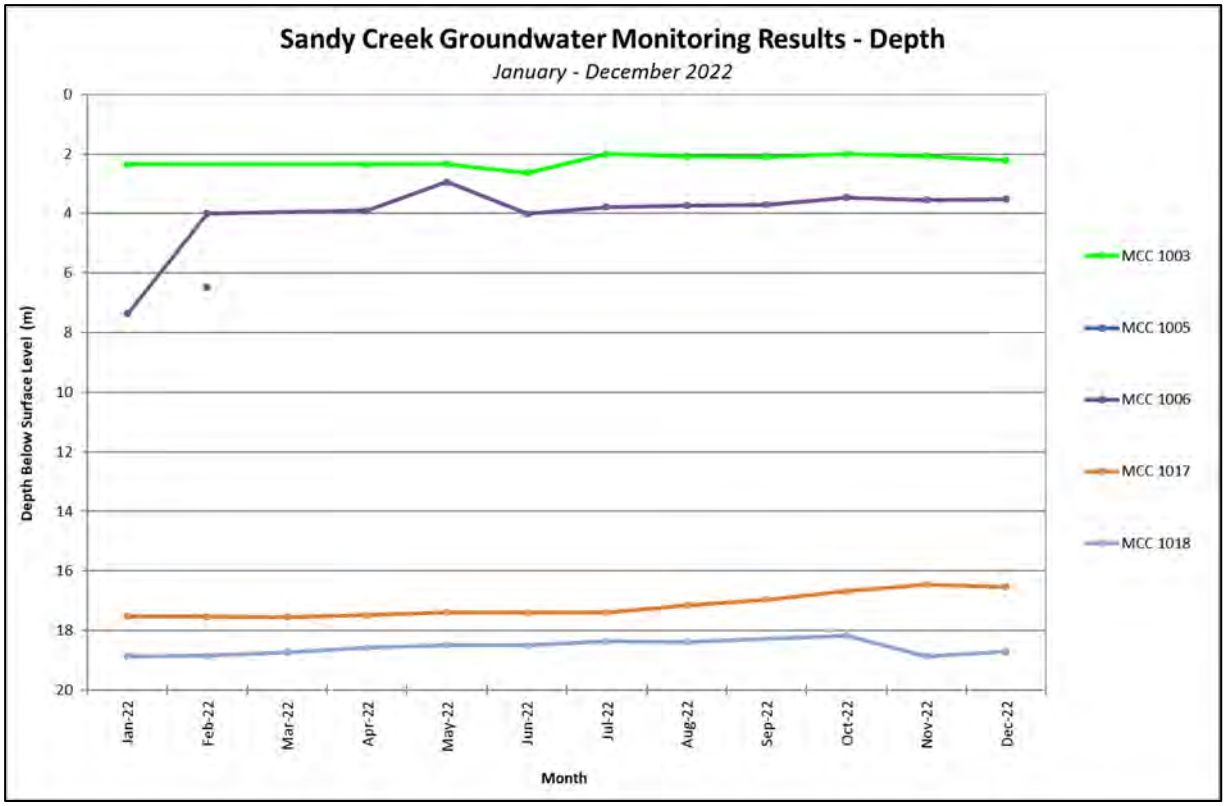


**Figure 24: Sandy Creek Groundwater Depth**

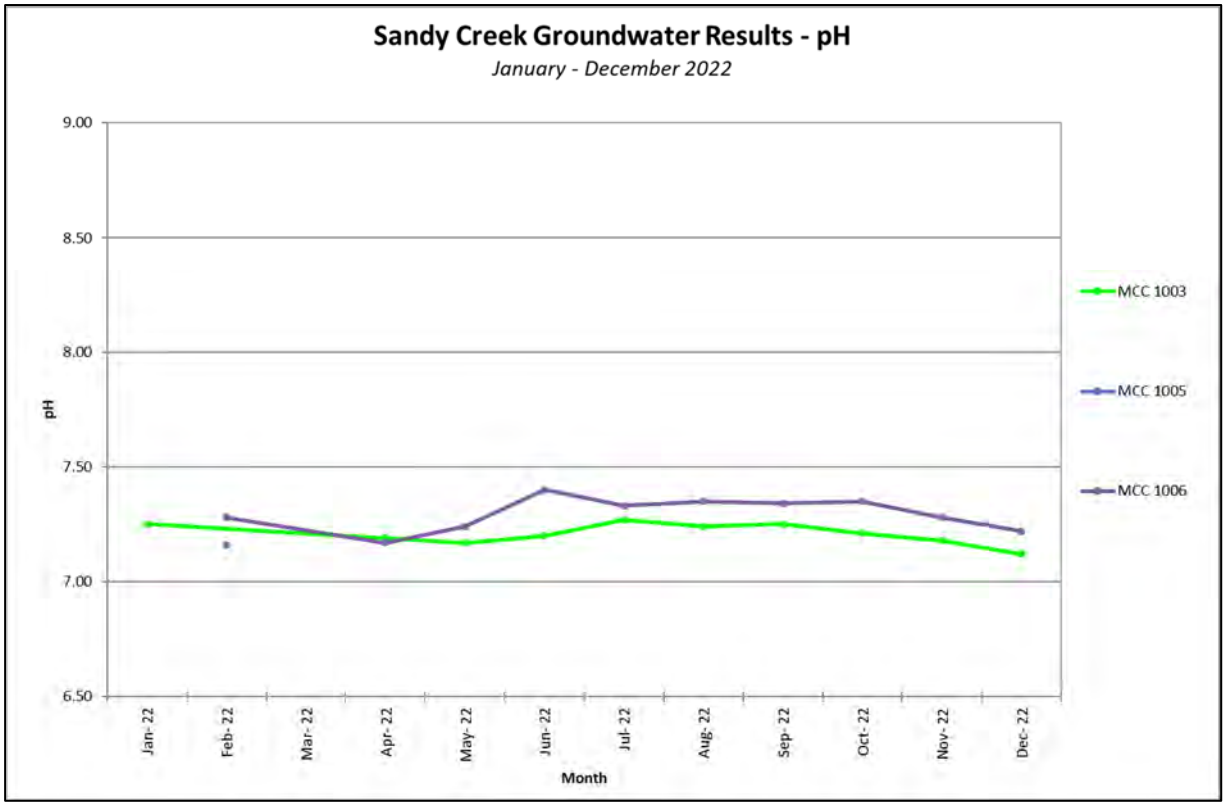


**Figure 25: Sandy Creek Water Quality – pH**

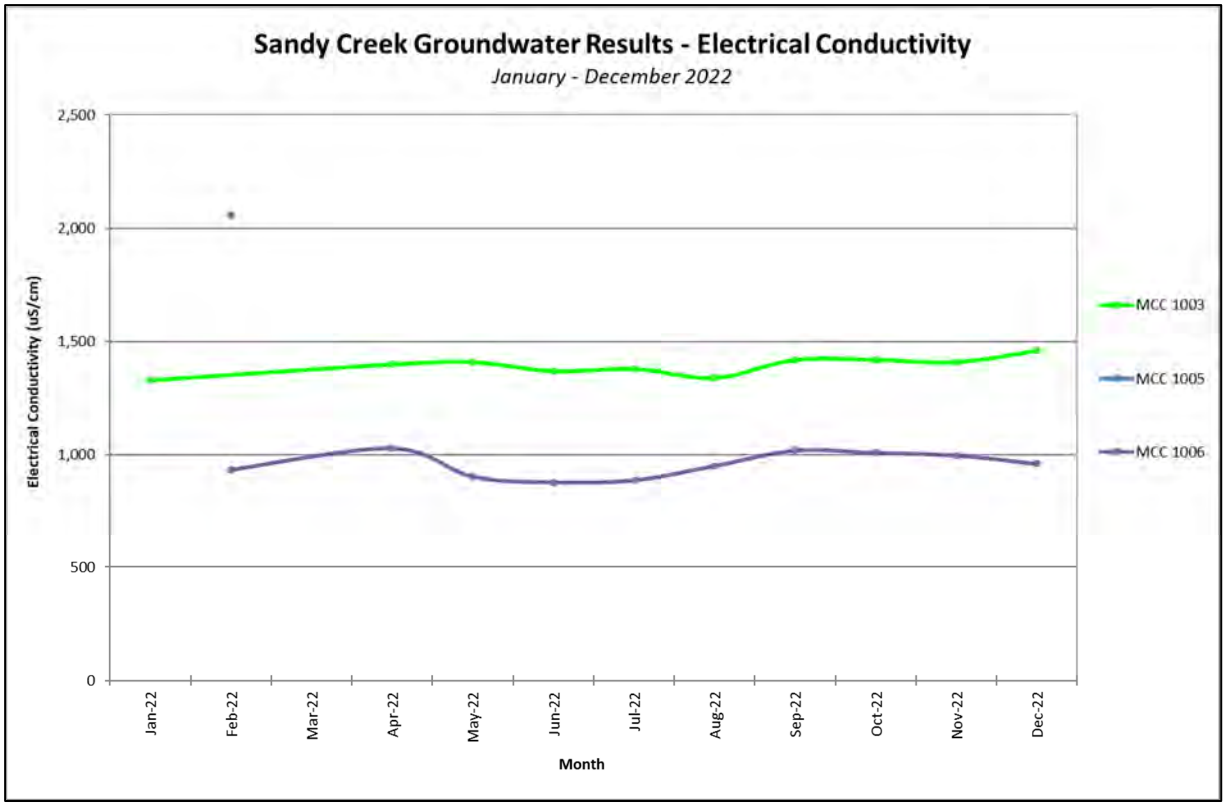


**Figure 26: Sandy Creek Water Quality – Electrical Conductivity**

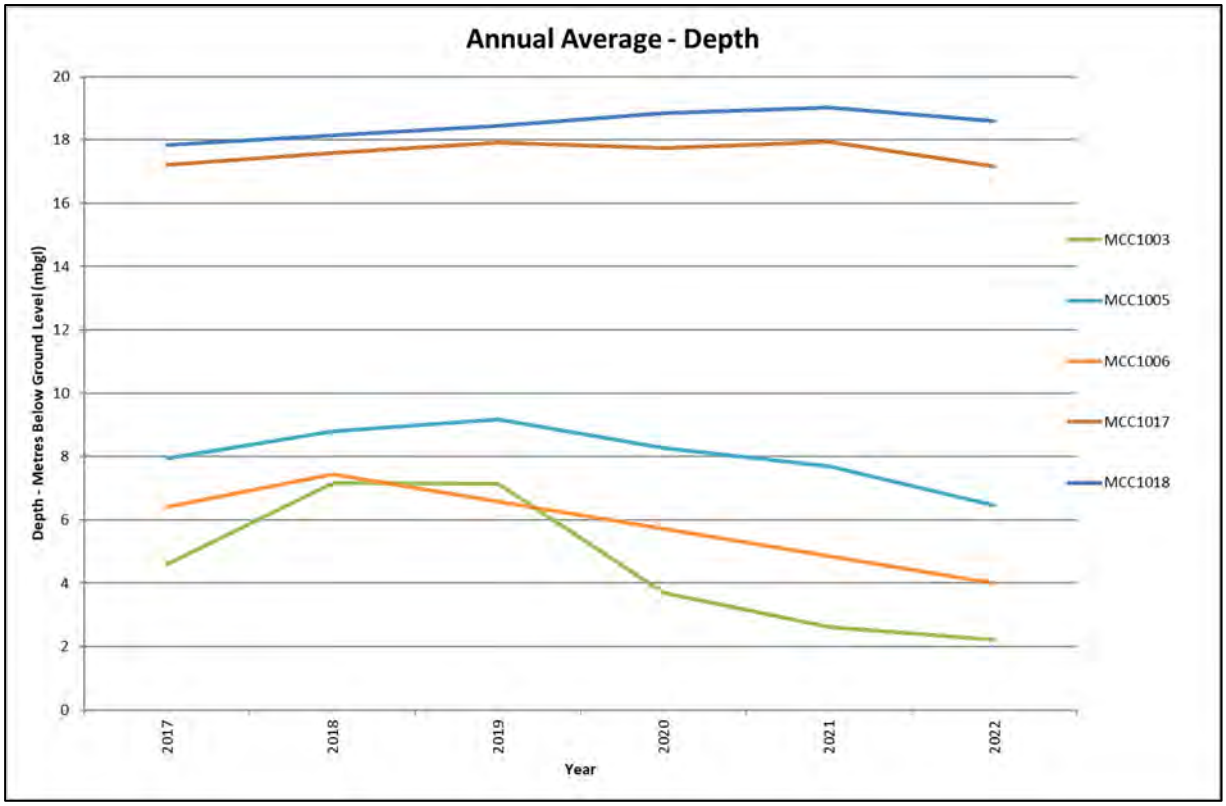


**Figure 27: Comparison of Depth to Historical Results – Sandy Creek**

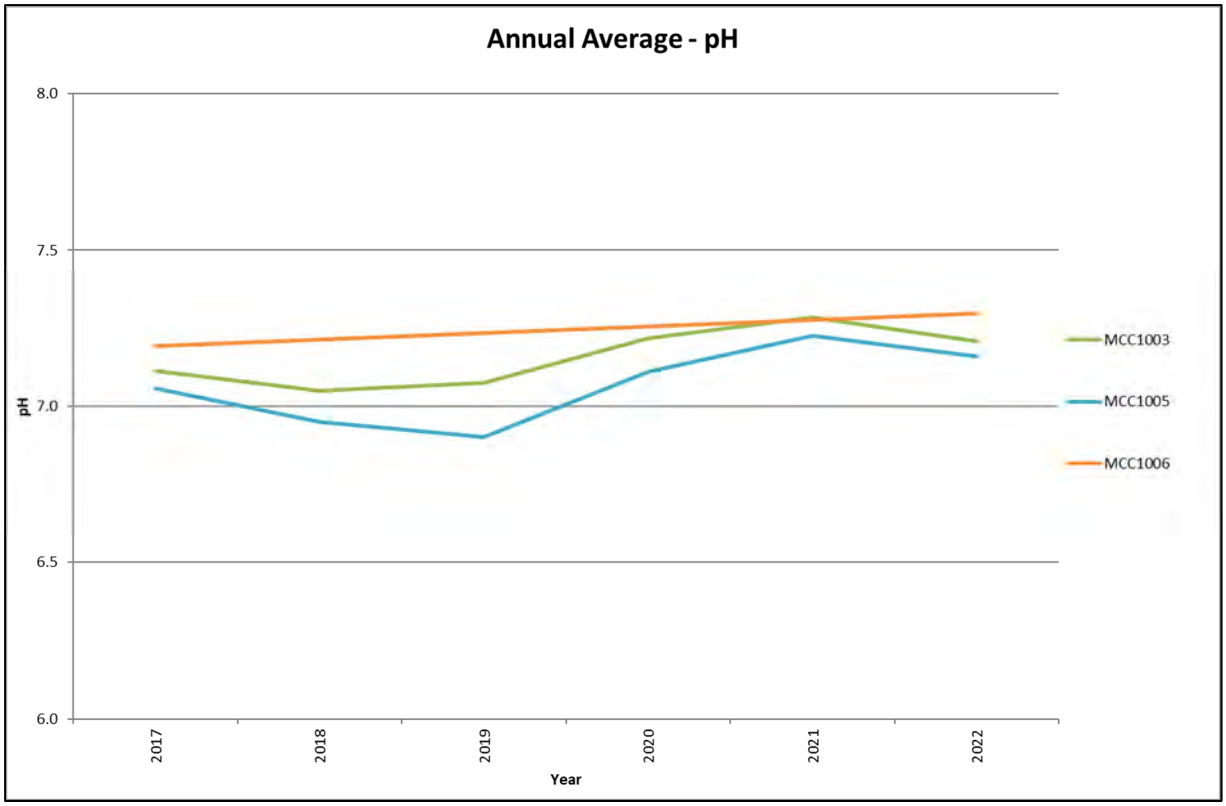


**Figure 28: Comparison of pH Results to Historical Results – Sandy Creek**

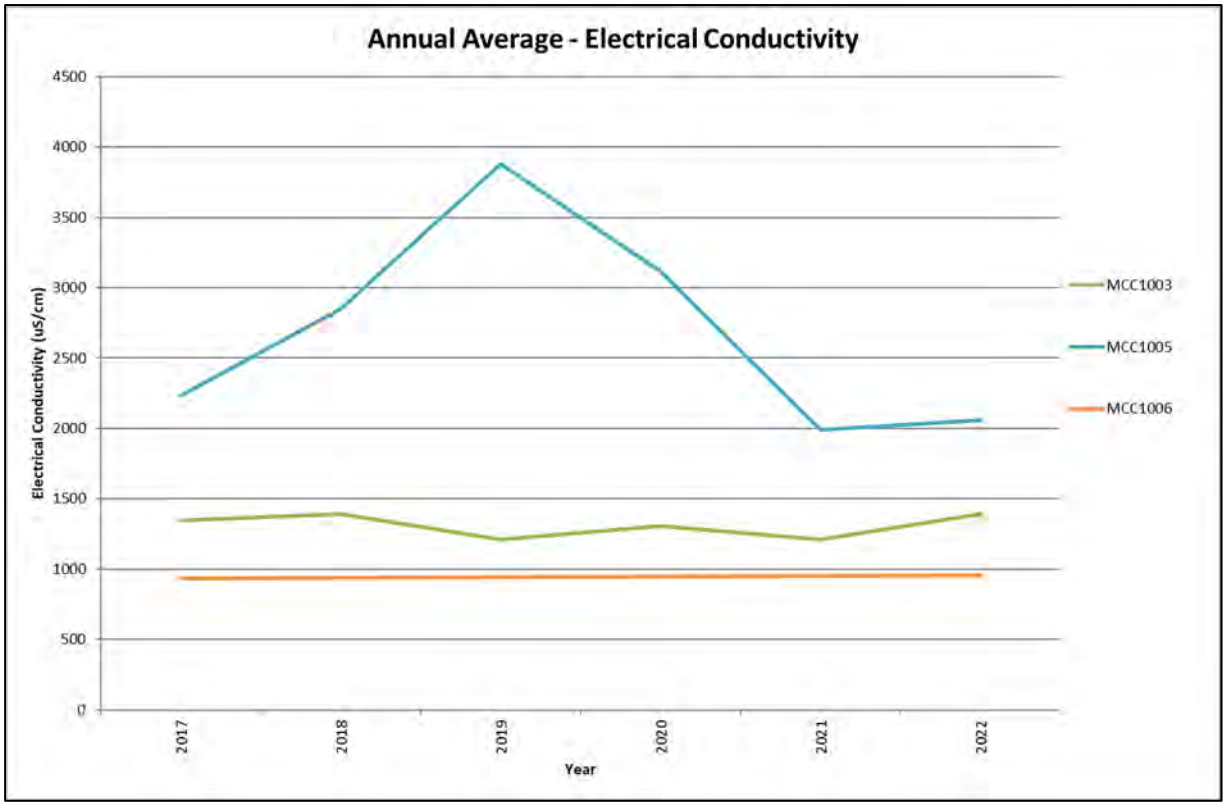


**Figure 29: Comparison of EC Results to Historical Results – Sandy Creek**

## 3.8 CONTAMINATED LAND

MCC has a Bioremediation Area where material contaminated with hydrocarbons is managed and tested. When the test results indicate that the material is no longer contaminated it is removed and disposed of in the carbonaceous dump in the mining area.

During the reporting period, preliminary contamination assessments were undertaken across the site as part of the mine closure studies. These reports found areas of concern that require more detailed contamination assessment. These detailed assessments commenced during the reporting period with results pending at the end of the reporting period. These assessments will continue during the next reporting period.

## 3.9 FLORA AND FAUNA MANAGEMENT

MCC continues to manage impacts on flora and fauna in accordance with the Rehabilitation Management Plan (MCC).

MCC is set amongst an area of existing disturbed and mined land. The mining area is extensively altered from its natural state through current and past mining operations.

Five vegetation communities have been identified within the DA boundary at MCC. These are:

- Hunter Floodplain Red Gum Woodland,
- Central Hunter Grey Box-Ironbark Woodland,
- Regenerating Central Hunter Grey Box-Ironbark Woodland,
- Aquatic Forbland, and
- Mine Rehabilitation.

No threatened flora species have been identified at MCC. The area to be disturbed is not considered important habitat for threatened fauna. The area is also not considered critical habitat.

No tree clearing was undertaken during the reporting period.

During the reporting period, a biodiversity assessment was undertaken across the site as part of the mine closure studies. This assessment did not identify any changes required to the management of flora and fauna across the site.

## 3.10 WEEDS, PEST AND FERAL ANIMALS

MCC continues to manage weeds, pest and feral animals on site.

***Weed Control***

Weed control and eradication techniques used at MCC include:

- Promotion of vigorous pasture growth to out-compete weeds,
- Minimisation of area available for weed infestation, through prompt revegetation of bare areas,
- Spraying with selective herbicides, and
- Physical removal by chipping/slashing.

Weed species targeted during the reporting period included Galenia, Acacia Saligna, Prickly Pear, Fleabane, Fireweed, Castor Oil and African Boxthorn.

***Feral Animal Control***
During the reporting period, MCC undertook a wild dog and fox baiting program.

## 3.11 BLASTING

### 3.11.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage blasting impacts in accordance with the approved Blast Management Plan (BMP) prepared in accordance with condition 33 of the DA.

Members of the public are notified of proposed blasting times by contacting the Blast Information Service Line where they hear a recorded message or by looking at the "Blasting Notices" page of the Muswellbrook Shire Council Website.

The primary objective of blast management at MCC is to manage and minimise the impact of blasting operations on nearby residences. The intent of best practice goals in drill and blast activities is to comply with the fragmentation requirements for each blast. The use of best practice techniques will reduce air blast overpressure, ground vibration, fumes and odours from blasting activities.

### 3.11.2 BLAST MONITORING

All blasts are monitored by four automatically triggered blast monitors. The monitors are maintained in accordance with the relevant standards and calibrated annually.

The blasting criteria that apply to MCC are shown in **Table 20**.

**Table 20: Blast Criteria**

| Vibration (mm/s) | Allowable Exceedance |
|---|---|
| 5 | 5% of total number of blasts over a 12-month period |
| 10 | 0% |
| **Overpressure (dB(L))** | **Allowable Exceedance** |
| 115 | 5% of total number of blasts over a 12-month period |
| 120 | 0% |

The blast monitoring network is provided in **Table 21** and locations are displayed in **Figure 30**.

**Table 21: Blast Monitoring Network**

| Blast Monitor | Location |
|---|---|
| B1 (Queen St) | In the vicinity of the nearest non-company owned residence |
| B2 (School) | At the Muswellbrook Public School, Roger Street, North Muswellbrook |
| B3 (99 Queen St) | At the northern end of Queen Street, North Muswellbrook |
| B4 (Nisbet) | Sandy Creek Road, approximately 1.2km to the north of MCC |

During the reporting period, 60 blast events occurred at MCC. Blasting frequency and the size of the blasts reduced during the reporting period due to the reduction in mining activities as the site headed towards closure. The last mining related blast occurred in November 2022. The four blast monitors were operational throughout the reporting period, with 100% of data captured during the reporting period.

A summary of blast monitoring results is displayed in **Figure 31** to **Figure 34**. Blast data for all monitors is shown in **Appendix 3**.

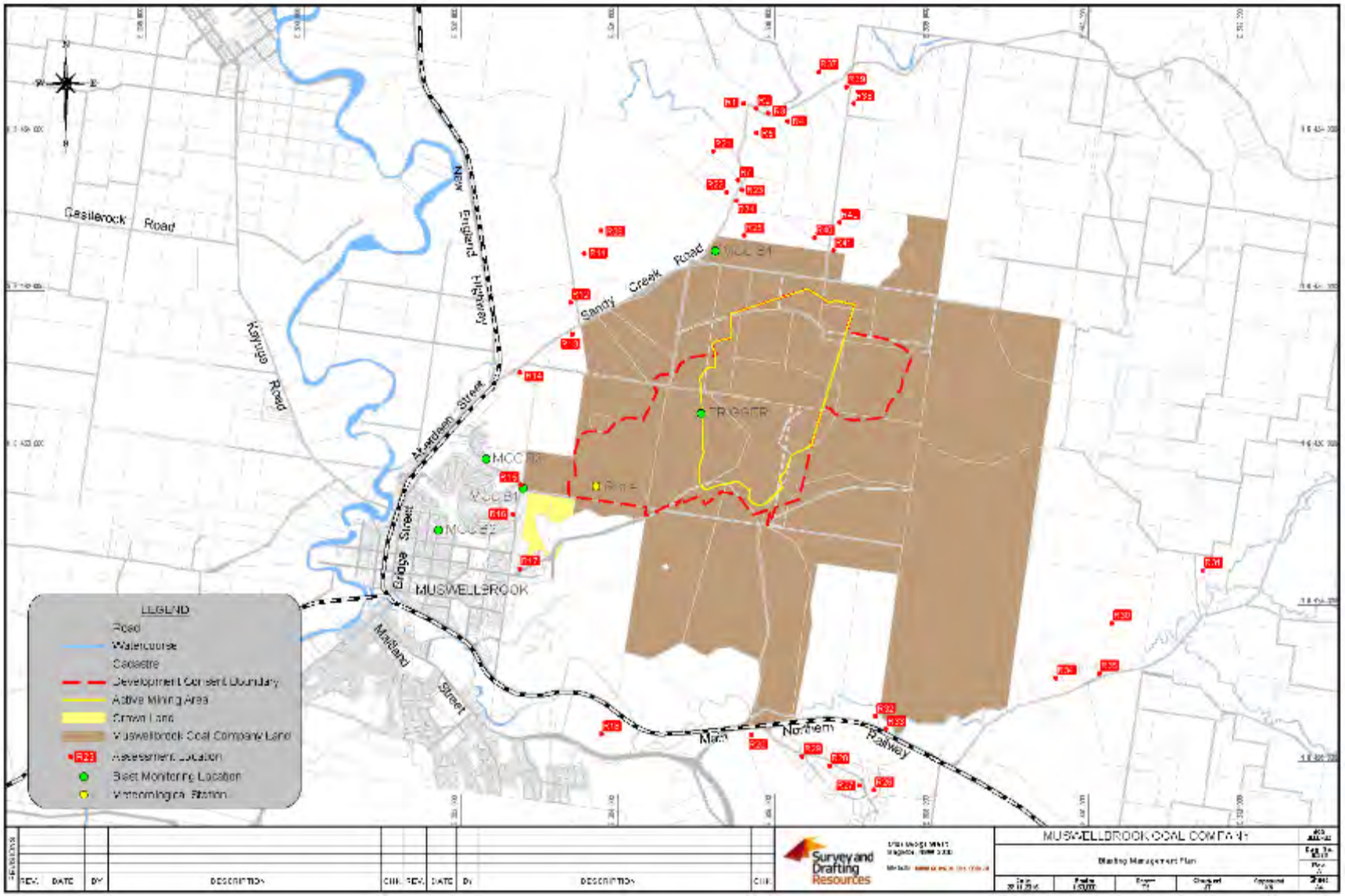


**Figure 30: Blast Monitoring Locations**

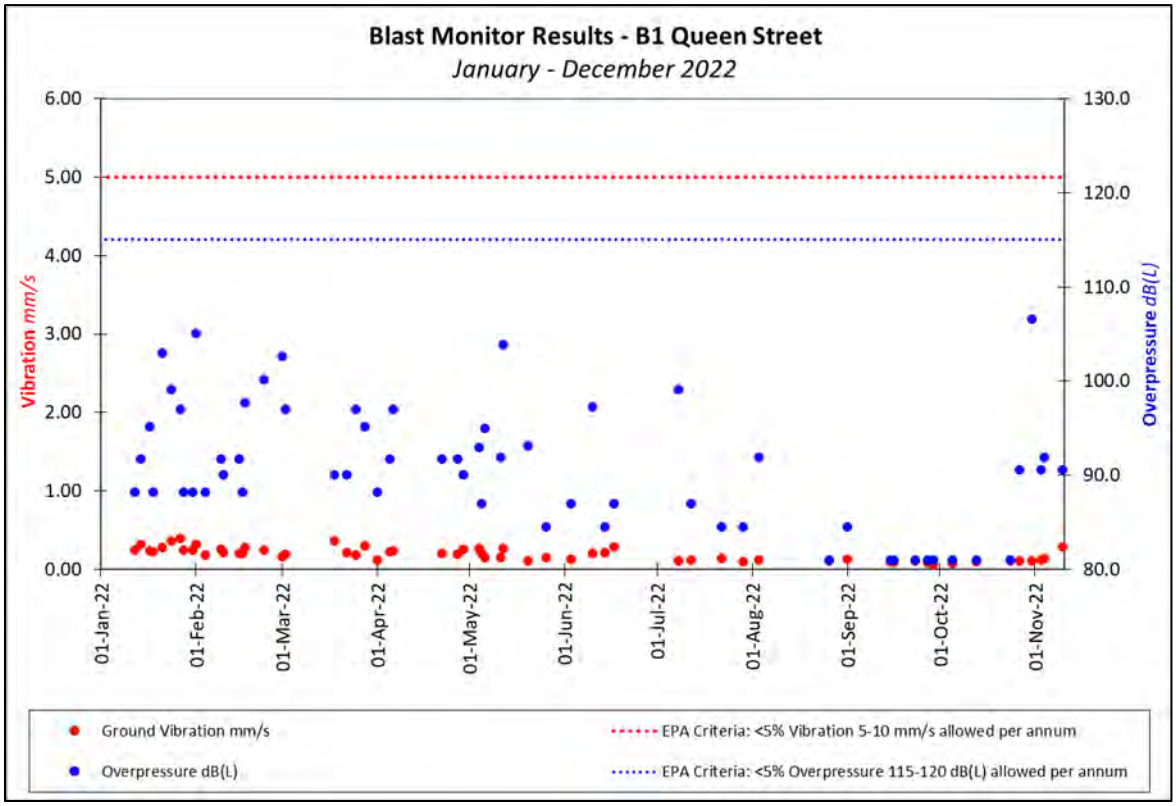


**Figure 31: Queen Street Blast Monitoring Results**

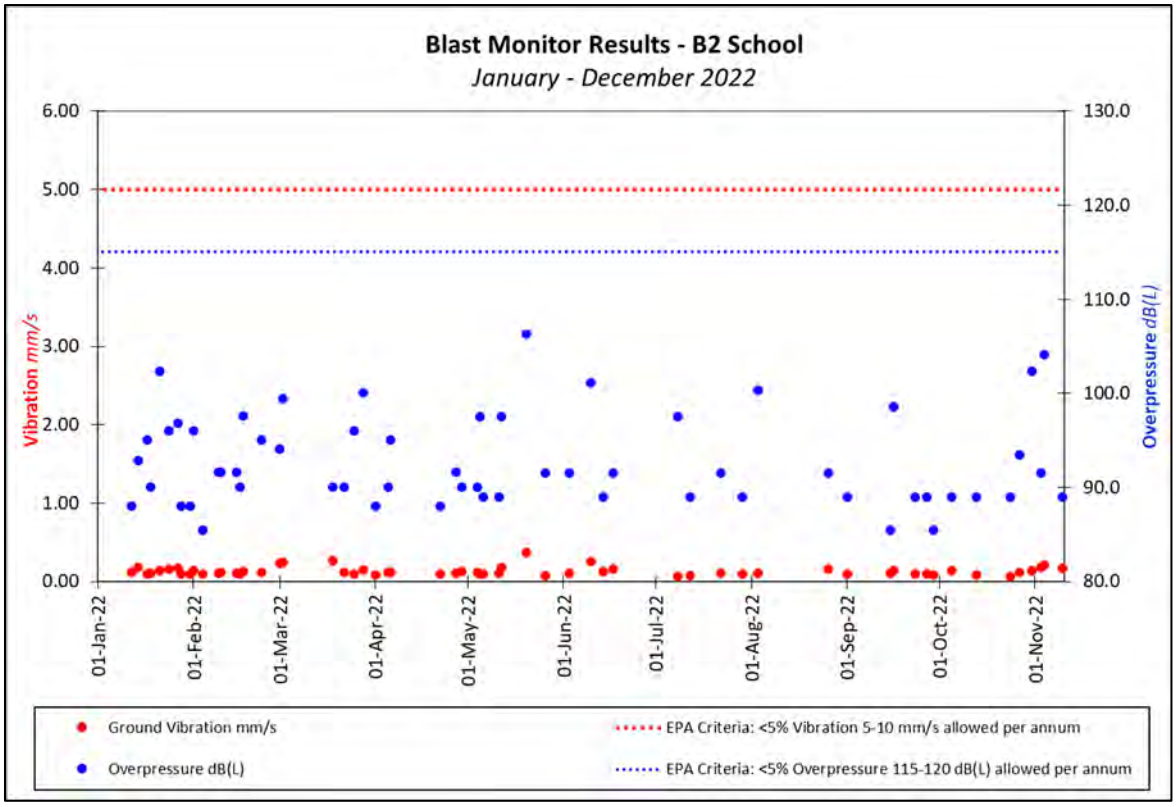


**Figure 32: School Blast Monitoring Results**

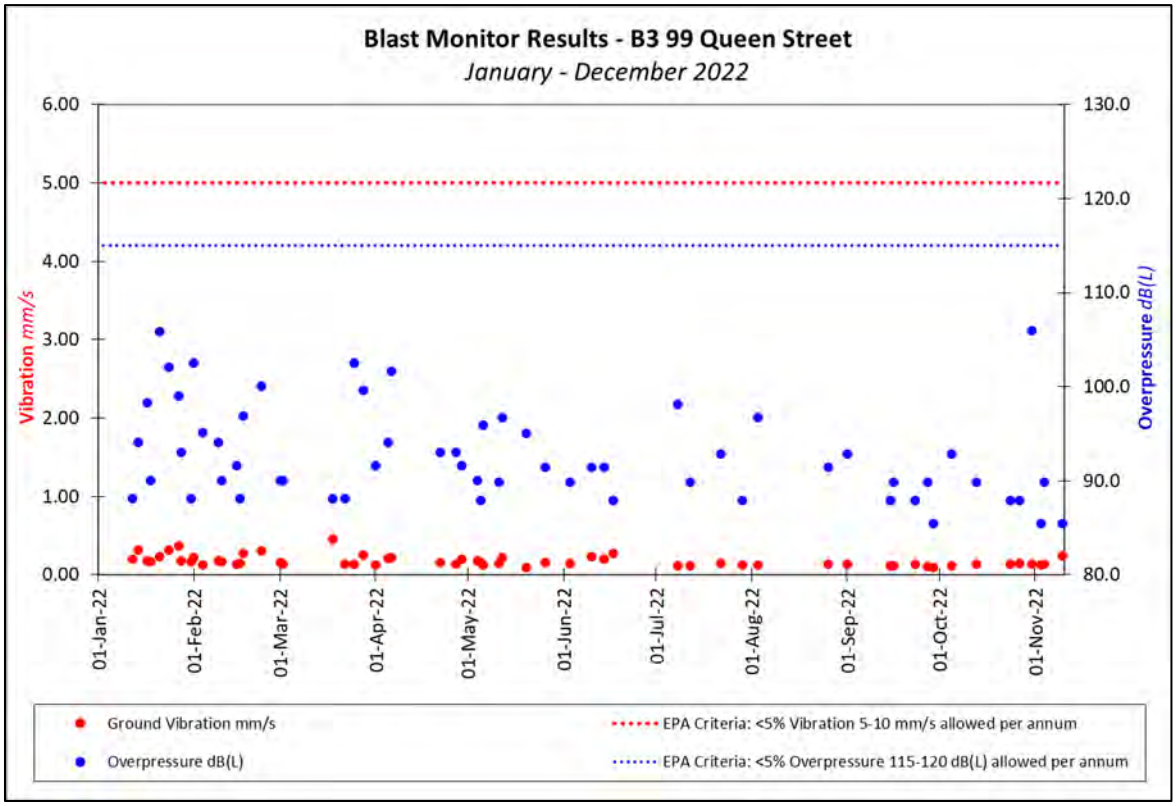


**Figure 33: 99 Queen Street Blast Monitoring Results**

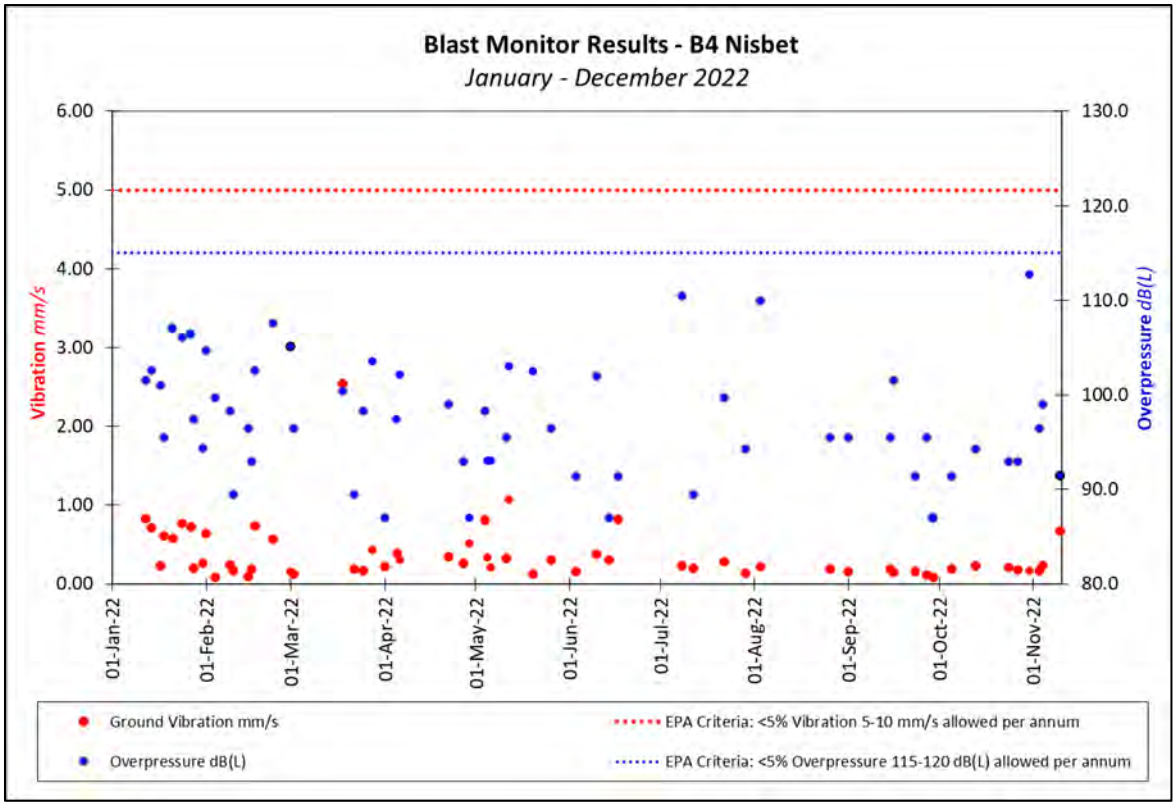


**Figure 34: Nisbet Blast Monitoring Results**

**Table 22** compares the average results from the blast monitoring sites during this reporting period, historical monitoring results, and predictions made in the 2016 Statement of Environmental Effects (SEE). The results this reporting period are generally consistent with historical monitoring results and below the predicted results in the EA and SEE.

**Table 22: Comparison of Blasting Results**

| Year | Vibration (mm/s) | | Overpressure (dBL) | |
|---|---|---|---|---|
| | Average Monitoring Results | EA Predicted Results | Average Monitoring Results | EA Predicted Results |
| 2022 | 0.22 | 0.7 | 93.5 | 111.0 |
| 2021 | 0.25 | 0.7 | 97.1 | 111.0 |
| 2020 | 0.20 | 0.7 | 98.0 | 111.0 |
| 2019 | 0.19 | 0.7 | 100.1 | 111.0 |
| 2018 | 0.20 | 0.7 | 101.3 | 111.0 |
| 2017 | 0.25 | 0.7 | 101.8 | 111.0 |

### 3.11.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period the BMP will be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

## 3.12 NOISE MANAGEMENT

### 3.12.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to operate in accordance with the approved Noise Management Plan (NMP) prepared in accordance with condition 39 of the DA.

The main objective of the NMP is to manage and minimise the impact of noise from mining operations on the environment and nearby residences.

### 3.12.2 NOISE MONITORING

The noise monitoring network is provided in **Table 23** and locations are displayed in **Figure 35**.

**Table 23: Noise Monitoring Network**

| Location | Description |
|---|---|
| R13 | Sandy Creek Road |
| R15 | Queen St |
| R17 | Queen St |
| R25 | Sandy Creek Road |
| R32 | Muscle Creek Road |

MCC has a network of five attended noise survey locations. Monitoring is conducted at these sites monthly. Monthly attended monitoring allows for a variety of operating configurations, weather conditions and seasonal variations to be measured. The noise consultant schedules the monitoring to occur at times unknown to MCC and they determine the intervals between surveys and the time of measurement. Each attended noise survey is conducted during night periods only. As the mining operations finished during the reporting period, the last round of noise monitoring was undertaken in November 2022.

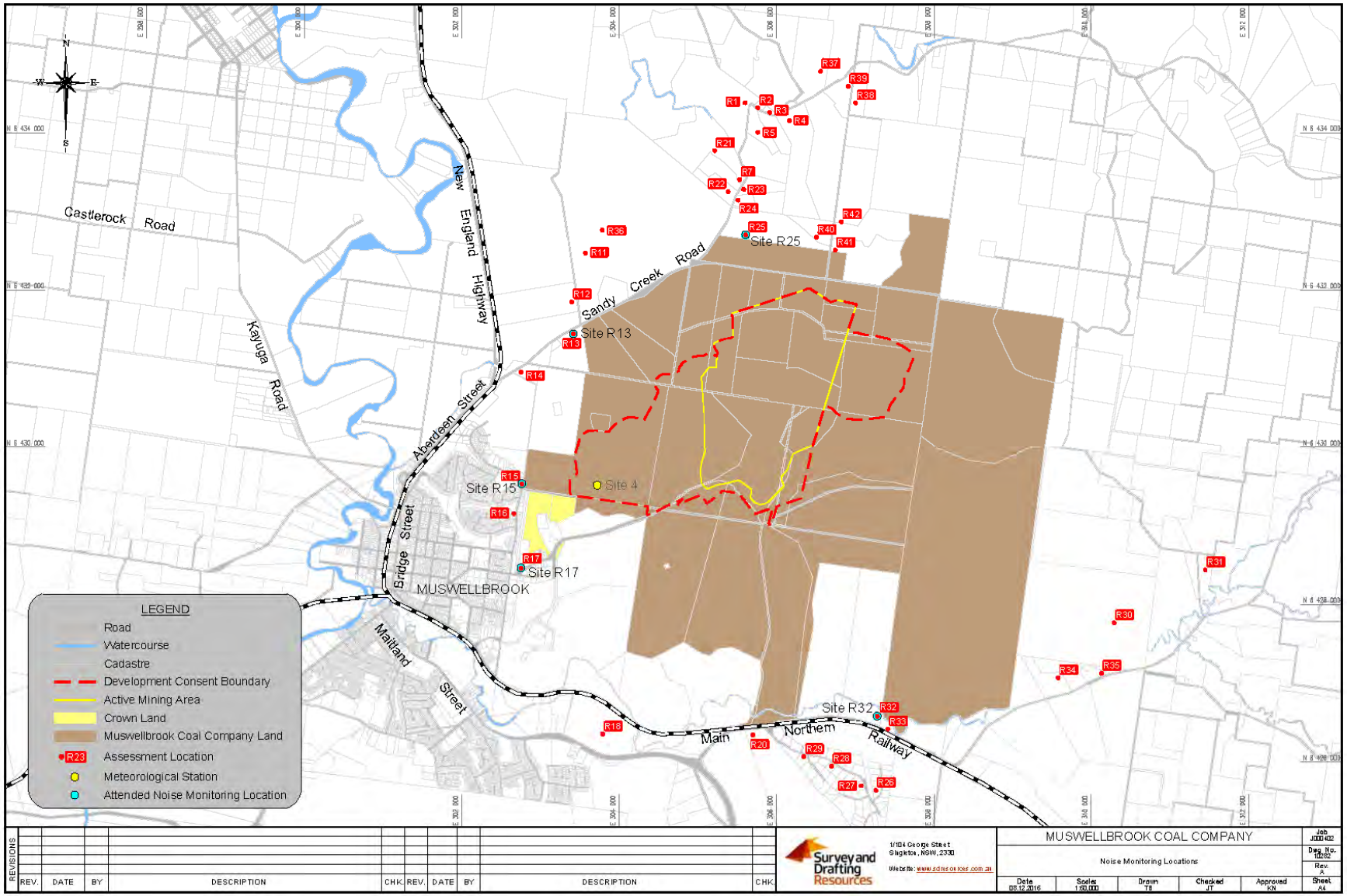


**Figure 35: Noise Monitoring Locations**

All noise surveys are performed in accordance with the EPA "NSW Noise Policy for Industry", the Periodic Noise Monitoring programme and Australian Standard 1055 "Acoustics, Description and Measurement of Environmental Noise" as specified in the NMP. Twelve attended noise surveys were undertaken during the reporting period.

Measurements were taken in third-octave bands with an instrument that has Type 1 characteristics as defined in AS1259-1990 "Acoustics – Sound Level Meters". The instrument has a current calibration as per manufacturer's instructions and calibration was also confirmed prior to and at the completion of measurements with a Sound Level Calibrator. The $LA_{eq}$ (15-minute) noise emission levels, at each monitoring site, were determined.

The actual noise level received at individual residences may vary due to:

- The location of mining equipment,
- The elevation of mining equipment,
- Impacts from other noise sources, and
- Prevailing meteorological conditions.

A summary of the results are shown in **Appendix 4** and **Figure 36** to **Figure 40.** The mining related noise sources were from engine noise, dozer tracks, horns, and modulated frequency reverse alarms.

**Table 24** and **Table 25** compare the average noise monitoring results for this reporting period, historical monitoring results, and predictions made in the 2016 Statement of Environmental Effects (SEE). The results are generally consistent with historical monitoring results and below the predicted results in the EA and SEE.

**Table 24: Comparison of Average $LA_{eq}$ Noise Results**

| Year | R13 Sandy Creek Road | | R15 Queen Street | | R17 Queen Street | | R25 Sandy Creek Road | | R32 Muscle Creek Road | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | Predicted | Actual | Predicted | Actual | Predicted | Actual | Predicted | Actual | Predicted |
| 2022 | 23 | 40 | 20 | 37 | 20 | 34 | 24 | 41 | 17 | 32 |
| 2021 | 24 | 40 | 22 | 37 | 18 | 34 | 27 | 41 | 25 | 32 |
| 2020 | 27 | 40 | 24 | 37 | 22 | 34 | 25 | 41 | 26 | 32 |
| 2019 | 29 | 40 | 25 | 37 | 24 | 34 | 29 | 41 | 20 | 32 |
| 2018 | 29 | 40 | 29 | 37 | 31 | 34 | 30 | 41 | 24 | 32 |
| 2017 | 28 | 40 | 27 | 37 | 24 | 34 | 27 | 41 | 25 | 32 |

**Table 25: Comparison of Average $LA_{max}$ Noise Results**

| Year | R13 Sandy Creek Road | | R15 Queen Street | | R17 Queen Street | | R25 Sandy Creek Road | | R32 Muscle Creek Road | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | Predicted | Actual | Predicted | Actual | Predicted | Actual | Predicted | Actual | Predicted |
| 2022 | 25 | 37 | 22 | 33 | 22 | 31 | 26 | 40 | 19 | 32 |
| 2021 | 28 | 37 | 28 | 33 | 22 | 31 | 33 | 40 | 29 | 32 |
| 2020 | 31 | 37 | 28 | 33 | 26 | 31 | 28 | 40 | 29 | 32 |
| 2019 | 33 | 37 | 29 | 33 | 28 | 31 | 33 | 40 | 23 | 32 |
| 2018 | 34 | 37 | 34 | 33 | 37 | 31 | 35 | 40 | 26 | 32 |
| 2017 | 33 | 37 | 32 | 33 | 28 | 31 | 32 | 40 | 29 | 32 |

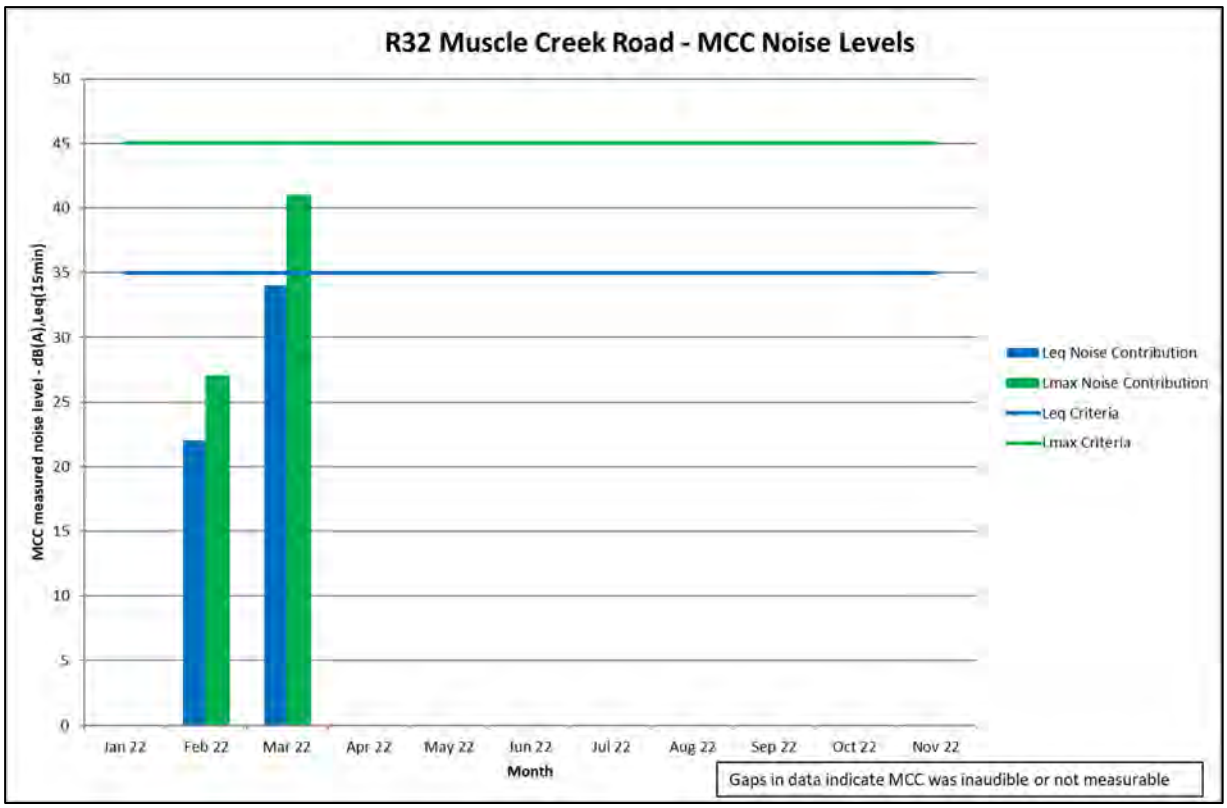


**Figure 36: R13 Sandy Creek Road Noise Monitoring Results**

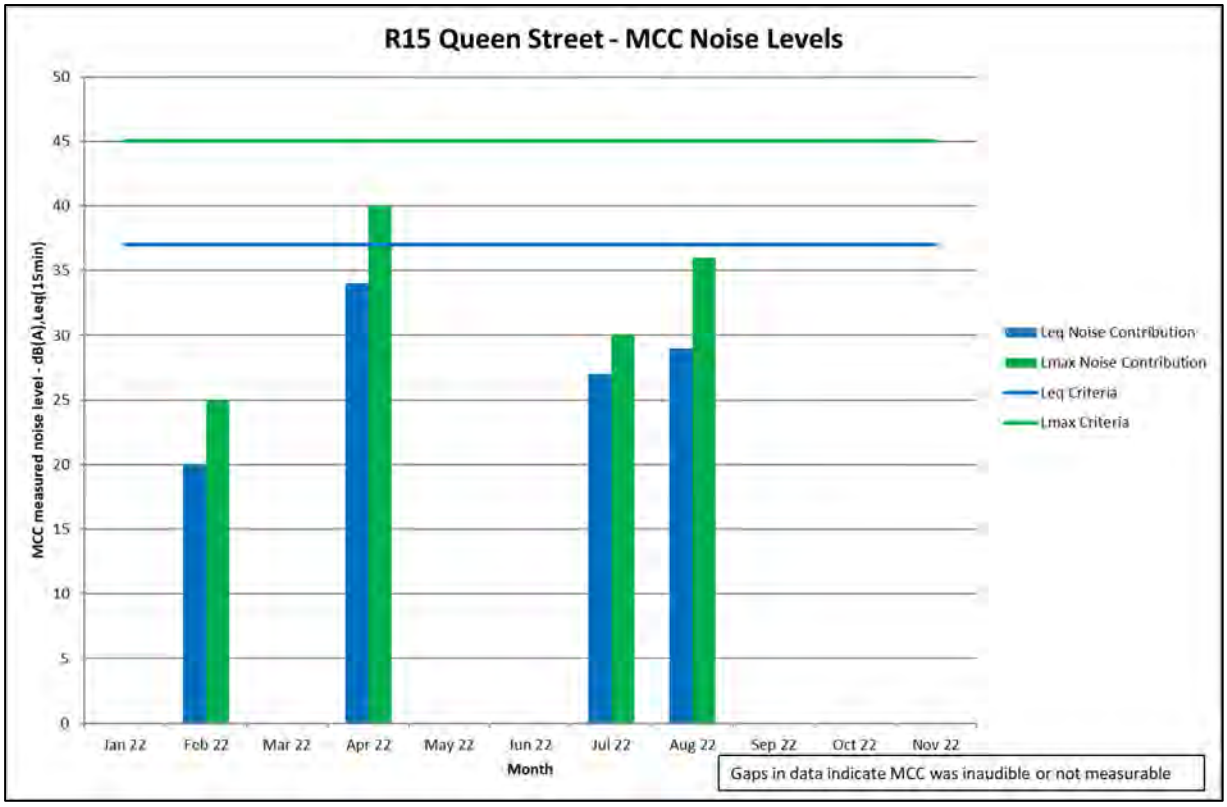


**Figure 37: R15 Queen Street Noise Monitoring Results**

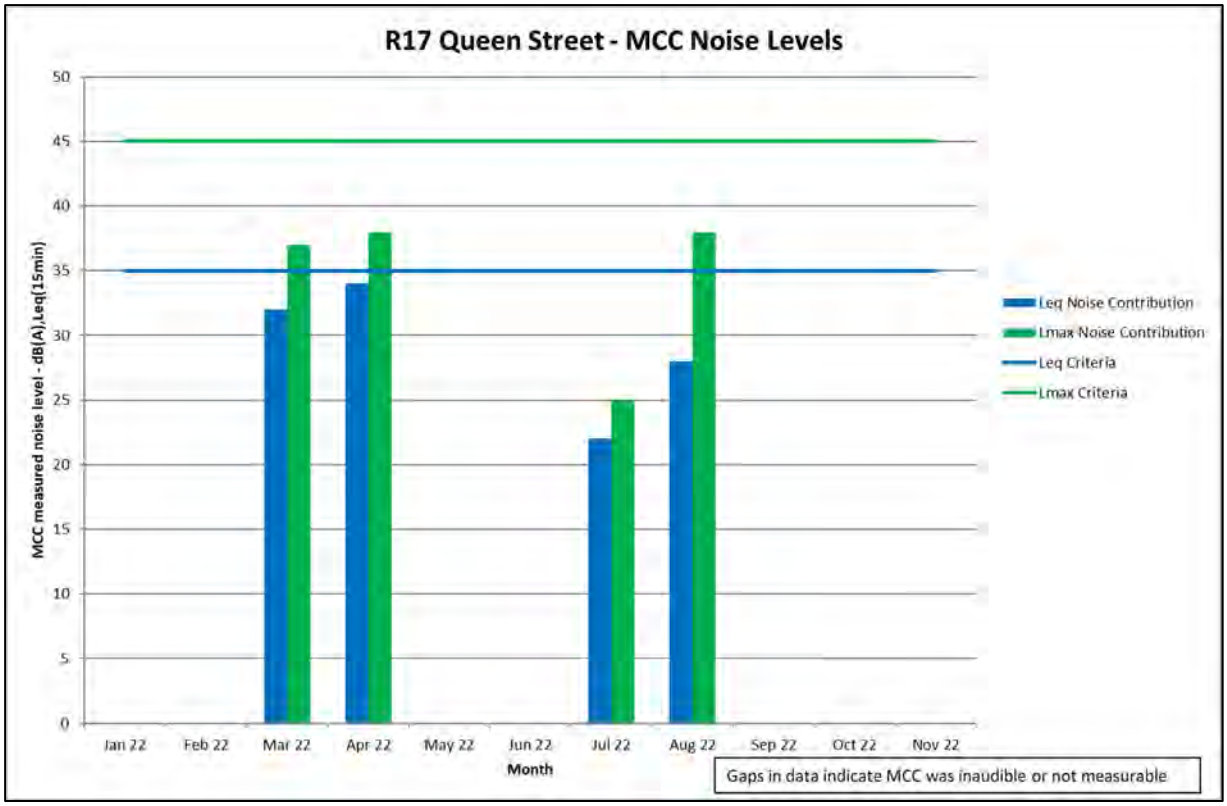


**Figure 38: R17 Queen Street Noise Monitoring Results**

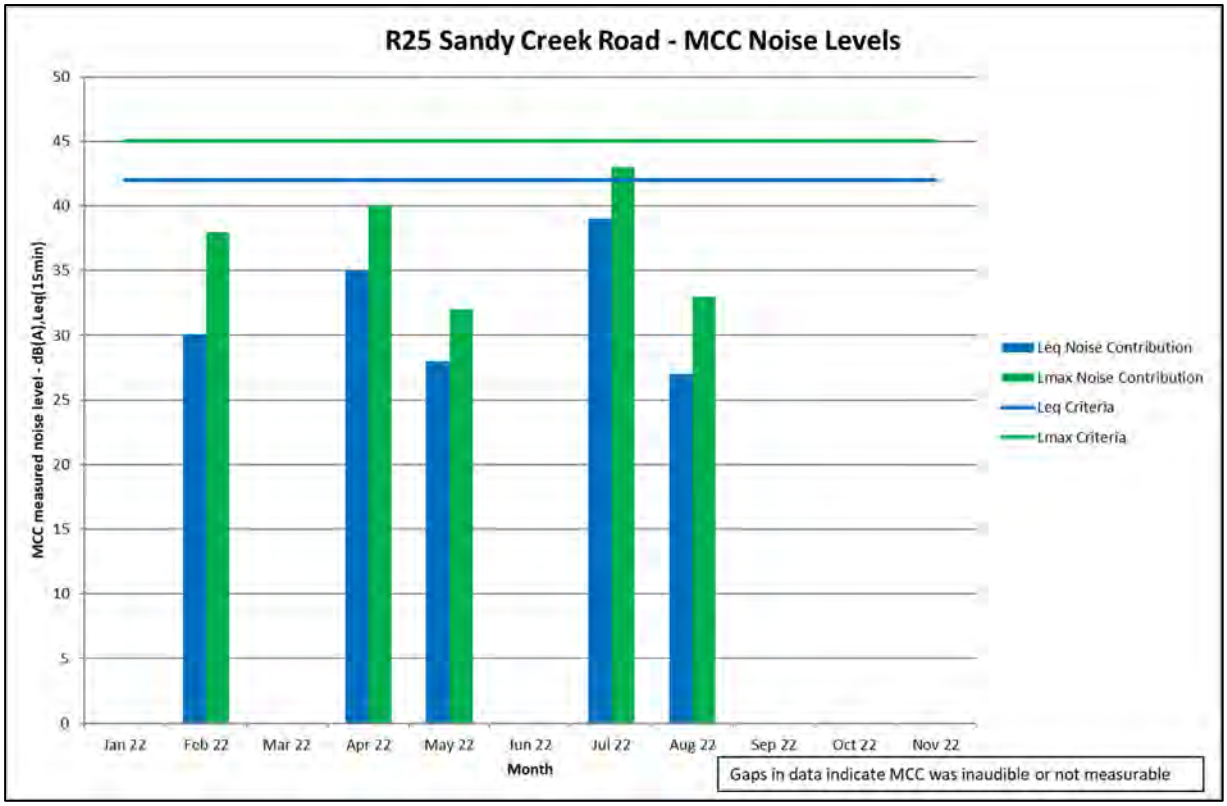


**Figure 39: R25 Sandy Creek Road Noise Monitoring Results**

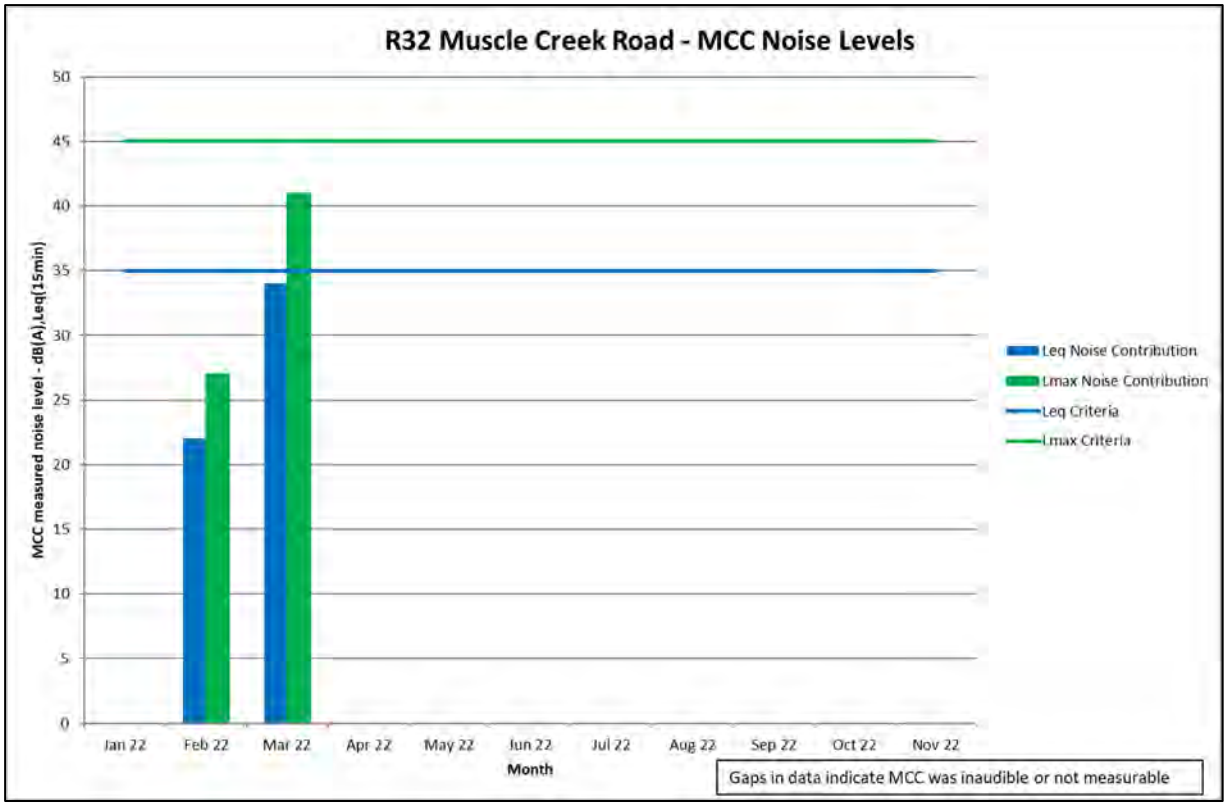


**Figure 40: R32 Muscle Creek Road Noise Monitoring Results**

### 3.12.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage and monitor noise related impacts in accordance with the NMP. The NMP will be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

## 3.13 VISUAL AMENITY, LIGHTING AND LANDSCAPING

During the reporting period MCC continued to operate in accordance with the approved Visual Amenity, Lighting and Landscaping Management Plan (VALLMP) prepared in accordance with condition 22 of the DA.

The primary objectives of the VALLMP are to implement visual reduction strategies to minimise the visual amenity, lighting and landscape impact on the community and meet the development consent requirements.

During the next reporting period MCC will continue to manage visual amenity, lighting and landscaping in accordance with the VALLMP.

## 3.14 ABORIGINAL HERITAGE

During the reporting period, no ground disturbance operations required consultation with Aboriginal groups.

MCC has successfully completed salvage operations and continues to maintain and protect one Aboriginal cultural site located within the mine lease boundary. The site is fenced, and sign posted to prevent disturbance by mine personnel but is outside the area to be disturbed for mining. MCC has

no ongoing requirement to protect the site post-mining. Once rehabilitation has been completed, the fencing and signage will be removed.

## 3.15 EUROPEAN HERITAGE

There are no European Heritage sites located at MCC that require ongoing management.

## 3.16 SPONTANEOUS COMBUSTION

### 3.16.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to operate in accordance with the approved Spontaneous Combustion Management Plan (SCMP) prepared in accordance with condition 31 of the DA.

The main objective of the SCMP is to minimise the occurrence and manage the effect from spontaneous combustion in:

- The highwall and existing U/G mine workings in Open Cut 1,
- The overburden/interburden removal and coal removal in Open Cut 1,
- Active and recent emplacement areas within Open Cut 1,
- Open Cut 2,
- Coal emplacement and storage areas, and
- Elsewhere with the disturbance area.

The SCMP lists the preventative measures, control measures and trigger action response plans (TARP's) for each of these areas.

Regular spontaneous combustion reports are provided to both RR and EPA. These reports identify existing and new incidents of spontaneous combustion, mitigation procedures and improvements to these procedures, effectiveness of actions, areas capped, areas mined, areas under water infusion and complaints received. The report also includes a plan showing the extent and location of problem areas.

All affected areas during the reporting period were within the open cut and overburden emplacement areas. The areas that were treated each month are shown in **Table 26.** A historical comparison of affected areas without active control measures is provided in **Table 27**.

**Table 26: Spontaneous Combustion Report Summary**

| Reporting Month | Areas Capped ($m^2$) | Areas Mined ($m^2$) | Area Under Water Infusion ($m^2$) |
|---|---|---|---|
| January 22 | 0 | 0 | 2,600 |
| February 22 | 0 | 0 | 2,600 |
| March 22 | 0 | 0 | 1,710 |
| April 22 | 0 | 0 | 4,165 |
| May 22 | 0 | 0 | 5,275 |
| June 22 | 0 | 0 | 3,300 |
| July 22 | 0 | 2,310 | 5,400 |
| August 22 | 0 | 6,100 | 6,100 |
| September 22 | 0 | 0 | 0 |
| October 22 | 55 | 0 | 0 |
| November 22 | 0 | 0 | 0 |
| December 22 | 0 | 0 | 0 |

**Table 27: Summary of Spontaneous Combustion Affected Areas Without Active Control**

| Total Area Affected by Spontaneous Combustion Without Active Control ($m^2$) | | | | | | |
|---|---|---|---|---|---|---|
| | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** |
| Jan-Mar | 24 | 96 | 52 | 114 | 250 | 153 |
| Apr-Jun | 48 | 60 | 44 | 166 | 356 | 167 |
| Jul-Sep | 52 | 36 | 64 | 258 | 424 | 1,395 |
| Oct-Dec | 52 | 56 | 87 | 286 | 597 | 1,710 |
| **Yearly Average** | **44** | **62** | **62** | **206** | **149** | **856** |

Note: These values are the values at the end of the respective reporting period. These areas may change during the reporting period.

***Planned Versus Actual Activities***

One of the requirements of the SCMP is to prepare an annual plan in relation to spontaneous combustion management activities and then at the end of the reporting period to review the actual activities against the planned activities and identify any opportunities for improvement in relation to spontaneous combustion management. Below is a summary of the review of the action plan from this reporting period.

The planned activities for this reporting period were to finish mining out underground workings in Open Cut 1 (except for the Lower Lewis seam, which has been sealed). This work occurred during the reporting period along with other spontaneous combustion management activities including use of water sprays, removal of hot coal, and installation of inert clay seals.

The above average rainfall assisted with containing spontaneous combustion throughout the reporting period.

***What Worked Well***

The following activities worked well during the reporting period.

- Spontaneous combustion control and, where it was present, management of spontaneous combustion in overburden dumps was excellent. While this was assisted at times with higher rainfall, the control on the ground provided excellent results.
- The control and management of higher temperature coal was also very well managed with stockpile residence time kept as low as possible to minimise anything but low-level spontaneous combustion. Residence time for stockpile areas was carefully monitored to prevent spontaneous combustion from developing.
- The use of fragmented rill material, together with additional water kept spontaneous combustion to a minimum.
- The detailed planning, rescheduling and execution of mining to remove underground workings in the old St Heliers Colliery has shown the commitment of all personnel.

***Final Outcomes***

- Mining all underground roadways except for the Lower Lewis was achieved thereby eliminating the risk of fires in upper seam workings in the final void area.
- Water levels in the Lower Lewis Seam (the lowest seam with underground workings) roadways has now reached the seals and no spontaneous combustion can occur.
- Water has risen to a level in the final void that any hot material has been cooled.
- All but the active washery reject dumps have been at least partly covered.

### 3.16.2 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage spontaneous combustion in accordance with the SCMP. Until the final landform is established MCC has a contingency plan to manage any significant outbreak of spontaneous combustion in the dumps. Minor levels of heating will be controlled with water and/or interim layers of clay/inerts.

The SCMP will be updated following the end of mining activities to confirm the management and monitoring requirements associated with the rehabilitation of the site.

## 3.17 BUSHFIRE

Management of bushfire risks are undertaken in accordance with the approved Bushfire Management Plan (BFMP) prepared in accordance with condition 23 of the DA.

The objectives of the Bushfire Management Plan are:

- To manage activities on site to minimise the risk of outbreak of fire,
- Contain fuel loads to acceptable levels to moderate fire intensity,
- To put in place hazard mitigation measures to contain an outbreak of fire should one occur, and
- To put in place arrangements to liaise with and support the Rural Fire Service (RFS) should an outbreak of fire occur at MCC or threaten MCC's operations.

There were no bushfire outbreaks within the development consent area during the reporting period. Annual inspections are conducted of the access tracks and powerline easements. These are slashed regularly to maintain access and reduce fuel loads. Weeds are sprayed in asset protection zones around all infrastructure, including buildings, electrical infrastructure and explosives storage facilities.

During the next reporting period the BFMP will be updated following the end of mining activities to confirm the management requirements associated with the rehabilitation of the site.

## 3.18 HYDROCARBON CONTAMINATION

Hydrocarbon storage facilities were constructed as part of the workshop, stores and blasting facilities. These storage facilities comply with the requirements of *AS1940 – The storage and handling of flammable and combustible liquids*. Activities undertaken on site to reduce the risk of hydrocarbon contamination include:

- Above ground fuel storage tanks are self-bunded to contain any spillage which may occur,
- Waste oil from the workshop is stored in a bunded waste oil tank and is removed as required,
- Oily water runoff from the re-fuelling bay drains into an above ground sump which is fully bunded, and
- Runoff from the hardstand wash-down bay passes through a three-staged silt trap and an oil/water separator. The collected silt is routinely cleaned out.

A Bioremediation Management Plan has been developed by MCC to provide guidance on how to manage material that is potentially contaminated with hydrocarbons. Any material that is potentially contaminated is tested with the results being compared to the limits in the *NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014)*. If the material is classified as solid waste, it is disposed on site. If the material is classified as contaminated it is either treated on site prior to disposal or it is taken off site for disposal.

## 3.19 METHANE DRAINAGE/VENTILATION

As no underground mining occurred at MCC during the reporting period, no methane drainage or ventilation was required.

## 3.20 PUBLIC SAFETY

During the reporting period, public safety was managed in accordance with current MCC procedures. Fences surrounding the operational areas and along property boundaries were inspected and maintained.

A security patrol is conducted by a local security firm over weekends and other nominated periods (Christmas, shutdowns, etc.) when the site is not manned. A series of security cameras are established around the site to monitor access to the site.

## 3.21 OTHER ISSUES AND RISKS

No incidents of damage to surface infrastructure were recorded during this reporting period.

# 4.0 COMMUNITY RELATIONS

MCC undertakes community consultation through the Community Consultative Committee, discussions with community members and operating a toll free 24-hour Environmental Contact Line (1800 600 205). MCC are a member of the Upper Hunter Mining Dialogue – a forum for the mining industry and the community to discuss concerns relating to mining impacts.

## 4.1 ENVIRONMENTAL COMPLAINTS

MCC operates a toll free 24-hour Environmental Contact Line where community members can communicate their concerns to site personnel. On receiving a complaint, MCC staff investigate the complaint, take action to reduce impact as required and report back to the complainant with the findings. The recording of environmental complaints and the operation of the Environmental Contact Line is conducted in accordance with the MCC Development Consent and Environmental Protection Licence conditions.

7 complaints were received during the reporting period. More details on the complaints are provided in **Appendix 5**. **Table 28** and **Figure 41** provide a summary of the complaints received during the reporting period.

**Table 28: Summary of Complaints**

| Type of Complaint | Number | Percentage |
|---|---|---|
| Odour | 5 | 71.4% |
| Dust | 0 | 0.0% |
| Blast | 0 | 0.0% |
| Visual | 2 | 28.6% |
| **Total** | **7** | **100%** |

In comparison to the previous reporting periods, there has been a decrease in the number of complaints received. The complaint history chart is shown in **Figure 42**.

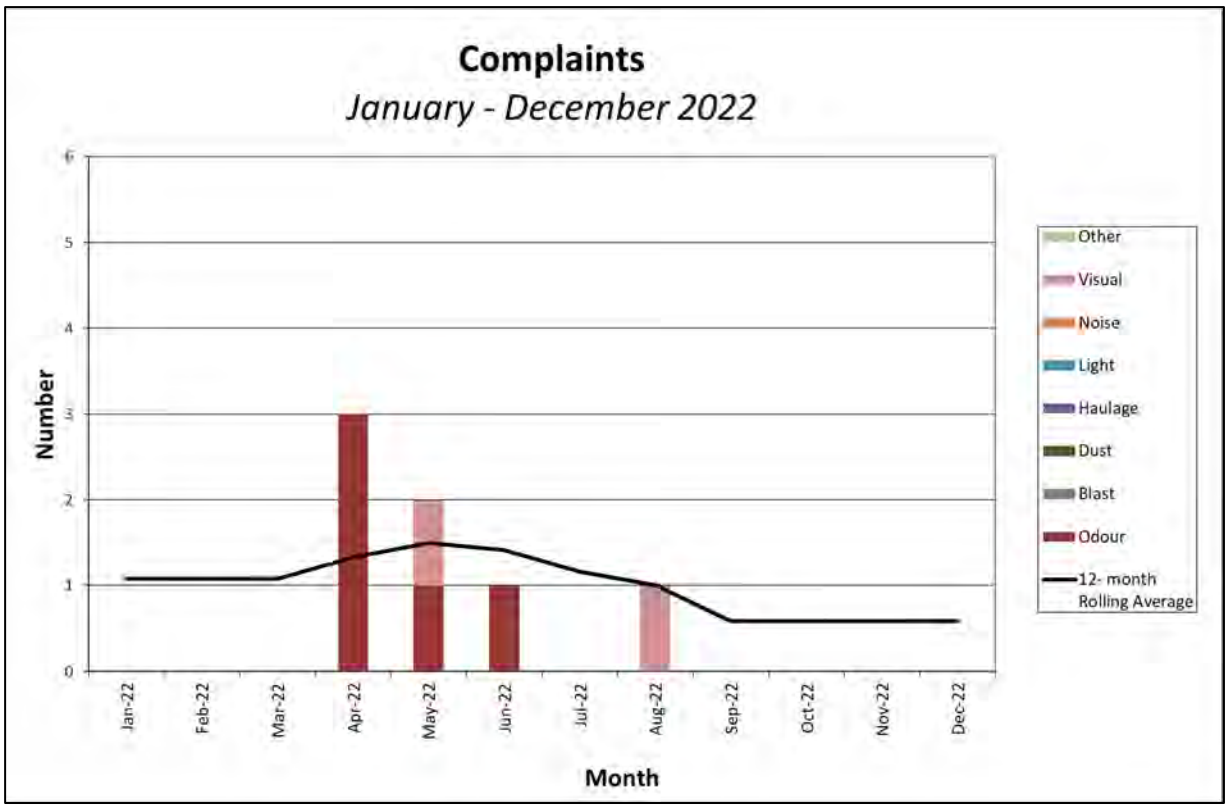


**Figure 41: Complaint Summary**

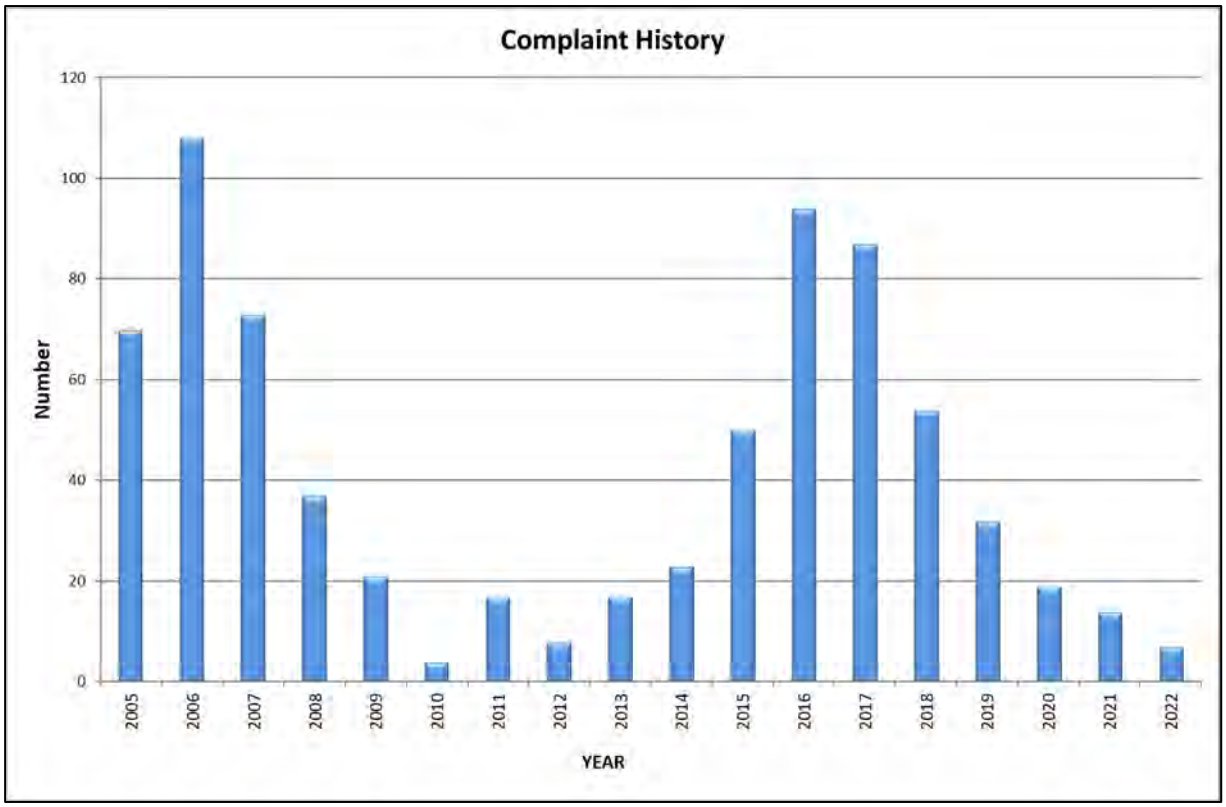


**Figure 42: Complaint History**

## 4.2 COMMUNITY LIAISON, SPONSORSHIPS AND DONATIONS

MCC personnel maintain contact with nearby residents and are committed to continually fostering and developing strong links with the community.

Community support throughout the reporting period included donations to the following organisations:

- Singleton Mountain Bike Club – contribution towards local sports club,
- Muswellbrook Public School – supporting Local School's "Colourful Fun Day",
- Special Children's Christmas Party – supporting local children at Christmas time,
- Upper Hunter Regional Museum – Regional Museum Project sponsorship,
- Muswellbrook Race Club – annual sponsorship,
- Mark Hughes Foundation – support brain cancer research,
- Muswellbrook Shire Council – support for New Year's celebration,
- Muscle Creek Bush Fire Brigade – community Christmas celebration, and
- Cancer Council of NSW – supported a worker participating in a fundraising event.

In addition to the sponsorship, MCC held a Community Open Day in May 2022 to celebrate the end of mining at MCC after 115 years of operation.

## 4.3 COMMUNITY CONSULTATIVE COMMITTEE

MCC's Community Consultative Committee (CCC) provides information regarding mine operations to the local community. The aim of the committee is to provide an effective communication mechanism so that members of the local community have adequate information on mining and environmental matters. CCC meetings are held twice per year at the MCC office and committee members are actively involved in the review of environmental monitoring data and are kept up to date on mining operations through presentations and site visits.

The CCC is comprised of one Councillor, one council staff representative, five community representatives (including Wanaruah Local Aboriginal Lands Council) and two MCC representatives.

During the reporting period meetings were held on 7 April 2022, 7 June 2022 and 6 December 2022 in the MCC board room. Minutes of the meetings can be found on MCC's website.

# 5.0 ANNUAL REHABILITATION REPORT

During the reporting period updated mining lease conditions were received by MCC, which changed the way rehabilitation activities are to be reported. MCC are now required to prepare an Annual Rehabilitation Report and Forward Program in accordance with the Resources Regulator Form and Way document. This change in reporting requirements is reflected in this report.

In accordance with the updated mining lease conditions, MCC prepared a Rehabilitation Management Plan (RMP) during the reporting period. This RMP replaces the Mining Operations Plan/Rehabilitation Plan (MOP) that was in existence during the previous reporting period.

## 5.1 SURFACE DISTURBANCE AND REHABILITATION ACTIVITIES DURING THE ANNUAL REPORTING PERIOD

### 5.1.1 SURFACE DISTRUBANCE AND REHABILITATION ACTIVITIES

There was no surface disturbance undertaken during the reporting period.

Mining operations continued in previously disturbed areas.

The areas that were proposed to be rehabilitated this reporting period are shown in **Figure 43** (dark green polygon). The proposed work was to complete the reshaping of Open Cut 2, installation of a drop structure and contour drains, application of growth media and to seed the area.

The actual work completed was finalisation of the reshaping of Open Cut 2 and commencement of the installation of the drop structure and contour drains. Excessive and extensive rainfall received during the reporting period delayed the reshaping of the area, which in turn delayed the commencement of the installation of the drop structure and contour drains. In addition to the commencement delay, illness (mostly Covid) affected the ability of the contractor to provide resources to complete the work in a timely manner. These factors resulted in MCC not completing the proposed rehabilitation works in Open Cut 2 during the reporting period.

Work is continuing on the installation of the drop structure and contour drains, and this will be completed in Q2 2023. Following the completion of the installation of these water management structures; growth media and seed will be applied to the area. These areas are shown as being completed in 2023 in the Forward Program (**Section 6.0**).

Mining operations at MCC continued longer than expected during the reporting reported. This extension of mining operations was due to wet weather delaying mining activities and the identification of additional coal reserves available to mine. Due to this delay in mining, there will be a delay to the rehabilitation activities in Open Cut 1 as the areas won't be available for rehabilitation when expected. The updated rehabilitation forecast is shown in the Forward Program (**Figure 45** to **Figure 47**).

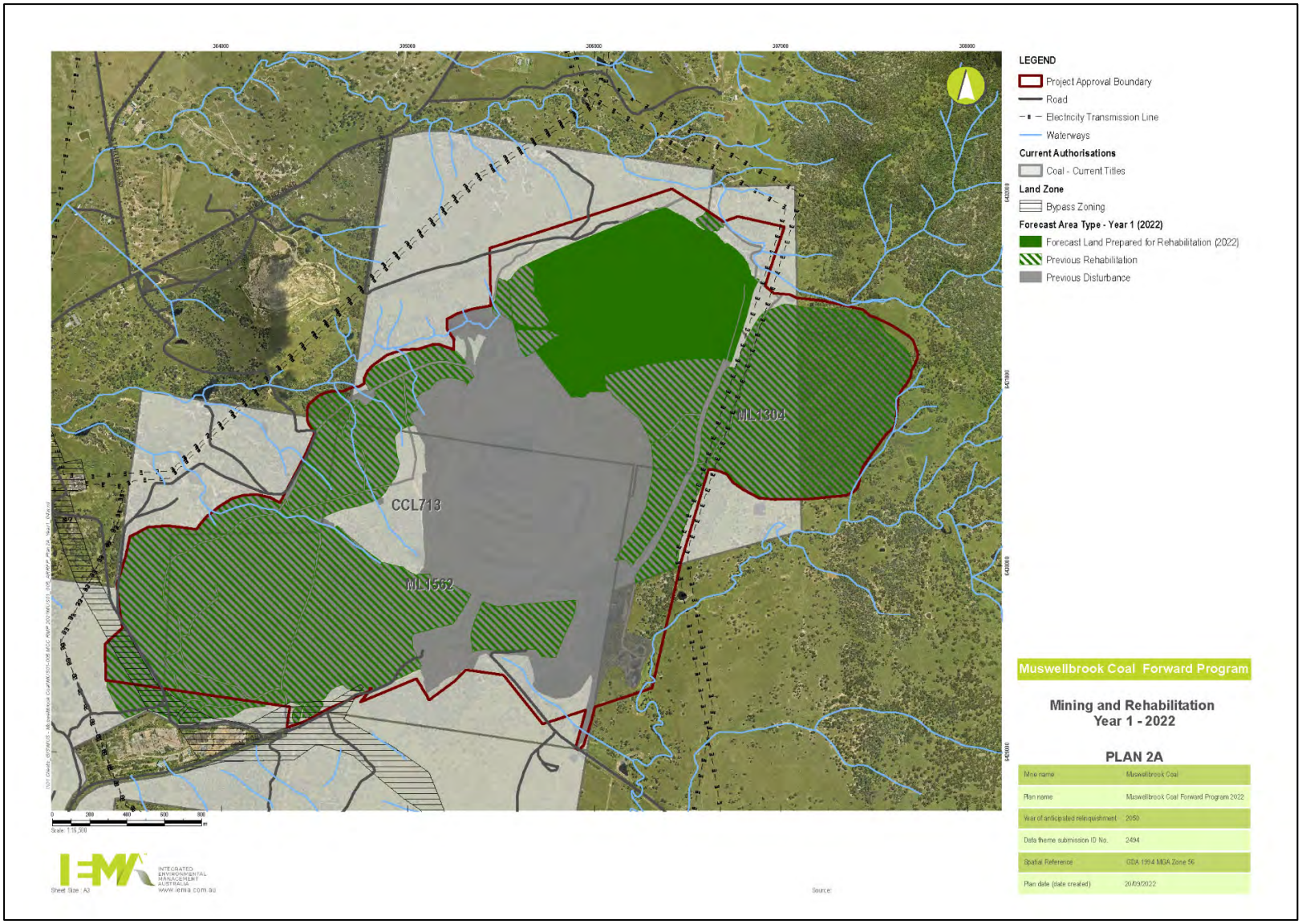


**Figure 43: Areas Proposed to be Rehabilitated During the Reporting Period**

### 5.1.2 REHABILITATION PLANNING ACTIVITIES

During the reporting period MCC commenced a series of studies relating to mine closure. These studies include:

- Groundwater
- Surface Water
- Contaminated Land
- Ecology
- Geochemistry
- Demolition of Infrastructure
- Mine Sealing
- Subsidence
- Heritage
- Socio-Economic
- Waste Management
- Borehole Sealing
- Spontaneous Combustion
- Hazardous Materials
- Methane and other gases
- Landform Stability

The studies are being undertaken in consultation with Subject Matter Experts (SME's) and they include rehabilitation activities and other activities relating to mine relinquishment. The outcomes of these studies that are applicable to the ongoing rehabilitation of the site will be included in future revisions of the Rehabilitation Management Plan.

As part of the mine closure studies and planning for future rehabilitation activities, MCC continued with a Phase 2 contamination assessment of the site during the reporting period. This assessment will identify if there are any areas of contamination that need to be managed as part of the rehabilitation activities on site.

### 5.1.3 SUBSIDENCE REPAIR AND/OR REMEDIATION

Subsidence is not expected to impact on areas of rehabilitation. Historical bord and pillar underground mining has been undertaken at the site, which typically results in minimal subsidence therefore the risk of impact to rehabilitation is considered very low. No subsidence repair and/or remediation was required during the reporting period.

### 5.1.4 REHABILITATION MANAGEMENT AND MAINTENANCE

Rehabilitation management and maintenance activities that occurred during the reporting period included:

- Spreading and incorporating compost and seeding an area of rehabilitation near Open Cut 2 where the vegetation had not established.
- Bare areas in rehabilitation across the site were spread with compost and reseeded to encourage vegetation to establish.
- Removing areas of spontaneous combustion in rehabilitation areas and replacing with inert material.
- Weed control on rehabilitation areas. Target species included Galenia, Acacia Saligna, Prickly Pear, Fleabane, Fireweed, Castor Oil and African Boxthorn.
- Wild dog baiting.

### 5.1.5 GOVERNMENT AGENCY LETTERS, DIRECTIONS OR NOTICES

In June 2022, MCC received a Notice under the Mining Act 1992 section 240 from the Resources Regulator. This notice resulted from a site inspection conducted in March 2022 where concerns were raised about areas of erosion that were identified in a previous inspection in April 2021 and during the 2021 Independent Environmental Audit.

The s240 Notice has directed MCC to undertake an assessment of the long-term erosional stability of the approved final landforms as part of the rehabilitation of the mine, using an industry accepted Landform Evolution Model. At the end of the reporting period work has commenced on this assessment, with the assessment to be finalised early in 2023. The findings from the assessment will be reported in the next Annual Rehabilitation Report.

### 5.1.6 REHABILITATION ACTIVITIES THAT HAVE ACHIEVED FINAL LAND USE

There are no areas at MCC that have achieved final land use.

### 5.1.7 KEY PRODUCTION MILESTONES/MATERIAL PRODUCTION

The key production milestones and material production achieved during the reporting period are shown in **Table 29**.

**Table 29: Key Production Milestones/Material Production**

| Material | Unit | Year 1 | This Report |
|---|---|---|---|
| Stripped topsoil | $m^3$ | 0.00 | 0.00 |
| Overburden | $m^3$ | 52,000 | 1,774,000 |
| ROM coal extracted | Mt | 0.12 | 1.313 |
| Reject material | Mt | 0.05 | 0.206 |
| Product | Mt | 0.11 | 1.130 |

## 5.2 PLAN 1 – STATUS OF MINING AND REHABILITATION AT THE COMPLETION OF THE ANNUAL REPORTING PERIOD

The status of mining and rehabilitation at the end of the reporting period is shown in **Figure 44**.

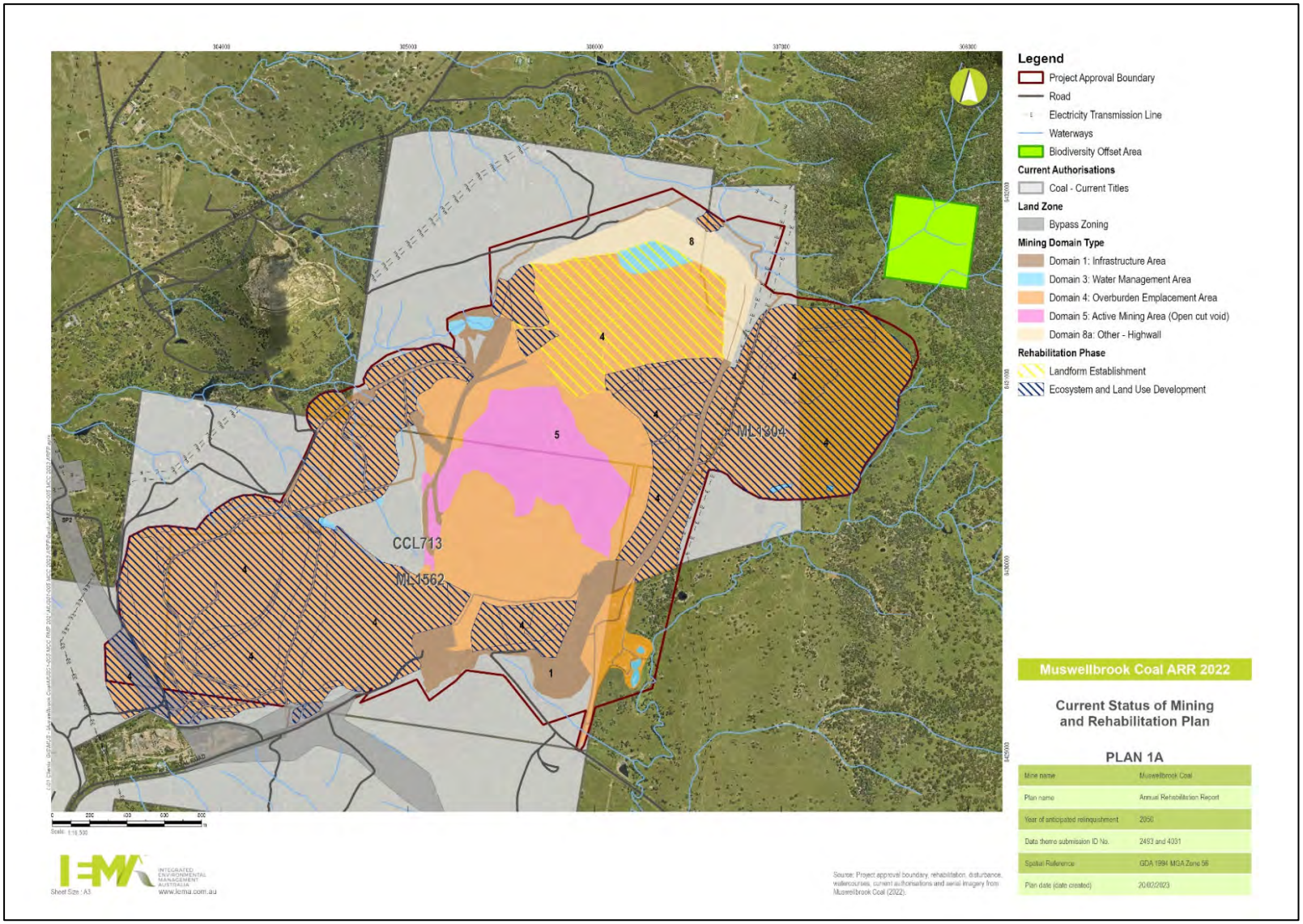


**Figure 44: Plan 1 – Status of Mining and Rehabilitation at Completion of Annual Reporting Period**

## 5.3 DISTURBANCE AND REHABILITATION STATISTICS

### 5.3.1 CURRENT DISTURBANCE AND REHABILITATION PROGRESSIONS

A summary of the current disturbance and rehabilitation status of the end of the reporting period is shown in **Table 30**.

**Table 30: Status of Disturbance and Rehabilitation at End of Reporting Period**

| **Annual Reporting Period** | | 01/01/22 – 31/12/22 |
|---|---|---|
| **Total Disturbance Footprint – Surface Disturbance (ha)** | **A1** | 618.07 |
| **Underground Mining Area Footprint** | **A2** | 0.00 |
| **Total Active Disturbance (ha)** | **B** | 219.51 |
| **Rehabilitation – Land Preparation (ha)** | **C** | 61.44 |
| **Ecosystem and Land Use Establishment (ha)** | **D** | 0.00 |
| **Ecosystem and Land Use Development (ha)** | **E** | 337.12 |
| **Rehabilitation Completion (ha)** | **F** | 0.00 |

### 5.3.2 REHABILITATION KEY PERFORMANCE INDICATORS (KPIs)

A summary of the key performance indicators (KPIs) at the end of the reporting period is shown in **Table 31**.

**Table 31: Rehabilitation KPIs at End of Reporting Period**

| **Annual Reporting Period** | | 01/01/22 – 31/12/22 |
|---|---|---|
| **New Active Disturbance (ha)** | **G** | 0.00 |
| **New Rehabilitation Commenced During Annual Reporting Period (ha)** | **H** | 0.00 |
| **Established Rehabilitation (ha)** | **I** | 337.12 |
| **Annual Rehabilitation to Disturbance Ratio (ha)** | **J** | 0.00 |
| **% Rehabilitated Land to Total Mine Footprint** | **K** | 54.54 |

### 5.3.3 PROGRESSIVE ACHIEVEMENT OF ESTABLISHED REHABILITATION

A summary of the progressive achievement of established rehabilitation at the end of the reporting period is shown in **Table 32**.

**Table 32: Proportion of Established Rehabilitation for Final Land Use Classifications at End of Reporting Period**

| **Annual Reporting Period** | | 01/01/22 – 31/12/22 |
|---|---|---|
| **Established Rehabilitation for Agricultural Final Land Used (percent)** | **L** | 67.52 |
| **Established Rehabilitation for Native Ecosystem Final Land Used (percent)** | **M** | 32.23 |
| **Established Rehabilitation for Other/Non-Vegetated Final Land Used (percent)** | **N** | 0.24 |

### 5.3.4 VARIATION TO THE REHABILITATION SCHEDULE

The areas that were proposed to be rehabilitated this reporting period are shown in **Figure 43** (dark green polygon). The proposed work was to complete the reshaping of Open Cut2, installation of a drop structure and contour drains, application of growth media and to seed the area.

The actual work completed was finalisation of the reshaping of Open Cut 2 and commencement of the installation of the drop structure and contour drains. The rehabilitation in Open Cut 2 was not completed during the reporting period. The installation of a drop structure and contour drains, application of growth media and to seed the area were not completed.

Excessive and extensive rainfall received during the reporting period delayed the reshaping of the area, which in turn delayed the commencement of the installation of the drop structure and contour drains. In addition to the commencement delay, illness (mostly Covid) affected the ability of the contractor to provide resources to complete the work in a timely manner.

Work is continuing on the installation of the drop structure and contour drains, and this will be completed in Q2 2023. Following the completion of the installation of these water management structures; growth media and seed will be applied to the area. These areas are shown as being completed in 2023 in the Forward Program (**Section 6.0**).

Mining operations at MCC continued longer than expected during the reporting reported. This extension of mining operations was due to wet weather delaying mining activities and the identification of additional coal reserves available to mine. Due to this delay in mining, there will be a delay to the rehabilitation activities in Open Cut 1 as the areas won't be available for rehabilitation when expected. The updated rehabilitation forecast is shown in the Forward Program (Figure 45 to **Figure 47)**.

## 5.4 REHABILITATION MONITORING AND RESEARCH FINDINGS

### 5.4.1 REHABILITATION MONITORING

Rehabilitation monitoring was undertaken during the reporting period in accordance with the requirements of the RMP. A summary of the rehabilitation monitoring is shown below.

***Rehabilitation Woodland – Vegetation***

Based on the monitoring results, Rehabilitation woodland sites are performing well with species assemblages containing more than the minimum 25% of species being characteristic of the Vegetation Classes and Threatened Ecological Community's (TECs) within the region.

All sites also recorded native overstory species that occur in Plant Community Types (PCTs) and associated TECs within the region and are in the recommended species mix as shown in the RMP.

Across the Rehabilitation woodlands, the median foliage cover for Native Overstorey, Native Midstorey and Litter was within the 10th and 90th percentile variation range of the Analogue woodland sites, however, the Native ground cover fell below the 10th percentile variation range of the Analogue woodland sites.

The total priority and HTE cover has been calculated at 12% across rehabilitation woodlands and is below the completion criteria threshold of <15%.

***Rehabilitation Woodland – Fauna***

Overall, there seems to have been a slight increase in the overall numbers of fauna species recorded at Analogue and Rehabilitation sites.

Mammals, particularly the larger mammals, appeared to show a preference for utilisation of Rehabilitation areas over Analogue areas.

There has been an overall increase in the average number of bird species recorded within Rehabilitation woodland sites from 2015 to 2022.

Rehabilitation woodland site RW3 recorded presence of *Pomatostomus temporalis* (Grey crowned Babbler) which is listed as Vulnerable under the *Biodiversity Conservation Act 2016* (BC Act).

Monitoring indicates good microbat activity, with both common species recorded at all Analogue and woodland sites, and threatened species recorded across all Analogue and Rehabilitation sites.

***Rehabilitation pasture – Vegetation***

Rehabilitation pasture sites are preforming well. Overall, ground cover was good with all sites well above the minimum >50% ground cover require. The median herbage mass yield was much greater than the Analogue pastures 10th percentile and the minimum 1000 kg/ha threshold required for sustainable grazing. The species composition showed that vegetative cover was dominated by desirable and palatable pasture species.

The median value for weeds recorded at the Rehabilitation pasture sites was well below the 90th percentile criteria threshold based on Analogue pasture sites.

***Rehabilitation – Erosion and landform stability***

Generally, there was little active erosion occurring within the rehabilitation sites.

### 5.4.2 STATUS OF PERFOMANCE AGAINST REHABILITATION OBJECTIVES AND COMPLETION CRITERIA

The rehabilitation monitoring program undertaken this year aligns with the rehabilitation monitoring program included in the Rehabilitation Management Plan. All rehabilitation areas in the Landform Establishment phase are represented in the rehabilitation monitoring program to assess performance against the proposed rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan.

***Woodland Summary***

- All of the Rehabilitation woodland areas met the required completion criteria targets for characteristic species assemblage, priority and High Threat Exotic (HTE) weed burden cover and evidence of characteristic species seedlings (**Table 33**).
- Rehabilitation woodland areas met three of the four components of the completion criteria targets for foliage cover being Native Overstorey, Native Midstorey and Litter, however, Native ground cover fell below the 10$^{th}$ percentile variation range of the Analogue woodland sites (**Table 34**). Rehabilitation woodland areas may require further intervention (weed control or overseeding with competitive native species) to decrease weed cover/exotic grass cover and increase native grass cover to allow them to reach the completion criterion benchmark for native groundcover.
- Monitoring confirms that multiple native fauna species including ground-dwelling mammals, woodland birds, microbats, and reptiles are utilising rehabilitation woodlands across the site and that various fauna habitats are available for use by these species.
- Little significant active erosion occurring, no immediate action is required (**Table 37**).

***Pasture Summary***

- All of the Rehabilitation pasture areas met the required completion criteria targets for groundcover, herbage biomass, priority weed burden and pasture composition (pasture quality) (**Table 35** and **Table 36**).
- Weed management is recommended to reduce the priority weed burden for Fireweed at Rehabilitation pasture sites RP1, RP4 and RP6 and Coolatai grass at RP4.

- Little significant active erosion occurring, no immediate action is required (**Table 37**).

Rehabilitation is moving towards achieving the final land use as soon as reasonably practicable.

The Rehabilitation Monitoring Report demonstrated that overall, the rehabilitation areas are performing well. When the results were compared to relevant completion criteria, only one assessed item did not reach the target. This was the native ground cover levels at the Woodland rehabilitation sites.

The Rehabilitation Monitoring Report identified that targeted weed management may be required to prevent degradation of rehabilitated areas. The Rehabilitation Monitoring Report also identified that rehabilitation woodland areas may require further intervention (weed control or overseeding with competitive native species) to decrease weed cover/exotic grass cover and increase native grass cover to allow them to reach the completion criterion benchmark for native groundcover.

**Table 33: Rehabilitation Woodland Completion Criteria Targets and 2022 Results**

| Completion Criteria Target (characteristic species) | 2022 Result | Target Reached | Completion Criteria Target (Priority and HTE) | 2022 Result | Target Reached | Completion Criteria Target (Evidence of characteristic species seedlings) Y/N | Target Reached |
|---|---|---|---|---|---|---|---|
| 25% | 42% | Yes | <15% | 12% | Yes | Y | Yes |

**Table 34: Rehabilitation Woodland Foliage Cover Completion Criteria Target and 2002 Results**

| | Native Overstorey | Native Midstorey | Native Ground Cover | Litter |
|---|---|---|---|---|
| $10^{th}$-$90^{th}$ percentile range of Analogue sites | 18.5-28.75 | 2-15 | 82-10 | 8-43 |
| Rehabilitation sites (Median foliage cover %) | 24 | 4 | 48 | 22 |
| Target Reached | No | | | |

**Table 35: Rehabilitation Pasture Site Completion Criteria Targets and 2022 Results**

| Completion Criteria Target (>50% ground cover required) | Target Reached | Completion Criteria Target (median herbage biomass > Analogue $10^{th}$ Percentile 1570 kg/ha) | Target Reached | Completion Criteria Target (Desirable pasture spp. cover >50%) | Target Reached |
|---|---|---|---|---|---|
| >50% | Yes | >1570 | Yes | >50% | Yes |

**Table 36: Rehabilitation Pasture Weeds Criteria Target and 2022 Results**

| Completion Criteria Target (Priority weed cover %<$90^{th}$ percentile of analogue) | 2022 Result | Target Reached |
|---|---|---|
| <21% | 1.1% | Yes |

**Table 37: Woodland and Pasture Rehabilitation Site Completion Criteria Target for Erosion and Landform Stability and 2022 Results**

| Active Gullies >300mm Present in Rehabilitation Woodland or Pasture Sites (yes/no) | Target Reached |
|---|---|
| No | Yes |

### 5.4.3 OUTCOMES OF REHABILITATION RESEARCH TRIALS

During the reporting period, MCC commenced work on a Landform Evolution Model to assess the long-term erosional stability of the approved final landforms. The outcomes of this work will be available in early 2023 and will be reported in the next Annual Rehabilitation Report.

**Table 38: List of Active Rehabilitation Research and Trials**

| No. | RRT no | Project/ trial name | Objective of Trial Project | Methodology | Expected Date of Completion |
|---|---|---|---|---|---|
| 1 | 1 | Landform Evolution Modelling | Identify erosional stability of rehabilitation areas | SIBERIA Landform Evolution Model | 31 January 2023 |

# 6.0 REHABILITATION FORWARD PROGRAM

## 6.1 THREE YEAR FORECAST – SURFACE DISTURBANCE ACTIVITIES

This section provides details on surface disturbance activities being carried out over the next three years.

### 6.1.1 EXPLORATION ACTIVITIES

No further exploration is proposed by MCC at the site during the next three years.

### 6.1.2 CONSTRUCTION ACTIVITIES

No construction is proposed by MCC at the site during the next three years.

### 6.1.3 MINING SCHEDULE

***Mining Development***

No further coal mining is proposed by MCC.

***Emplacement Areas***

Historically, both coarse and fine rejects were trucked back to the pit for disposal and managed as carbonaceous material. Overburden has been dumped sequentially into the Open Cut 1 and Open Cut 2 voids with consideration being given to carbonaceous content and liability to spontaneous combustion. Selective stockpiling of inert materials with no carbonaceous content has been undertaken for use as cover material in the final voids to aid in the prevention of potential spontaneous combustion. The location and approximate volume of material in the stockpile is recorded.

***Infrastructure and Tailings Facilities***

Decommissioning of the Coal Handling and Preparation Plant (CHPP) will be undertaken in Year 1 of the FP (2023). All work will be completed in accordance with consent and lease conditions.

There are no tailings storage facilities onsite.

***Waste Management***

Waste is currently segregated and taken offsite to either be recycled or disposed of at landfill by licenced contractors. This process will continue throughout the decommissioning process. All waste will be disposed of in accordance with EPA Guidelines.

Where possible, all identified sources of contamination will be remediated during the operational phase of the mine. In some cases, however, this may not be possible (for example, under existing slabs and workshops) and in these circumstances the remediation will be undertaken during decommissioning.

A preliminary investigation into potential sources of contamination, including some Phase 1 sampling and analysis, has been undertaken around the CHPP and MIA, as well as any other areas on site with the potential for contamination such as dams with diesel pumps, laydown areas etc. This Phase 1 review identified Areas of Environmental Concern that need further investigation and management. MCC commenced the Phase 2 of the assessment in 2022 to further define the extent of contamination across the site. The findings from the Phase 2 assessment will be obtained in Year 1 of the FP (2023) and will be incorporated into the rehabilitation activities on site.

***Material Production Schedule***

The material production schedule in **Table 39** reflects the mining operations being completed at the site during 2022.

**Table 39: Material Production Schedule During the Next Three Years**

| Material | Unit | Year 1 (01/01/23-31/12/23) | Year 2 (01/01/24-31/12/24) | Year 3 (01/01/25-31/12/25) |
|---|---|---|---|---|
| Stripped topsoil (if applicable) | $m^3$ | 0 | 0 | 0 |
| Rock/Overburden | $m^3$ | 0 | 0 | 0 |
| Ore | Mt | 0 | 0 | 0 |
| Reject Material | Mt | 0 | 0 | 0 |
| Product | Mt | 0 | 0 | 0 |

## 6.2 THREE YEAR REHABILITATION FORECAST

### 6.2.1 REHABILITATION PLANNING SCHEDULE

Detailed mine planning is completed annually to determine proposed mining/disturbance and rehabilitation to be undertaken in the following year.

Mine closure studies are ongoing for the site to address potential closure related knowledge gaps relating to lease relinquishment. Any outcomes that affect rehabilitation of the site will be incorporated into this document.

### 6.2.2 STAKEHOLDER CONSULTATION

Consultation is included in Section 4.2 of the RMP. A Stakeholder Engagement Plan has been developed for implementation during mine closure.

### 6.2.3 REHABILITATION STUDIES/DESIGN WORK

Design works will be undertaken to determine the material handling required each year to achieve the approved final landform. A detailed design of water management structures will be prepared prior to construction.

### 6.2.4 RISK ASSESSMENT

A Rehabilitation Risk Assessment was undertaken in January 2022 to identify and assess the identified rehabilitation and closure risks for the site in accordance with:

- Rehabilitation Risk Assessment Guideline (NSW Resources Regulator, 2021); and
- AS/NZS ISO 31000:2018 Risk Management Guidelines.

Of the 83 potential risks that were identified across the six phases of rehabilitation from active mining to ecosystem and land use development, 25 risks were deemed residual. Further details are included in Section 3.0 of the RMP. The Rehabilitation Risk Assessment will be reviewed in accordance with the guideline.

## 6.3 REHABILITATION RESEARCH AND TRIALS

In 2022, MCC commenced work on a Landform Evolution Model to assess the long-term erosional stability of the approved final landforms. The outcomes of this work will be available in early 2023 and will be reported in the next Annual Rehabilitation Report. The findings from this assessment will be incorporated into future revisions of the RMP.

## 6.4 REHABILITATION MAINTENANCE AND CORRECTIVE ACTIONS

### 6.4.1 MAINTENANCE

Maintenance activities will be conducted in accordance with the requirements of Section 6.2.6 of the Rehabilitation Management Plan.

### 6.4.2 INTERVENTION AND ADAPTIVE MANAGEMENT

Intervention and adaptive management will be conducted in accordance with the requirements of Section 10.0 of the Rehabilitation Management Plan.

### 6.4.3 MANAGEMENT AND MITIGATION RESPONSES

Management and mitigation responses will be conducted in accordance with the requirements of Section 10.0 of the Rehabilitation Management Plan.

### 6.4.4 TRIGGER ACTION RESPONSE PLAN (TARP)

The Trigger Action Response Plan included in Section 10.0 of the Rehabilitation Management Plan identifies the proposed contingency strategies in the event of unexpected variations or impacts to rehabilitation outcomes. The TARP outlines the key identified risks, their trigger and proposed mitigation measures to reduce the identified risks.

## 6.5 REHABILITATION SCHEDULE

The status of areas still to rehabilitated and decommissioned along with the proposed timing for completion of rehabilitation and decommissioning are shown below**.**

- Coal Handling and Preparation Plant
  - Removal of coal from stockpiles – Q1 2023
  - Demolition of infrastructure – Q2 2023
  - Removal of coal stockpiles – Q4 2023
  - Reshaping of landform – Q4 2023
  - Application of growth medium and seeding – Q1 2024
- Mine Infrastructure Area
  - Demolition of infrastructure – Q2 2026
  - Reshaping of landform – Q3 2026
  - Application of growth medium and seeding – Q4 2026
- Open Cut 1
  - Reshaping of landform – Q3 2026
  - Installation of water control structures – Q3 2026
  - Application of growth medium and seeding – Q4 2026
- Open Cut 2
  - Reshaping of landform – Q3 2022
  - Installation of water control structures – Q2 2023
  - Application of growth medium and seeding – Q3 2023

Key assumptions and principles used when developing the life of mine rehabilitation schedule include:

- Achieving acceptable slopes (equal to or less than 14 degrees),
- Minimising the haulage distance of overburden,
- Minimising the amount of bulk shaping required after the cessation of coal extraction,
- Minimising the size and depth of the voids remaining at the end of mine life, and

- Having adequate inert material to cover carbonaceous material.

This schedule addresses the remaining rehabilitation activities at the site in a timeframe that is reasonably practicable.

## 6.6 SUBSIDENCE REMEDIATION FOR UNDERGROUND OPERATIONS

Subsidence is not expected to impact on areas of rehabilitation. Historical bord and pillar underground mining has been undertaken at the site, which typically results in minimal subsidence therefore the risk of impact to rehabilitation is considered very low. No subsidence monitoring is required by MCC.

## 6.7 PLAN 2 – MINING AND REHABILITATION THREE YEAR FORECAST

The mining and rehabilitation progress for the next three years (2023 to 2025) is shown on **Figure 45** to **Figure 47**.

## 6.8 PROGRESSIVE MINING AND REHABILITATION SCHEDULE

### 6.8.1 THREE YEARLY FORECAST AND DISTURBANCE SCHEDULE

The activities proposed for the next three years are associated with decommissioning and rehabilitation of the site following cessation of mining this reporting period.

**Table 40: Predicted Cumulative Disturbance and Rehabilitation Progression During the Next Three-Year Term**

| Year | | Year 1 (2023) | Year 2 (2024) | Year 3 (2025) |
|---|---|---|---|---|
| **Total Disturbance Footprint – Surface Disturbance (hectares)** | **A1** | 618.07 | 618.07 | 618.07 |
| **Total Active Disturbance (hectare)** | **B** | 137.23 | 109.15 | 57.05 |
| **Rehabilitation – Land Preparation (hectares)** | **C** | 82.29 | 110.37 | 162.47 |
| **Ecosystem and Land Use Establishment (hectares)** | **D** | 0.00 | 0.00 | 0.00 |

### 6.8.2 REHABILITATION KEY PERFORMANCE INDICATORS (KPIs)

**Table 41: Progressive Rehabilitation Key Performance Indicators (KPIs) During the Next Three-Year Term**

| Year | | Year 1 (2023) | Year 2 (2024) | Year 3 (2025) |
|---|---|---|---|---|
| **Total New Active Disturbance Area During Reporting Period (hectares)** | **O** | 0.00 | 0.00 | 0.00 |
| **Area of Land Proposed for Active Rehabilitation During Reporting Period (hectares)** | **P** | 82.29 | 28.08 | 52.10 |
| **Annual Rehabilitation to Disturbance Ratio** | **Q** | 0.00 | 0.00 | 0.00 |

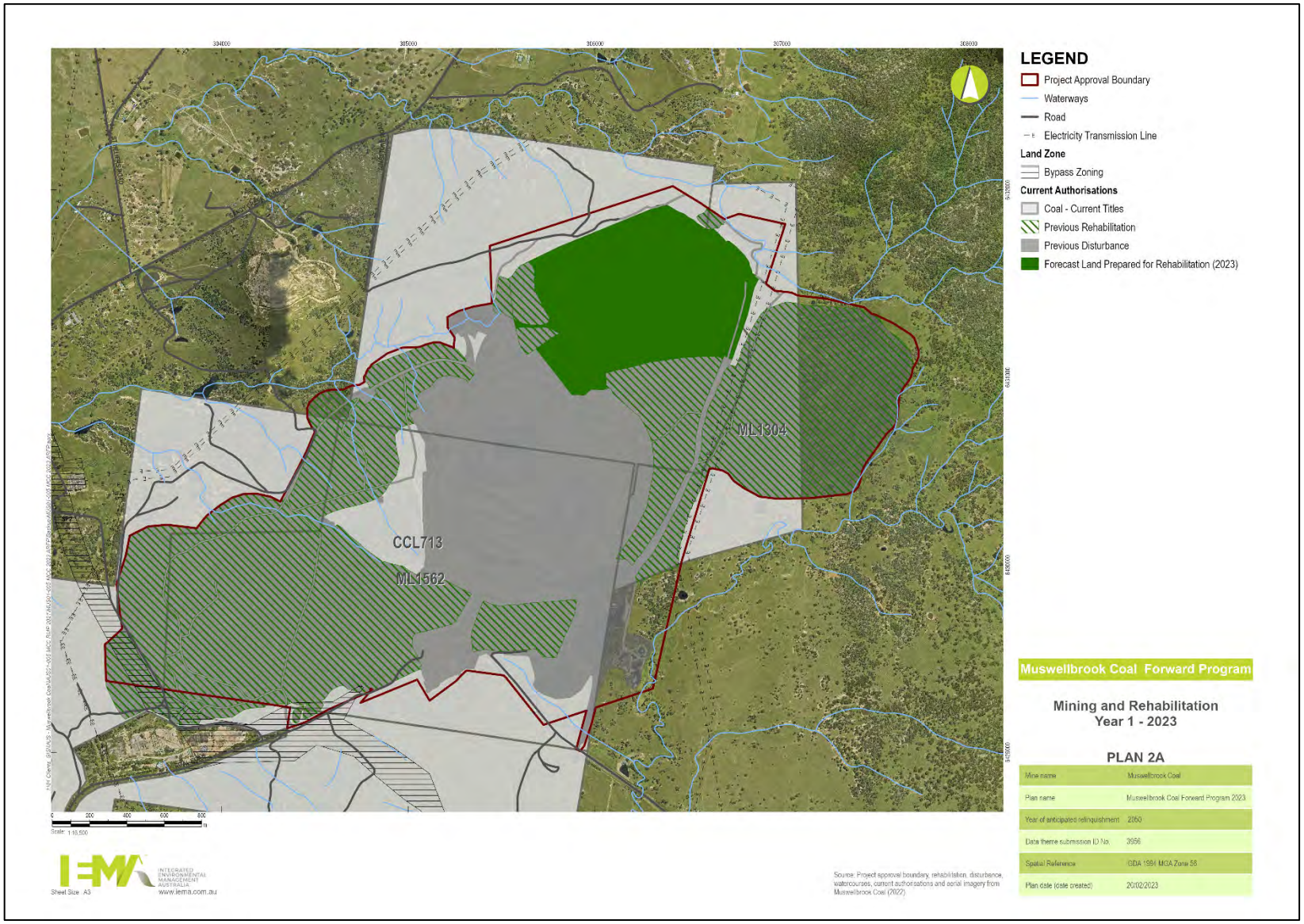


**Figure 45: Plan 2A – Mining and Rehabilitation Year 1 (2023)**

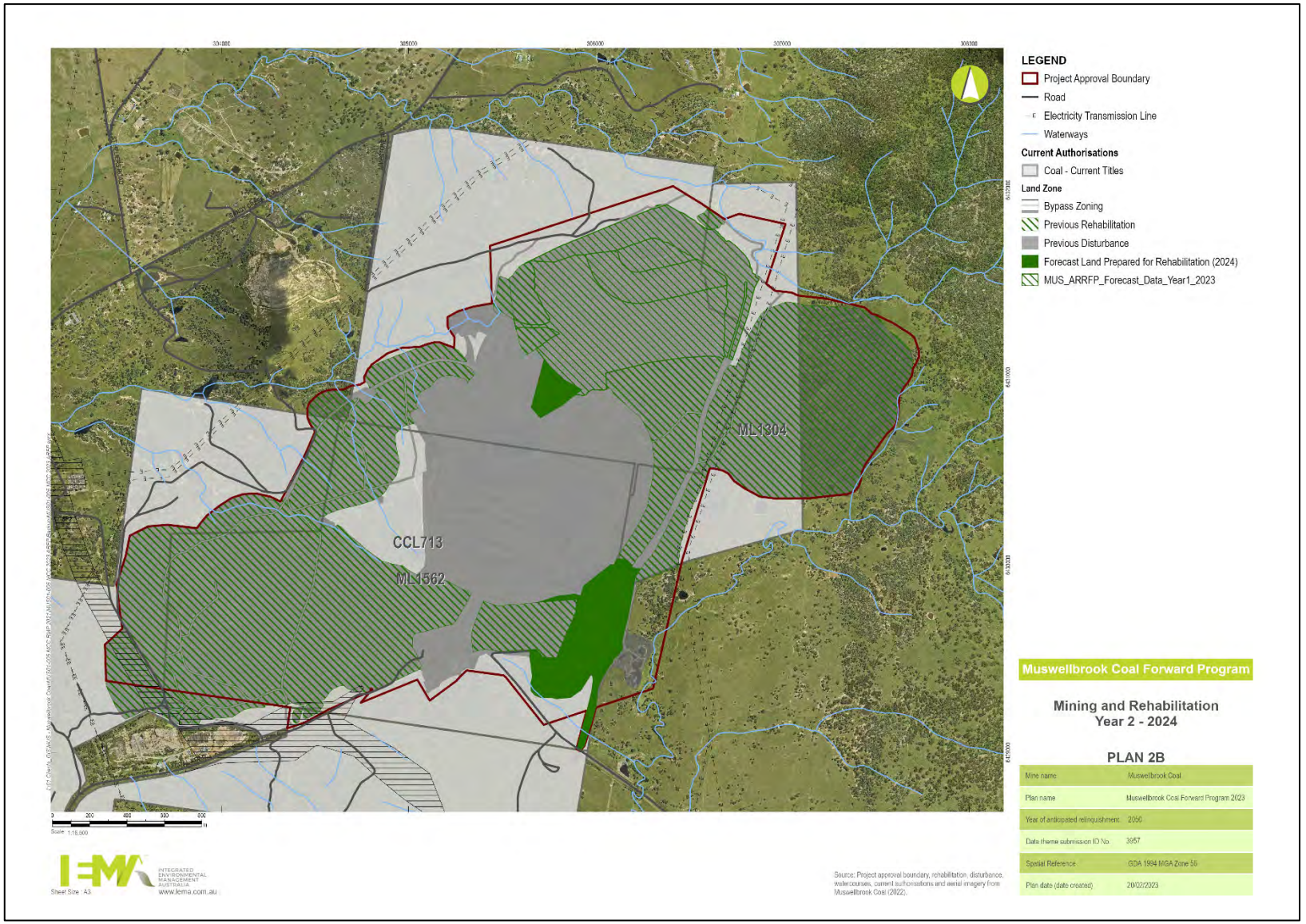


**Figure 46: Plan 2B – Mining and Rehabilitation Year 2 (2024)**

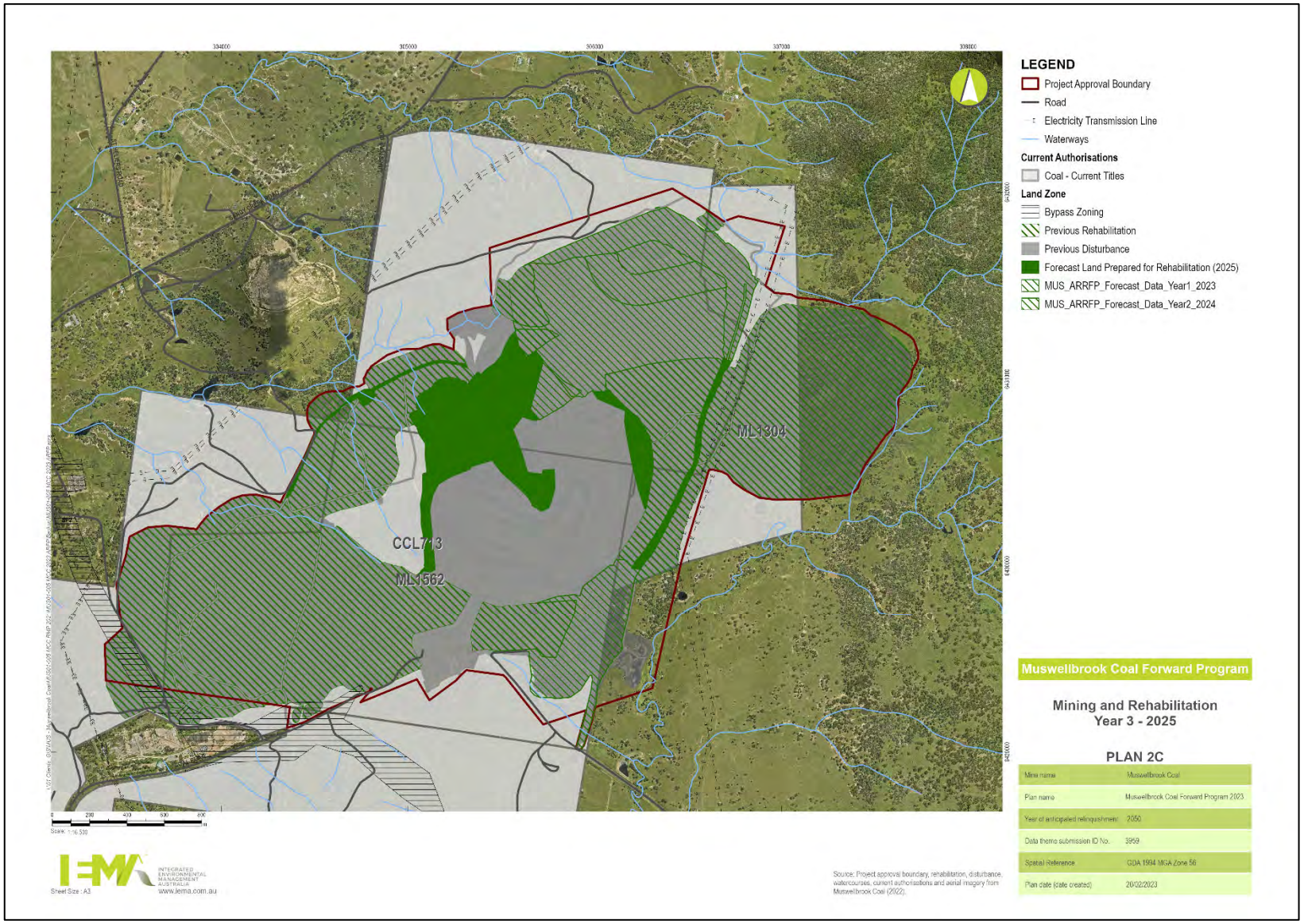


**Figure 47: Plan 2C – Mining and Rehabilitation Year 3 (2025)**

# 7.0 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

During the next reporting period, the following activities are planned:

- Review the Environmental Management Plans to address rehabilitation activities.
- Continue to implement obligations in the Environmental Management Plans including the Rehabilitation Management Plan.
- Continue rehabilitation activities as committed to in the Forward Program.
- Continue with detailed environmental studies associated with the closure of the site.

# Appendix 1: Air Quality Monitoring Results

## REAL-TIME $PM_{10}$ MONITORING RESULTS

| January 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Jan-22 | 18.4 | 16.5 | 16.7 |
| 02-Jan-22 | 13.2 | 12.6 | 10.3 |
| 03-Jan-22 | 15.4 | 15.1 | 15.6 |
| 04-Jan-22 | 29.7 | 18.5 | 20.5 |
| 05-Jan-22 | 21.8 | 11.0 | 12.4 |
| 06-Jan-22 | 11.9 | 12.9 | 13.1 |
| 07-Jan-22 | 16.2 | no data | 15.5 |
| 08-Jan-22 | 8.6 | 10.0 | 10.1 |
| 09-Jan-22 | 16.7 | 15.4 | 16.8 |
| 10-Jan-22 | 23.4 | 23.7 | 24.5 |
| 11-Jan-22 | 25.8 | 23.7 | 17.9 |
| 12-Jan-22 | 21.7 | 30.9 | 23.6 |
| 13-Jan-22 | 21.1 | 14.9 | 8.4 |
| 14-Jan-22 | no data | 27.4 | 14.6 |
| 15-Jan-22 | 12.3 | no data | 10.6 |
| 16-Jan-22 | 23.6 | no data | 19.4 |
| 17-Jan-22 | 31.5 | no data | 29.4 |
| 18-Jan-22 | 27.8 | 30.1 | 15.8 |
| 19-Jan-22 | 14.3 | 12.4 | 10.7 |
| 20-Jan-22 | 24.0 | 22.6 | 20.4 |
| 21-Jan-22 | 28.4 | 34.6 | 19.9 |
| 22-Jan-22 | 16.7 | 12.9 | 13.0 |
| 23-Jan-22 | 11.8 | 10.1 | 10.3 |
| 24-Jan-22 | 13.3 | 14.4 | 13.3 |
| 25-Jan-22 | 26.2 | 64.1 | 23.3 |
| 26-Jan-22 | 30.6 | 17.4 | 18.6 |
| 27-Jan-22 | 26.5 | 17.3 | 20.0 |
| 28-Jan-22 | 29.1 | 34.0 | 23.0 |
| 29-Jan-22 | 32.0 | 22.9 | 22.4 |
| 30-Jan-22 | 20.3 | no data | 19.4 |
| 31-Jan-22 | 30.2 | no data | 24.2 |

| February 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Feb-22 | 22.8 | 57.4 | 20.5 |
| 02-Feb-22 | 8.9 | 23.9 | 9.8 |
| 03-Feb-22 | 15.3 | 14.1 | 15.2 |
| 04-Feb-22 | 17.1 | 15.7 | 16.9 |
| 05-Feb-22 | 19.2 | 15.9 | 14.7 |
| 06-Feb-22 | 15.4 | 14.3 | 14.2 |
| 07-Feb-22 | 22.8 | 14.8 | 16.5 |
| 08-Feb-22 | 15.5 | 14.9 | 14.4 |
| 09-Feb-22 | 17.0 | 39.4 | 16.0 |
| 10-Feb-22 | 23.9 | 57.3 | 23.4 |
| 11-Feb-22 | 20.4 | 23.1 | 20.9 |
| 12-Feb-22 | 17.1 | 16.3 | 17.2 |
| 13-Feb-22 | 19.9 | 15.3 | 17.6 |
| 14-Feb-22 | 24.9 | 24.4 | 23.1 |
| 15-Feb-22 | 21.7 | 18.2 | 19.9 |
| 16-Feb-22 | 26.1 | 24.7 | 23.5 |
| 17-Feb-22 | 18.5 | 53.5 | 19.0 |
| 18-Feb-22 | 17.7 | 37.2 | 21.1 |
| 19-Feb-22 | 18.3 | 18.6 | 18.9 |
| 20-Feb-22 | 13.8 | 27.7 | 17.0 |
| 21-Feb-22 | 11.9 | 79.6 | 16.2 |
| 22-Feb-22 | 19.0 | 15.9 | 16.7 |
| 23-Feb-22 | 10.7 | 8.3 | 10.0 |
| 24-Feb-22 | 8.4 | 7.6 | 10.0 |
| 25-Feb-22 | 13.3 | 14.9 | 15.9 |
| 26-Feb-22 | 14.9 | 10.9 | 14.6 |
| 27-Feb-22 | 14.8 | 10.4 | 15.2 |
| 28-Feb-22 | 12.9 | 13.0 | 12.7 |

| March 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Mar-22 | 17.3 | 12.6 | 9.8 |
| 02-Mar-22 | 12.4 | 10.5 | 10.3 |
| 03-Mar-22 | 16.7 | 21.8 | 9.6 |
| 04-Mar-22 | 17.6 | 16.0 | 9.7 |
| 05-Mar-22 | 14.7 | no data | 16.7 |
| 06-Mar-22 | 13.7 | no data | 11.1 |
| 07-Mar-22 | 12.7 | no data | 9.6 |
| 08-Mar-22 | 8.7 | no data | 10.9 |
| 09-Mar-22 | 6.8 | 14.7 | 11.2 |
| 10-Mar-22 | 14.6 | 16.9 | 16.8 |
| 11-Mar-22 | 19.7 | 42.1 | 20.1 |
| 12-Mar-22 | 19.7 | 17.6 | 13.2 |
| 13-Mar-22 | 13.6 | 16.2 | 13.2 |
| 14-Mar-22 | 12.4 | 26.9 | 14.1 |
| 15-Mar-22 | 17.0 | 16.0 | 16.5 |
| 16-Mar-22 | 16.7 | 22.1 | 17.4 |
| 17-Mar-22 | 18.6 | 30.4 | 19.0 |
| 18-Mar-22 | 19.6 | 13.0 | 16.0 |
| 19-Mar-22 | 21.6 | 21.3 | 15.1 |
| 20-Mar-22 | 23.9 | 28.4 | 20.8 |
| 21-Mar-22 | 21.0 | 46.2 | 19.3 |
| 22-Mar-22 | 14.1 | 69.9 | 19.2 |
| 23-Mar-22 | 20.4 | no data | 27.9 |
| 24-Mar-22 | 13.8 | 10.7 | 9.5 |
| 25-Mar-22 | 13.3 | 19.6 | 14.6 |
| 26-Mar-22 | 13.4 | 10.4 | 11.1 |
| 27-Mar-22 | 18.7 | 11.5 | 11.7 |
| 28-Mar-22 | 12.3 | 20.9 | 13.6 |
| 29-Mar-22 | 11.2 | no data | 10.5 |
| 30-Mar-22 | 23.3 | 15.5 | 14.7 |
| 31-Mar-22 | 22.8 | 15.1 | 12.7 |

| April 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Apr-22 | 18.4 | 13.6 | 12.0 |
| 02-Apr-22 | 9.4 | 49.8 | 14.5 |
| 03-Apr-22 | 9.4 | 68.9 | 12.1 |
| 04-Apr-22 | 9.9 | 94.9 | 15.4 |
| 05-Apr-22 | 18.8 | 46.0 | 22.2 |
| 06-Apr-22 | 21.8 | 23.9 | 20.3 |
| 07-Apr-22 | 13.6 | 13.9 | 13.3 |
| 08-Apr-22 | 10.2 | 11.4 | no data |
| 09-Apr-22 | 11.8 | 9.8 | no data |
| 10-Apr-22 | 24.1 | 16.3 | 13.9 |
| 11-Apr-22 | 13.1 | 44.7 | no data |
| 12-Apr-22 | 20.9 | 18.5 | 18.3 |
| 13-Apr-22 | 18.0 | 13.8 | 13.2 |
| 14-Apr-22 | 17.2 | 13.0 | 9.4 |
| 15-Apr-22 | 13.7 | 32.1 | 6.7 |
| 16-Apr-22 | 11.0 | 20.8 | 8.4 |
| 17-Apr-22 | 9.6 | 26.2 | 9.8 |
| 18-Apr-22 | 11.1 | 36.5 | 10.2 |
| 19-Apr-22 | 10.0 | 79.0 | 14.9 |
| 20-Apr-22 | 4.8 | 49.7 | 6.8 |
| 21-Apr-22 | 8.8 | 30.0 | 11.3 |
| 22-Apr-22 | 13.3 | 8.8 | 10.7 |
| 23-Apr-22 | no data | 14.8 | 12.5 |
| 24-Apr-22 | 9.5 | 6.6 | 9.3 |
| 25-Apr-22 | 12.0 | 9.8 | 8.2 |
| 26-Apr-22 | 8.8 | 98.6 | 11.6 |
| 27-Apr-22 | 11.8 | 11.9 | 13.3 |
| 28-Apr-22 | 17.0 | 27.5 | 16.4 |
| 29-Apr-22 | 12.2 | 59.9 | 13.3 |
| 30-Apr-22 | 7.9 | 71.4 | 10.6 |

| May 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-May-22 | 10.9 | 24.6 | 10.3 |
| 02-May-22 | | 38.2 | 13.2 |
| 03-May-22 | 10.1 | 42.7 | 9.2 |
| 04-May-22 | 8.5 | 61.2 | 11.5 |
| 05-May-22 | 8.8 | 48.2 | 12.6 |
| 06-May-22 | 8.3 | 57.7 | 14.1 |
| 07-May-22 | 6.4 | 69.0 | 8.4 |
| 08-May-22 | 8.4 | 38.8 | 9.6 |
| 09-May-22 | 16.9 | 39.5 | 18.2 |
| 10-May-22 | 11.8 | 12.7 | 16.5 |
| 11-May-22 | 12.6 | 13.2 | 16.9 |
| 12-May-22 | 10.7 | 11.6 | 13.6 |
| 13-May-22 | 10.9 | 7.4 | 9.6 |
| 14-May-22 | 10.5 | 17.2 | 11.0 |
| 15-May-22 | 10.6 | 43.1 | 16.1 |
| 16-May-22 | 6.6 | 92.0 | 13.9 |
| 17-May-22 | 8.1 | 146.6 | 13.6 |
| 18-May-22 | 7.6 | 96.0 | 10.3 |
| 19-May-22 | 10.7 | 60.9 | 15.4 |
| 20-May-22 | 18.3 | 40.6 | 20.1 |
| 21-May-22 | 13.6 | 10.4 | 14.4 |
| 22-May-22 | 11.3 | 8.7 | 11.4 |
| 23-May-22 | 10.1 | 8.5 | 12.2 |
| 24-May-22 | 11.1 | 7.7 | 11.4 |
| 25-May-22 | 7.2 | 28.0 | 10.1 |
| 26-May-22 | 13.7 | 30.6 | 13.5 |
| 27-May-22 | 12.1 | 46.2 | 16.7 |
| 28-May-22 | 7.8 | 26.8 | 11.4 |
| 29-May-22 | 4.6 | 22.9 | 5.8 |
| 30-May-22 | 8.7 | 54.3 | 10.4 |
| 31-May-22 | 8.8 | 23.4 | 10.4 |

| June 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Jun-22 | 8.2 | 37.7 | 9.9 |
| 02-Jun-22 | 6.4 | 34.2 | 9.5 |
| 03-Jun-22 | 6.3 | 26.9 | 12.6 |
| 04-Jun-22 | 4.8 | 12.5 | 5.0 |
| 05-Jun-22 | 4.4 | 24.4 | 4.3 |
| 06-Jun-22 | 5.2 | 25.3 | 6.4 |
| 07-Jun-22 | 6.6 | 60.9 | 7.8 |
| 08-Jun-22 | 5.2 | 65.5 | 6.1 |
| 09-Jun-22 | 5.5 | 50.8 | 6.4 |
| 10-Jun-22 | 4.9 | 80.5 | 6.1 |
| 11-Jun-22 | 4.7 | 29.5 | 5.6 |
| 12-Jun-22 | 9.6 | 32.8 | 11.5 |
| 13-Jun-22 | 9.6 | 23.3 | 8.0 |
| 14-Jun-22 | 8.5 | 64.1 | 14.9 |
| 15-Jun-22 | 10.3 | 47.7 | 14.3 |
| 16-Jun-22 | 8.6 | 64.6 | 13.6 |
| 17-Jun-22 | 7.3 | 24.3 | 9.2 |
| 18-Jun-22 | 11.2 | 30.1 | 15.3 |
| 19-Jun-22 | 15.2 | 12.4 | 15.1 |
| 20-Jun-22 | 12.9 | 12.8 | 11.7 |
| 21-Jun-22 | 9.8 | 82.1 | 16.6 |
| 22-Jun-22 | 8.1 | 40.0 | 14.3 |
| 23-Jun-22 | 6.4 | 65.3 | 12.4 |
| 24-Jun-22 | 8.0 | 75.3 | 9.1 |
| 25-Jun-22 | 9.9 | 17.0 | 11.4 |
| 26-Jun-22 | 8.9 | 18.6 | 11.4 |
| 27-Jun-22 | 11.9 | 29.0 | 15.5 |
| 28-Jun-22 | 16.9 | 22.4 | 14.9 |
| 29-Jun-22 | 8.4 | 29.1 | 9.9 |
| 30-Jun-22 | 13.7 | 41.9 | 19.3 |

| July 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Jul-22 | 17.1 | 22.2 | 20.8 |
| 02-Jul-22 | 10.4 | 8.6 | 10.5 |
| 03-Jul-22 | 6.6 | 15.8 | 9.1 |
| 04-Jul-22 | 4.7 | 21.8 | 10.5 |
| 05-Jul-22 | 7.2 | 6.0 | 6.1 |
| 06-Jul-22 | 6.4 | 2.2 | 2.6 |
| 07-Jul-22 | 7.2 | 8.1 | 4.6 |
| 08-Jul-22 | 6.7 | 33.8 | 7.6 |
| 09-Jul-22 | 6.4 | 27.6 | 6.8 |
| 10-Jul-22 | 9.2 | 19.7 | 9.6 |
| 11-Jul-22 | 9.5 | 8.6 | 6.7 |
| 12-Jul-22 | 3.5 | 20.5 | 6.8 |
| 13-Jul-22 | 4.4 | 9.2 | 0.6 |
| 14-Jul-22 | 13.5 | 13.7 | 4.2 |
| 15-Jul-22 | 6.2 | 22.4 | 3.0 |
| 16-Jul-22 | 5.1 | 21.0 | 6.8 |
| 17-Jul-22 | 9.2 | 60.9 | 7.3 |
| 18-Jul-22 | 6.6 | 45.9 | 8.7 |
| 19-Jul-22 | 9.3 | 25.1 | 14.1 |
| 20-Jul-22 | 9.4 | 7.1 | 8.4 |
| 21-Jul-22 | 21.8 | 13.5 | 10.4 |
| 22-Jul-22 | 16.4 | 8.9 | 10.9 |
| 23-Jul-22 | 17.6 | 8.4 | 9.8 |
| 24-Jul-22 | 10.5 | 21.9 | 8.6 |
| 25-Jul-22 | 12.3 | 61.6 | 12.4 |
| 26-Jul-22 | 8.9 | 29.0 | 11.2 |
| 27-Jul-22 | 8.2 | 24.6 | 9.3 |
| 28-Jul-22 | 5.1 | 38.4 | 10.4 |
| 29-Jul-22 | 7.6 | 24.6 | 10.6 |
| 30-Jul-22 | 10.9 | 26.5 | 9.6 |
| 31-Jul-22 | 8.8 | 28.6 | 11.7 |

| August 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Aug-22 | 7.3 | 37.7 | 9.0 |
| 02-Aug-22 | 5.0 | 33.0 | 7.6 |
| 03-Aug-22 | 9.0 | 50.7 | 13.0 |
| 04-Aug-22 | 10.1 | 50.2 | 14.0 |
| 05-Aug-22 | 7.0 | 29.4 | 7.5 |
| 06-Aug-22 | 5.8 | 13.9 | 6.7 |
| 07-Aug-22 | 6.2 | 15.1 | 7.1 |
| 08-Aug-22 | 7.1 | 16.5 | 7.4 |
| 09-Aug-22 | 10.5 | 15.1 | 7.2 |
| 10-Aug-22 | 12.2 | 10.3 | 10.9 |
| 11-Aug-22 | 10.7 | 31.5 | 13.9 |
| 12-Aug-22 | 9.9 | 25.5 | 12.5 |
| 13-Aug-22 | 3.9 | 10.7 | 4.9 |
| 14-Aug-22 | 4.1 | 21.7 | 3.9 |
| 15-Aug-22 | 4.8 | 36.4 | 5.5 |
| 16-Aug-22 | 5.0 | 23.6 | 8.1 |
| 17-Aug-22 | 9.1 | 27.0 | 10.1 |
| 18-Aug-22 | 5.5 | 36.4 | 6.9 |
| 19-Aug-22 | 7.8 | 38.5 | 9.6 |
| 20-Aug-22 | 7.8 | 36.5 | 9.3 |
| 21-Aug-22 | 12.7 | 15.3 | 10.9 |
| 22-Aug-22 | 12.3 | 76.0 | 12.7 |
| 23-Aug-22 | 12.2 | 87.0 | 12.2 |
| 24-Aug-22 | 5.0 | 17.2 | 6.5 |
| 25-Aug-22 | 5.9 | 36.7 | 8.0 |
| 26-Aug-22 | 11.7 | 14.6 | 10.4 |
| 27-Aug-22 | 9.6 | 9.3 | 11.6 |
| 28-Aug-22 | 15.7 | 24.5 | 14.5 |
| 29-Aug-22 | 27.3 | 18.3 | 16.5 |
| 30-Aug-22 | 13.1 | 39.9 | 11.9 |
| 31-Aug-22 | 9.6 | 12.2 | 10.5 |

| September 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Sep-22 | 10.7 | 28.4 | 17.5 |
| 02-Sep-22 | 9.5 | 21.6 | 12.5 |
| 03-Sep-22 | 11.6 | 8.3 | 9.7 |
| 04-Sep-22 | 12.1 | 12.9 | 9.4 |
| 05-Sep-22 | 11.5 | 9.6 | 8.7 |
| 06-Sep-22 | 11.2 | 13.7 | 10.6 |
| 07-Sep-22 | 13.1 | 18.0 | 11.4 |
| 08-Sep-22 | 17.6 | 16.2 | 12.8 |
| 09-Sep-22 | 6.5 | 71.1 | 8.6 |
| 10-Sep-22 | 5.5 | 21.8 | 7.3 |
| 11-Sep-22 | 7.1 | 15.4 | 9.2 |
| 12-Sep-22 | 7.8 | 33.1 | 12.0 |
| 13-Sep-22 | 10.8 | 35.3 | 14.0 |
| 14-Sep-22 | 11.5 | 19.3 | 14.5 |
| 15-Sep-22 | 16.8 | 18.9 | 16.4 |
| 16-Sep-22 | 5.4 | 22.6 | 7.4 |
| 17-Sep-22 | 9.4 | 38.5 | 12.8 |
| 18-Sep-22 | 7.1 | 14.6 | 10.7 |
| 19-Sep-22 | 8.2 | 22.8 | 10.1 |
| 20-Sep-22 | 15.3 | 17.2 | 16.4 |
| 21-Sep-22 | 22.4 | 17.7 | 20.6 |
| 22-Sep-22 | 8.0 | 6.1 | 7.4 |
| 23-Sep-22 | 9.5 | 9.0 | 8.9 |
| 24-Sep-22 | 7.3 | 16.9 | 9.5 |
| 25-Sep-22 | 7.0 | 13.6 | 7.4 |
| 26-Sep-22 | 11.6 | 20.1 | 12.5 |
| 27-Sep-22 | 11.4 | 18.1 | 12.6 |
| 28-Sep-22 | 9.5 | 32.7 | 12.5 |
| 29-Sep-22 | 8.9 | 10.6 | 8.5 |
| 30-Sep-22 | 14.1 | 12.3 | 13.3 |

| October 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Oct-22 | 15.1 | 13.2 | 15.1 |
| 02-Oct-22 | 11.5 | 12.4 | 10.4 |
| 03-Oct-22 | 8.4 | 15.7 | 12.0 |
| 04-Oct-22 | 10.6 | 28.4 | 11.5 |
| 05-Oct-22 | 16.2 | 12.3 | 15.1 |
| 06-Oct-22 | 9.0 | 8.6 | 9.0 |
| 07-Oct-22 | 15.2 | 13.4 | 9.7 |
| 08-Oct-22 | 9.7 | 17.1 | 11.3 |
| 09-Oct-22 | 4.0 | 6.6 | 5.9 |
| 10-Oct-22 | 8.0 | 13.1 | 9.8 |
| 11-Oct-22 | 7.0 | 3.9 | 4.9 |
| 12-Oct-22 | 11.5 | 13.9 | 8.2 |
| 13-Oct-22 | 14.5 | 13.4 | 12.0 |
| 14-Oct-22 | 10.2 | 24.8 | 10.0 |
| 15-Oct-22 | 13.6 | 27.5 | 10.8 |
| 16-Oct-22 | 18.0 | 22.0 | 15.4 |
| 17-Oct-22 | 17.1 | 15.3 | 15.4 |
| 18-Oct-22 | 13.7 | 12.2 | 14.8 |
| 19-Oct-22 | 10.8 | 15.2 | 10.4 |
| 20-Oct-22 | 10.1 | 7.8 | 8.8 |
| 21-Oct-22 | 6.9 | 10.1 | 7.0 |
| 22-Oct-22 | 9.8 | 13.7 | 9.0 |
| 23-Oct-22 | 8.6 | 9.4 | 8.4 |
| 24-Oct-22 | 12.8 | 11.4 | 11.5 |
| 25-Oct-22 | 9.9 | 35.9 | 11.6 |
| 26-Oct-22 | 7.4 | 21.2 | 8.3 |
| 27-Oct-22 | 8.5 | 74.5 | 8.6 |
| 28-Oct-22 | 10.7 | 65.8 | 15.6 |
| 29-Oct-22 | 9.3 | 38.8 | 11.8 |
| 30-Oct-22 | 8.6 | 23.8 | 12.0 |
| 31-Oct-22 | 14.9 | 70.3 | 15.3 |

| November 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Nov-22 | 8.0 | 40.3 | 8.2 |
| 02-Nov-22 | 7.3 | 25.5 | 9.3 |
| 03-Nov-22 | 10.1 | 47.2 | 12.0 |
| 04-Nov-22 | 13.0 | 18.6 | 18.3 |
| 05-Nov-22 | 13.9 | 11.2 | 12.6 |
| 06-Nov-22 | 13.6 | 16.6 | 11.6 |
| 07-Nov-22 | 12.3 | 14.3 | 13.3 |
| 08-Nov-22 | 13.1 | 14.4 | 11.5 |
| 09-Nov-22 | 11.9 | 9.1 | 12.4 |
| 10-Nov-22 | 15.0 | 16.6 | 13.4 |
| 11-Nov-22 | 16.3 | 26.7 | 14.2 |
| 12-Nov-22 | 12.3 | 25.2 | 13.3 |
| 13-Nov-22 | 17.4 | 19.5 | 16.4 |
| 14-Nov-22 | 10.2 | 44.2 | 14.0 |
| 15-Nov-22 | 6.4 | 44.1 | 12.1 |
| 16-Nov-22 | 10.9 | 44.6 | 11.3 |
| 17-Nov-22 | 15.9 | 37.8 | 15.1 |
| 18-Nov-22 | 16.5 | 20.2 | 17.4 |
| 19-Nov-22 | 12.2 | 38.3 | 13.3 |
| 20-Nov-22 | 14.8 | 30.3 | 17.0 |
| 21-Nov-22 | 13.1 | 26.3 | 15.5 |
| 22-Nov-22 | 10.6 | 54.9 | 17.0 |
| 23-Nov-22 | 10.8 | 75.0 | 12.5 |
| 24-Nov-22 | 13.1 | 46.9 | 15.1 |
| 25-Nov-22 | 18.2 | 33.3 | 19.3 |
| 26-Nov-22 | 23.2 | 18.0 | 16.5 |
| 27-Nov-22 | 17.8 | 40.9 | 16.6 |
| 28-Nov-22 | 23.0 | 27.8 | 21.2 |
| 29-Nov-22 | 23.4 | 26.4 | 22.7 |
| 30-Nov-22 | 20.5 | 16.1 | 21.7 |

| December 2022 | | | |
|---|---|---|---|
| SAMPLE DATE | SITE 7 | SITE 8 | SITE 9 |
| 01-Dec-22 | 19.5 | 21.6 | 21.5 |
| 02-Dec-22 | 17.2 | 15.9 | 17.4 |
| 03-Dec-22 | 13.6 | 15.7 | 12.6 |
| 04-Dec-22 | 12.6 | 11.8 | 9.1 |
| 05-Dec-22 | 14.7 | 61.2 | 16.0 |
| 06-Dec-22 | 21.7 | 34.2 | 26.8 |
| 07-Dec-22 | 15.5 | 30.0 | 15.9 |
| 08-Dec-22 | 12.2 | 43.9 | 14.1 |
| 09-Dec-22 | 22.3 | 25.2 | 23.7 |
| 10-Dec-22 | 17.4 | 17.0 | 18.7 |
| 11-Dec-22 | 17.2 | 22.4 | 15.9 |
| 12-Dec-22 | 13.4 | 43.2 | 17.7 |
| 13-Dec-22 | 10.1 | 51.1 | 15.7 |
| 14-Dec-22 | 11.9 | 38.9 | 14.5 |
| 15-Dec-22 | 14.8 | 51.0 | 15.4 |
| 16-Dec-22 | 15.6 | 22.0 | 18.3 |
| 17-Dec-22 | 18.1 | 15.5 | 17.5 |
| 18-Dec-22 | 8.6 | 9.0 | 10.2 |
| 19-Dec-22 | 17.8 | 15.7 | 18.7 |
| 20-Dec-22 | 17.9 | 19.6 | 19.0 |
| 21-Dec-22 | 15.2 | 11.0 | 15.2 |
| 22-Dec-22 | 19.4 | 34.1 | 21.1 |
| 23-Dec-22 | 17.3 | 26.4 | 18.6 |
| 24-Dec-22 | 11.4 | 18.6 | 14.8 |
| 25-Dec-22 | 14.4 | 18.1 | 15.4 |
| 26-Dec-22 | 13.7 | 12.4 | 9.6 |
| 27-Dec-22 | 18.4 | 14.1 | 15.1 |
| 28-Dec-22 | 16.4 | 31.0 | 17.7 |
| 29-Dec-22 | 31.7 | 43.6 | 29.9 |
| 30-Dec-22 | 16.4 | 15.0 | 20.1 |
| 31-Dec-22 | 14.5 | 15.0 | 16.5 |

# Appendix 2: Water Monitoring Results

**MONTHLY SURFACE WATER MONITORING RESULTS - pH**

| DATE | Dam 1/2 | MCC12 Final Settling Pond | No.2 Open Cut Void | No.1 Open Cut Void | MCC07 | MCC08 |
|---|---|---|---|---|---|---|
| January 22 | 7.78 | 8.66 | no access | no access | 7.80 | 7.76 |
| February 22 | 7.81 | 8.45 | no access | no access | 7.78 | 7.82 |
| March 22 | 7.91 | 8.50 | no access | no access | 7.71 | 7.79 |
| April 22 | 7.98 | 8.16 | no access | no access | 7.75 | 7.79 |
| May 22 | 8.06 | 8.24 | no access | no access | 7.83 | 7.73 |
| June 22 | 8.01 | 8.15 | no access | no access | 7.76 | 7.79 |
| July 22 | 7.83 | 7.86 | no access | no access | 7.77 | 7.77 |
| August 22 | 7.68 | 8.16 | no access | no access | 7.84 | 7.90 |
| September 22 | 8.06 | 8.32 | no access | no access | 7.92 | 7.96 |
| October 22 | 7.92 | 8.31 | no access | no access | 7.84 | 7.95 |
| November 22 | 8.00 | 8.21 | no access | no access | 7.89 | 8.00 |
| December 22 | 8.24 | 8.22 | no access | no access | 7.76 | 7.78 |

**MONTHLY SURFACE WATER MONITORING RESULTS – ELECTRICAL CONDUCTIVITY**

| DATE | Dam 1/2 | MCC12 Final Settling Pond | No.2 Open Cut Void | No.1 Open Cut Void | MCC07 | MCC08 |
|---|---|---|---|---|---|---|
| January 22 | 5,860 | 3,160 | no access | no access | 1,390 | 1,390 |
| February 22 | 6,240 | 3,720 | no access | no access | 1,310 | 1,830 |
| March 22 | 4,880 | 2,320 | no access | no access | 719 | 934 |
| April 22 | 5,710 | 4,500 | no access | no access | 1,130 | 1,420 |
| May 22 | 6,540 | 4,890 | no access | no access | 1,630 | 1,250 |
| June 22 | 6,920 | 5,050 | no access | no access | 1,280 | 1,680 |
| July 22 | 4,810 | 3,640 | no access | no access | 555 | 705 |
| August 22 | 5,370 | 4,280 | no access | no access | 715 | 921 |
| September 22 | 5,540 | 4,170 | no access | no access | 779 | 986 |
| October 22 | 4,860 | 3,750 | no access | no access | 811 | 1,070 |
| November 22 | 5,070 | 3,390 | no access | no access | 1,010 | 1,360 |
| December 22 | 5,340 | 4,850 | no access | no access | 1,480 | 1,990 |

**MONTHLY SURFACE WATER MONITORING RESULTS – TOTAL SUSPENDED SOLIDS**

| DATE | Dam 1/2 | MCC12 Final Settling Pond | No.2 Open Cut Void | No.1 Open Cut Void | MCC07 | MCC08 |
|---|---|---|---|---|---|---|
| January 22 | 11 | 7 | no access | no access | 12 | 13 |
| February 22 | 19 | 12 | no access | no access | 11 | 10 |
| March 22 | 11 | 16 | no access | no access | 14 | 14 |
| April 22 | 12 | <5 | no access | no access | 6 | 5 |
| May 22 | 21 | 18 | no access | no access | 13 | 10 |
| June 22 | 28 | 12 | no access | no access | 8 | 6 |
| July 22 | 9 | 5 | no access | no access | 9 | 9 |
| August 22 | 9 | 28 | no access | no access | 8 | 6 |
| September 22 | 19 | 11 | no access | no access | 8 | 11 |
| October 22 | 26 | 13 | no access | no access | 12 | 18 |
| November 22 | 23 | <5 | no access | no access | 12 | 16 |
| December 22 | 20 | 17 | no access | no access | 11 | 19 |

**QUARTERLY SURFACE WATER MONITORING RESULTS – pH**

| DATE | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|
| March 22 | 7.78 | 8.32 | 7.89 | 7.33 | 8.38 | 8.03 |
| June 22 | 8.34 | 8.33 | 8.04 | 7.58 | 8.52 | 7.86 |
| September 22 | 8.23 | 8.42 | 8.06 | 7.52 | 8.43 | 8.15 |
| December 22 | 8.19 | 8.63 | 8.07 | 7.63 | 8.35 | 8.06 |

**QUARTERLY SURFACE WATER MONITORING RESULTS – ELECTRICAL CONDUCTIVITY**

| DATE | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|
| March 22 | 1,210 | 6,500 | 2,730 | 441 | 3,330 | 2,160 |
| June 22 | 2,300 | 7,960 | 3,090 | 1,430 | 7,100 | 8,890 |
| September 22 | 2,220 | 4,270 | 3,220 | 476 | 6,120 | 4,880 |
| December 22 | 2,720 | 8,800 | 3,890 | 1,250 | 8,400 | 7,680 |

**QUARTERLY SURFACE WATER MONITORING RESULTS – TOTAL SUSPENDED SOLIDS**

| DATE | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|
| March 22 | 8 | 6 | 6 | 8 | 11 | 12 |
| June 22 | 7 | 20 | 8 | <5 | 20 | 11 |
| September 22 | 5 | 16 | 42 | 12 | 16 | 14 |
| December 22 | 16 | 25 | 16 | 12 | <5 | <5 |

## ANNUAL SURFACE WATER MONITORING RESULTS

Sampled 14 March 2022 and 26 April 2022

| ANALYTE | Dam 1/2 | MCC12 Final Settling Pond | No.1 Open Cut Void | No.2 Open Cut Void | MCC7 | MCC8 | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 7.91 | 8.5 | NO ACCESS | NO ACCESS | 7.71 | 7.79 | 7.78 | 8.32 | 7.89 | 7.33 | 8.38 | 8.03 |
| EC (µS/cm) | 4880 | 2320 | | | 719 | 934 | 1210 | 6500 | 2730 | 441 | 3330 | 2160 |
| TSS (mg/L) | 11 | 16 | | | 14 | 14 | 8 | 6 | 6 | 8 | 11 | 12 |
| Alkalinity - Hydroxide (mg CaCO3/L) | <1 | <1 | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Alkalinity - Carbonate (mg CaCO3/L) | <1 | <1 | | | <1 | <1 | <1 | <1 | <1 | <1 | 10 | <1 |
| Alkalinity - Bicarbonate (mg CaCO3/L) | 241 | 80 | | | 149 | 149 | 107 | 300 | 186 | 45 | 161 | 125 |
| Total Alkalinity (mg CaCO3/L) | 241 | 80 | | | 149 | 149 | 107 | 300 | 186 | 45 | 171 | 125 |
| Acidity (mg CaCO3/L) | 7 | 1 | | | 2 | 3 | 3 | 3 | 2 | 3 | <1 | 2 |
| Sulfates (mg/L) | 2340 | 1020 | | | 49 | 110 | 467 | 3610 | 1410 | 62 | 1790 | 908 |
| Chloride (mg/L) | 359 | 132 | | | 108 | 140 | 54 | 485 | 82 | 66 | 94 | 126 |
| Calcium (mg/L) | 338 | 227 | | | 39 | 46 | 76 | 212 | 243 | 14 | 140 | 113 |
| Magnesium (mg/L) | 365 | 129 | | | 16 | 23 | 79 | 665 | 181 | 12 | 375 | 163 |
| Sodium (mg/L) | 439 | 162 | | | 86 | 110 | 78 | 506 | 125 | 52 | 201 | 171 |
| Potassium (mg/L) | 25 | 12 | | | 3 | 3 | 8 | 29 | 10 | 4 | 15 | 14 |
| Hardness - total (calculation - mg/L) | 2350 | 1100 | | | 163 | 210 | 515 | 3270 | 1350 | 84 | 1890 | 953 |
| Iron - dissolved (mg/L) | <0.05 | <0.05 | | | 0.12 | 0.12 | <0.05 | <0.05 | <0.05 | 0.13 | <0.05 | 0.1 |
| Aluminium (mg/L) | 0.08 | 0.04 | | | 0.86 | 0.47 | 0.13 | 0.06 | <0.01 | 0.66 | 0.1 | <0.01 |
| Antimony (mg/L) | <0.001 | <0.001 | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Arsenic (mg/L) | 0.001 | <0.001 | | | 0.002 | 0.002 | <0.001 | 0.002 | <0.001 | <0.001 | <0.001 | <0.001 |
| Barium (mg/L) | 0.048 | 0.031 | | | 0.025 | 0.028 | 0.072 | 0.072 | 0.057 | 0.043 | 0.039 | 0.033 |
| Cadmium (mg/L) | <0.0001 | <0.0001 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Chromium (mg/L) | <0.001 | <0.001 | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Cobalt (mg/L) | 0.007 | 0.002 | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | <0.001 |
| Copper (mg/L) | 0.001 | <0.001 | | | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.002 | 0.002 |
| Lead (mg/L) | <0.001 | <0.001 | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Manganese (mg/L) | 0.774 | 0.072 | | | 0.071 | 0.067 | 0.052 | 0.073 | 0.077 | 0.053 | 0.026 | 0.129 |
| Molybdenum (mg/L) | 0.005 | 0.009 | | | 0.001 | <0.001 | <0.001 | 0.001 | <0.001 | <0.001 | 0.002 | 0.001 |
| Nickel (mg/L) | 0.036 | 0.014 | | | 0.001 | 0.001 | 0.002 | 0.005 | 0.005 | 0.002 | 0.005 | 0.005 |
| Selenium (mg/L) | <0.01 | <0.01 | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |

| ANALYTE | Dam 1/2 | MCC12 Final Settling Pond | No.1 Open Cut Void | No.2 Open Cut Void | MCC7 | MCC8 | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zinc (mg/L) | <0.005 | <0.005 | | | 0.007 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | 0.006 |
| Boron (mg/L) | 0.26 | 0.12 | | | 0.09 | 0.07 | 0.08 | 0.27 | <0.05 | <0.05 | 0.08 | 0.1 |
| Iron - total (mg/L) | 0.16 | 0.05 | | | 0.98 | 0.73 | 0.19 | 0.12 | 0.06 | 0.72 | 0.15 | 0.1 |
| Mercury - total (mg/L) | <0.0001 | <0.0001 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Fluoride (mg/L) | 0.7 | 0.6 | | | 0.4 | 0.3 | 0.3 | 0.7 | 0.5 | 0.1 | 0.5 | 0.4 |
| Nitrogen Ammonia (mg/L) | 0.54 | <0.01 | | | 0.03 | 0.04 | <0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 |
| Nitrite as N (mg/L) | 0.2 | 0.02 | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nitrate as N (mg/L) | 0.41 | 0.3 | | | 0.18 | 0.17 | <0.01 | <0.01 | <0.01 | 0.05 | <0.01 | <0.01 |
| Nitrite + Nitrate as N (mg/L) | 0.61 | 0.32 | | | 0.18 | 0.17 | <0.01 | <0.01 | <0.01 | 0.05 | <0.01 | <0.01 |
| Total Anions (meq/L) | 63.7 | 26.6 | | | 7.04 | 9.22 | 13.4 | 94.8 | 35.4 | 4.05 | 43.3 | 25 |
| Total Cations (meq/L) | 66.6 | 29.3 | | | 7.08 | 9.05 | 13.9 | 88.1 | 32.7 | 4.05 | 47 | 26.8 |
| Ionic Balance (meq/L) | 2.29 | 4.9 | | | 0.26 | 0.91 | 1.86 | 3.7 | 3.92 | 0.02 | 4.03 | 3.66 |
| Oil & Grease (mg/L) | <5 | <5 | | | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Naphthalene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Acenaphthylene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Acenaphthene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Fluorene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Phenanthrene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Anthracene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Fluoranthene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Pyrene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Benz(a)anthracene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Chrysene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Benzo(b+j)fluoranthene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Benzo(k)fluoranthene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Benzo(a)pyrene | <0.5 | <0.5 | | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(1.2.3.cd)pyrene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Dibenz(a.h)anthracene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Benzo(g.h.i)perylene | <1.0 | <1.0 | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Sum of polycyclic aromatic hydrocarbons | <0.5 | <0.5 | | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene TEQ (zero) | <0.5 | <0.5 | | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| C6 - C9 Fraction | <20 | <20 | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| C10 - C14 Fraction | <50 | <50 | | | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| C15 - C28 Fraction | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |

| ANALYTE | Dam 1/2 | MCC12 Final Settling Pond | No.1 Open Cut Void | No.2 Open Cut Void | MCC7 | MCC8 | MCC9 | MCC23 | MCC24 | MCC25 | MCC26 | MCC27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C29 - C36 Fraction | <50 | <50 | | | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| C10 - C36 Fraction (sum) | <50 | <50 | | | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| C6 - C10 Fraction | <20 | <20 | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| C6 - C10 Fraction minus BTEX (F1) | <20 | <20 | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| >C10 - C16 Fraction | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| >C16 - C34 Fraction | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| >C34 - C40 Fraction | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| >C10 - C40 Fraction (sum) | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| >C10 - C16 Fraction minus Naphthalene (F2) | <100 | <100 | | | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| Benzene (µg/L) | <1 | <1 | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Toluene (µg/L) | <2 | <2 | | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Ethylbenzene (µg/L) | <2 | <2 | | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| meta- & para-Xylene (µg/L) | <2 | <2 | | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| ortho-Xylene (µg/L) | <2 | <2 | | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Xylenes (µg/L) | <2 | <2 | | | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Sum of BTEX (µg/L) | <1 | <1 | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Naphthalene (µg/L) | <5 | <5 | | | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |

**GROUND WATER MONITORING RESULTS – MINING AREAS**

| DATE | Relative Level (mAHD) | pH | Electrical Conductivity (µS/cm) | Depth to Water (mbgl) | | |
|---|---|---|---|---|---|---|
| BORE RDH650 | | | | RDH616 | RDH617 | RDH624 |
| January 22 | 106.94 | 6.9 | 6,450 | 51.1 | 45.5 | 35.29 |
| February 22 | 106.73 | 7.0 | 6,390 | 52.13 | 45.51 | 35.23 |
| March 22 | 106.53 | 7.0 | 6,600 | 50.26 | 45.36 | 35.13 |
| April 22 | 106.93 | 6.9 | 6,190 | 52.04 | 45.83 | 34.81 |
| May 22 | 106.92 | 7.4 | 6,410 | 52.32 | 45.82 | 34.78 |
| June 22 | 106.94 | 6.9 | 6,500 | 52.2 | 45.71 | 34.69 |
| July 22 | 106.98 | 7.0 | 6,380 | 50.52 | 45.2 | 34.61 |
| August 22 | 107.01 | 7.1 | 6,450 | no access | no access | 34.27 |
| September 22 | 107.19 | 7.0 | 6,300 | 50.84 | 44.95 | 34.05 |
| October 22 | 107.23 | 6.9 | 6,310 | no access | no access | 33.87 |
| November 22 | 107.43 | 6.9 | 6,160 | no access | no access | 33.40 |
| December 22 | 107.43 | 6.8 | 5,920 | 52.14 | 45.65 | 33.25 |

**ANNUAL GROUNDWATER MONITORING RESULTS – MINING AREAS**

Sampled 14 March 2022

| ANALYTE | RDH529 |
|---|---|
| pH | 6.95 |
| EC (µS/cm) | 6600 |
| TSS (mg/L) | <5 |
| Alkalinity - Hydroxide (mg CaCO3/L) | <1 |
| Alkalinity - Carbonate (mg CaCO3/L) | <1 |
| Alkalinity - Bicarbonate (mg CaCO3/L) | 390 |
| Total Alkalinity - (mg CaCO3/L) | 390 |
| Acidity - (mg CaCO3/L) | 40 |
| Sulfates (mg/L) | 3220 |
| Chloride (mg/L) | 529 |
| Calcium (mg/L) | 572 |
| Magnesium (mg/L) | 459 |
| Sodium (mg/L) | 583 |
| Potassium (mg/L) | 40 |
| Hardness - total (calculation - mg/L) | 3320 |
| Iron - dissolved (mg/L) | 0.39 |
| Aluminium (mg/L) | 0.02 |
| Antimony (mg/L) | <0.001 |
| Arsenic (mg/L) | <0.001 |
| Barium (mg/L) | 0.026 |
| Cadmium (mg/L) | <0.0001 |
| Chromium (mg/L) | <0.001 |
| Cobalt (mg/L) | 0.001 |
| Copper (mg/L) | <0.001 |
| Lead (mg/L) | <0.001 |
| Manganese (mg/L) | 1.23 |
| Molybdenum (mg/L) | 0.001 |
| Nickel (mg/L) | 0.019 |
| Selenium (mg/L) | <0.01 |
| Zinc (mg/L) | 0.304 |
| Boron (mg/L) | 0.56 |
| Iron - total (mg/L) | 0.24 |
| Mercury (mg/L) | <0.0001 |
| Fluoride (mg/L) | 0.7 |
| Nitrogen Ammonia (mg/L) | 0.01 |
| Nitrite as N (mg/L) | 0.13 |
| Nitrate (mg/L) | 2.97 |
| Nitrite + Nitrate as N (mg/L) | 3.1 |
| Total Anions (meq/L) | 89.8 |
| Total Cations (meq/L) | 92.7 |
| Ionic Balance (meq/L) | 1.61 |
| Oil & Grease (mg/L) | <5 |
| Naphthalene | <1.0 |
| Acenaphthylene | <1.0 |
| Acenaphthene | <1.0 |
| Fluorene | <1.0 |
| Phenanthrene | <1.0 |

| ANALYTE | RDH529 |
|---|---|
| Anthracene | <1.0 |
| Fluoranthene | <1.0 |
| Pyrene | <1.0 |
| Benz(a)anthracene | <1.0 |
| Chrysene | <1.0 |
| Benzo(b+j)fluoranthene | <1.0 |
| Benzo(k)fluoranthene | <1.0 |
| Benzo(a)pyrene | <0.5 |
| Indeno(1.2.3.cd)pyrene | <1.0 |
| Dibenz(a.h)anthracene | <1.0 |
| Benzo(g.h.i)perylene | <1.0 |
| Sum of polycyclic aromatic hydrocarbons | <0.5 |
| Benzo(a)pyrene TEQ (zero) | <0.5 |
| C6 - C9 Fraction | 450 |
| C10 - C14 Fraction | <50 |
| C15 - C28 Fraction | <100 |
| C29 - C36 Fraction | <50 |
| C10 - C36 Fraction (sum) | <50 |
| C6 - C10 Fraction | 470 |
| C6 - C10 Fraction minus BTEX (F1) | 300 |
| >C10 - C16 Fraction | <100 |
| >C16 - C34 Fraction | <100 |
| >C34 - C40 Fraction | <100 |
| >C10 - C40 Fraction (sum) | <100 |
| >C10 - C16 Fraction minus Naphthalene (F2) | <100 |
| Benzene (µg/L) | 11 |
| Toluene (µg/L) | 85 |
| Ethylbenzene (µg/L) | 10 |
| meta- & para-Xylene (µg/L) | 37 |
| ortho-Xylene (µg/L) | 24 |
| Total Xylenes (µg/L) | 61 |
| Sum of BTEX (µg/L) | 167 |
| Naphthalene (µg/L) | 69 |

**GROUND WATER MONITORING RESULTS – SANDY CREEK**

| Date Sampled | MCC 1003 | | | MCC 1005 | | | MCC 1006 | | | MCC 1017 | MCC 1018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Depth (mbgl) | pH | EC (µS/cm) | Depth (mbgl) | pH | EC (µS/cm) | Depth (mbgl) | pH | EC (µS/cm) | Depth (mbgl) | Depth (mbgl) |
| January 22 | 2.36 | 7.25 | 1330 | no access | no access | no access | 7.37 | too low to sample | | 17.52 | 18.86 |
| February 22 | no access | no access | no access | 6.47 | 7.16 | 2060 | 4.00 | 7.28 | 935 | 17.54 | 18.85 |
| March 22 | no access | no access | no access | no access | no access | no access | no access | no access | no access | 17.55 | 18.73 |
| April 22 | 2.35 | 7.19 | 1400 | no access | no access | no access | 3.91 | 7.17 | 1030 | 17.48 | 18.58 |
| May 22 | 2.34 | 7.17 | 1410 | no access | no access | no access | 2.94 | 7.24 | 904 | 17.39 | 18.49 |
| June 22 | 2.63 | 7.20 | 1370 | no access | no access | no access | 4.01 | 7.40 | 879 | 17.40 | 18.50 |
| July 22 | 2.00 | 7.27 | 1380 | no access | no access | no access | 3.79 | 7.33 | 888 | 17.41 | 18.37 |
| August 22 | 2.08 | 7.24 | 1340 | no access | no access | no access | 3.73 | 7.35 | 952 | 17.15 | 18.38 |
| September 22 | 2.10 | 7.25 | 1420 | no access | no access | no access | 3.71 | 7.34 | 1020 | 16.96 | no access |
| October 22 | 2.00 | 7.21 | 1420 | no access | no access | no access | 3.47 | 7.35 | 1010 | 16.68 | 18.17 |
| November 22 | 2.07 | 7.18 | 1410 | no access | no access | no access | 3.54 | 7.28 | 998 | 16.46 | 18.86 |
| December 22 | 2.22 | 7.12 | 1460 | no access | no access | no access | 3.52 | 7.22 | 961 | 16.53 | 18.72 |

**ANNUAL GROUNDWATER MONITORING RESULTS – SANDY CREEK**

Sampled 26 April 2022

| ANALYTE | MCC1003 | MCC1005 | MCC1006 |
|---|---|---|---|
| pH | 7.19 | no access | 7.17 |
| EC (µS/cm) | 1400 | | 1030 |
| TSS (mg/L) | <5 | | 23 |
| Alkalinity - Hydroxide (mg CaCO3/L) | <1 | | <1 |
| Alkalinity - Carbonate (mg CaCO3/L) | <1 | | <1 |
| Alkalinity - Bicarbonate (mg CaCO3/L) | 248 | | 300 |
| Total Alkalinity - (mg CaCO3/L) | 248 | | 300 |
| Acidity - (mg CaCO3/L) | 1 | | <1 |
| Sulfates (mg/L) | 126 | | 32 |
| Chloride (mg/L) | 259 | | 146 |
| Calcium (mg/L) | 81 | | 47 |
| Magnesium (mg/L) | 37 | | 22 |
| Sodium (mg/L) | 150 | | 90 |
| Potassium (mg/L) | 2 | | 3 |
| Hardness - total (calculation - mg/L) | 355 | | 208 |
| Iron - dissolved (mg/L) | <0.05 | | <0.05 |
| Aluminium (mg/L) | <0.01 | | 0.02 |
| Antimony (mg/L) | <0.001 | | <0.001 |
| Arsenic (mg/L) | <0.001 | | <0.001 |
| Barium (mg/L) | 0.035 | | 0.03 |
| Cadmium (mg/L) | <0.0001 | | <0.0001 |
| Chromium (mg/L) | <0.001 | | <0.001 |
| Cobalt (mg/L) | <0.001 | | <0.001 |
| Copper (mg/L) | <0.001 | | <0.001 |
| Lead (mg/L) | <0.001 | | <0.001 |
| Manganese (mg/L) | 0.001 | | 0.049 |
| Molybdenum (mg/L) | 0.001 | | <0.001 |
| Nickel (mg/L) | <0.001 | | <0.001 |
| Selenium (mg/L) | <0.01 | | <0.01 |
| Zinc (mg/L) | 0.008 | | 0.024 |
| Boron (mg/L) | 0.07 | | 0.06 |
| Iron - total (mg/L) | <0.05 | | 0.19 |
| Mercury (mg/L) | <0.0001 | | <0.0001 |
| Fluoride (mg/L) | 0.4 | | 0.3 |
| Nitrogen Ammonia (mg/L) | <0.01 | | 17.2 |
| Nitrite as N (mg/L) | <0.01 | | <0.01 |
| Nitrate (mg/L) | 0.56 | | <0.01 |
| Nitrite + Nitrate as N (mg/L) | 0.56 | | <0.01 |
| Total Anions (meq/L) | 14.9 | | 10.8 |
| Total Cations (meq/L) | 13.7 | | 9.38 |
| Ionic Balance (meq/L) | 4.28 | | 7.04 |
| Oil & Grease (mg/L) | <5 | | <5 |
| Naphthalene | <1.0 | | <1.0 |
| Acenaphthylene | <1.0 | | <1.0 |

| ANALYTE | MCC1003 | MCC1005 | MCC1006 |
|---|---|---|---|
| Acenaphthene | <1.0 | | <1.0 |
| Fluorene | <1.0 | | <1.0 |
| Phenanthrene | <1.0 | | <1.0 |
| Anthracene | <1.0 | | <1.0 |
| Fluoranthene | <1.0 | | <1.0 |
| Pyrene | <1.0 | | <1.0 |
| Benz(a)anthracene | <1.0 | | <1.0 |
| Chrysene | <1.0 | | <1.0 |
| Benzo(b+j)fluoranthene | <1.0 | | <1.0 |
| Benzo(k)fluoranthene | <1.0 | | <1.0 |
| Benzo(a)pyrene | <0.5 | | <0.5 |
| Indeno(1.2.3.cd)pyrene | <1.0 | | <1.0 |
| Dibenz(a.h)anthracene | <1.0 | | <1.0 |
| Benzo(g.h.i)perylene | <1.0 | | <1.0 |
| Sum of polycyclic aromatic hydrocarbons | <0.5 | | <0.5 |
| Benzo(a)pyrene TEQ (zero) | <0.5 | | <0.5 |
| C6 - C9 Fraction | <20 | | 160 |
| C10 - C14 Fraction | <50 | | 430 |
| C15 - C28 Fraction | <100 | | 180 |
| C29 - C36 Fraction | <50 | | 200 |
| C10 - C36 Fraction (sum) | <50 | | 810 |
| C6 - C10 Fraction | <20 | | 170 |
| C6 - C10 Fraction minus BTEX (F1) | <20 | | 170 |
| >C10 - C16 Fraction | <100 | | 430 |
| >C16 - C34 Fraction | <100 | | 160 |
| >C34 - C40 Fraction | <100 | | 170 |
| >C10 - C40 Fraction (sum) | <100 | | 760 |
| >C10 - C16 Fraction minus Naphthalene (F2) | <100 | | 430 |
| Benzene (µg/L) | <1 | | <1 |
| Toluene (µg/L) | <2 | | <2 |
| Ethylbenzene (µg/L) | <2 | | <2 |
| meta- & para-Xylene (µg/L) | <2 | | <2 |
| ortho-Xylene (µg/L) | <2 | | <2 |
| Total Xylenes (µg/L) | <2 | | <2 |
| Sum of BTEX (µg/L) | <1 | | <1 |
| Naphthalene (µg/L) | <5 | | <5 |

# Appendix 3: Blast Monitoring Data

**BLAST MONITORING RESULTS**

| Date | Time | Queen Street (B1) | | School (B2) | | 99 Queen Street (B3) | | Nisbet (B4) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s |
| 12-Jan-22 | 12:56 | 88.2 | 0.25 | 88.0 | 0.12 | 88.1 | 0.20 | 101.5 | 0.83 |
| 14-Jan-22 | 13:01 | 91.7 | 0.32 | 92.9 | 0.18 | 94.1 | 0.31 | 102.6 | 0.71 |
| 17-Jan-22 | 13:03 | 95.2 | 0.24 | 95.1 | 0.10 | 98.3 | 0.18 | 101.0 | 0.23 |
| 18-Jan-22 | 09:56 | 88.2 | 0.23 | 90.0 | 0.11 | 90.0 | 0.17 | 95.5 | 0.61 |
| 21-Jan-22 | 13:03 | 103.0 | 0.28 | 102.4 | 0.14 | 105.9 | 0.23 | 107.0 | 0.58 |
| 24-Jan-22 | 12:31 | 99.1 | 0.36 | 96.0 | 0.16 | 102.1 | 0.31 | 106.1 | 0.77 |
| 27-Jan-22 | 12:55 | 97.0 | 0.40 | 96.8 | 0.17 | 99.0 | 0.37 | 106.4 | 0.73 |
| 28-Jan-22 | 13:45 | 88.2 | 0.25 | 88.0 | 0.10 | 93.0 | 0.18 | 97.4 | 0.20 |
| 31-Jan-22 | 13:04 | 88.2 | 0.25 | 88.0 | 0.10 | 88.1 | 0.17 | 94.4 | 0.26 |
| 01-Feb-22 | 13:01 | 105.1 | 0.32 | 96.0 | 0.14 | 102.5 | 0.22 | 104.7 | 0.64 |
| 04-Feb-22 | 13:05 | 88.2 | 0.18 | 85.5 | 0.10 | 95.1 | 0.12 | 99.7 | 0.08 |
| 09-Feb-22 | 11:04 | 91.7 | 0.26 | 91.6 | 0.11 | 94.1 | 0.18 | 98.3 | 0.24 |
| 10-Feb-22 | 13:05 | 90.1 | 0.22 | 91.6 | 0.12 | 90.0 | 0.17 | 89.5 | 0.17 |
| 15-Feb-22 | 13:05 | 91.7 | 0.21 | 91.6 | 0.11 | 91.6 | 0.13 | 96.5 | 0.10 |
| 16-Feb-22 | 13:38 | 88.2 | 0.21 | 90.0 | 0.10 | 88.1 | 0.15 | 93.0 | 0.19 |
| 17-Feb-22 | 13:05 | 97.7 | 0.28 | 97.6 | 0.13 | 96.9 | 0.27 | 102.6 | 0.74 |
| 23-Feb-22 | 13:11 | 100.2 | 0.25 | 95.1 | 0.12 | 100.1 | 0.30 | 107.6 | 0.57 |
| 01-Mar-22 | 13:00 | 102.6 | 0.16 | 94.1 | 0.23 | 90.0 | 0.16 | 105.1 | 0.15 |
| 02-Mar-22 | 13:00 | 97.0 | 0.19 | 99.5 | 0.24 | 90.0 | 0.13 | 96.5 | 0.13 |
| 18-Mar-22 | 13:09 | 90.1 | 0.36 | 90.0 | 0.26 | 88.1 | 0.45 | 100.4 | 2.54 |
| 22-Mar-22 | 13:05 | 90.1 | 0.22 | 90.0 | 0.12 | 88.1 | 0.14 | 89.5 | 0.19 |
| 25-Mar-22 | 09:59 | 97.0 | 0.18 | 96.0 | 0.10 | 102.5 | 0.14 | 98.3 | 0.17 |
| 28-Mar-22 | 13:07 | 95.2 | 0.30 | 100.1 | 0.15 | 99.6 | 0.25 | 103.5 | 0.43 |
| 01-Apr-22 | 09:55 | 88.2 | 0.12 | 88.0 | 0.09 | 91.6 | 0.12 | 87.0 | 0.22 |
| 05-Apr-22 | 13:03 | 91.7 | 0.23 | 90.0 | 0.12 | 94.1 | 0.21 | 97.4 | 0.39 |
| 06-Apr-22 | 12:31 | 97.0 | 0.24 | 95.1 | 0.12 | 101.6 | 0.22 | 102.1 | 0.30 |
| 22-Apr-22 | 12:52 | 91.7 | 0.20 | 88.0 | 0.10 | 93.0 | 0.16 | 99.0 | 0.35 |
| 27-Apr-22 | 10:16 | 91.7 | 0.19 | 91.6 | 0.11 | 93.0 | 0.14 | 93.0 | 0.26 |

| Date | Time | Queen Street (B1) | | School (B2) | | 99 Queen Street (B3) | | Nisbet (B4) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s |
| 29-Apr-22 | 11:02 | 90.1 | 0.26 | 90.0 | 0.13 | 91.6 | 0.20 | 87.0 | 0.51 |
| 04-May-22 | 13:01 | 93.0 | 0.27 | 90.0 | 0.12 | 90.0 | 0.18 | 98.3 | 0.81 |
| 05-May-22 | 12:59 | 87.0 | 0.21 | 97.5 | 0.10 | 87.9 | 0.16 | 93.0 | 0.33 |
| 06-May-22 | 13:07 | 95.0 | 0.15 | 89.0 | 0.10 | 95.9 | 0.12 | 93.0 | 0.21 |
| 11-May-22 | 11:19 | 91.9 | 0.15 | 89.0 | 0.11 | 89.8 | 0.15 | 95.5 | 0.33 |
| 12-May-22 | 09:36 | 103.9 | 0.27 | 97.5 | 0.18 | 96.7 | 0.22 | 103.0 | 1.07 |
| 20-May-22 | 13:01 | 93.1 | 0.11 | 106.3 | 0.37 | 95.0 | 0.09 | 102.5 | 0.13 |
| 26-May-22 | 14:56 | 84.5 | 0.15 | 91.5 | 0.07 | 91.4 | 0.16 | 96.5 | 0.31 |
| 03-Jun-22 | 13:00 | 87.0 | 0.13 | 91.5 | 0.11 | 89.8 | 0.15 | 91.4 | 0.16 |
| 10-Jun-22 | 11:11 | 97.3 | 0.20 | 101.1 | 0.25 | 91.4 | 0.23 | 102.0 | 0.38 |
| 14-Jun-22 | 12:55 | 84.5 | 0.22 | 89.0 | 0.13 | 91.4 | 0.20 | 87.0 | 0.31 |
| 17-Jun-22 | 11:26 | 87.0 | 0.29 | 91.5 | 0.16 | 87.9 | 0.27 | 91.4 | 0.82 |
| 08-Jul-22 | 13:10 | 99.1 | 0.11 | 97.5 | 0.06 | 98.1 | 0.11 | 110.5 | 0.23 |
| 12-Jul-22 | 12:59 | 87.0 | 0.12 | 89.0 | 0.07 | 89.8 | 0.11 | 89.5 | 0.20 |
| 22-Jul-22 | 13:24 | 84.5 | 0.14 | 91.5 | 0.11 | 92.8 | 0.15 | 99.7 | 0.28 |
| 29-Jul-22 | 12:58 | 84.5 | 0.10 | 89.0 | 0.10 | 87.9 | 0.12 | 94.3 | 0.14 |
| 03-Aug-22 | 14:06 | 91.9 | 0.12 | 100.3 | 0.11 | 96.7 | 0.12 | 109.9 | 0.22 |
| 26-Aug-22 | 12:59 | 81.0 | 0.11 | 91.5 | 0.16 | 91.4 | 0.13 | 95.5 | 0.19 |
| 01-Sep-22 | 11:57 | 84.5 | 0.13 | 89.0 | 0.10 | 92.8 | 0.14 | 95.5 | 0.16 |
| 15-Sep-22 | 11:24 | 81.0 | 0.10 | 85.5 | 0.11 | 87.9 | 0.11 | 95.5 | 0.19 |
| 16-Sep-22 | 12:01 | 81.0 | 0.09 | 98.6 | 0.14 | 89.8 | 0.11 | 101.5 | 0.15 |
| 23-Sep-22 | 12:59 | 81.0 | 0.11 | 89.0 | 0.10 | 87.9 | 0.13 | 91.4 | 0.16 |
| 27-Sep-22 | 13:01 | 81.0 | 0.09 | 89.0 | 0.10 | 89.8 | 0.10 | 95.5 | 0.12 |
| 29-Sep-22 | 09:15 | 81.0 | 0.06 | 85.5 | 0.09 | 85.4 | 0.09 | 87.0 | 0.08 |
| 05-Oct-22 | 11:29 | 81.0 | 0.08 | 89.0 | 0.14 | 92.8 | 0.11 | 91.4 | 0.19 |
| 13-Oct-22 | 12:51 | 81.0 | 0.10 | 89.0 | 0.09 | 89.8 | 0.14 | 94.3 | 0.23 |
| 24-Oct-22 | 13:54 | 81.0 | 0.11 | 89.0 | 0.06 | 87.9 | 0.13 | 93.0 | 0.21 |
| 27-Oct-22 | 12:55 | 90.6 | 0.11 | 93.5 | 0.12 | 87.9 | 0.15 | 93.0 | 0.18 |
| 31-Oct-22 | 11:00 | 106.6 | 0.11 | 102.4 | 0.14 | 106.0 | 0.13 | 112.7 | 0.16 |
| 03-Nov-22 | 10:01 | 90.6 | 0.12 | 91.5 | 0.18 | 85.4 | 0.12 | 96.5 | 0.17 |
| 04-Nov-22 | 11:46 | 91.9 | 0.14 | 104.1 | 0.21 | 89.8 | 0.14 | 99.0 | 0.23 |

| Date | Time | Queen Street (B1) | | School (B2) | | 99 Queen Street (B3) | | Nisbet (B4) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s | Overpressure dB(L) | Ground Vibration mm/s |
| 10-Nov-22 | 14:06 | 90.6 | 0.29 | 89.0 | 0.17 | 85.4 | 0.24 | 91.4 | 0.67 |

# Appendix 4: Noise Monitoring

**Noise Monitoring Results – MCC Contribution $LA_{eq}$**

| Month | R13 Sandy Creek Rd | Criteria | R15 Queen St | Criteria | R17 Queen St | Criteria | R25 Sandy Creek Rd | Criteria | R32 Muscle Creek Rd | Criteria |
|---|---|---|---|---|---|---|---|---|---|---|
| Jan 22 | 20 | 41 | <20 | 37 | Inaudible | 35 | <20 | 42 | Inaudible | 35 |
| Feb 22 | 34 | 41 | 20 | 37 | Inaudible | 35 | 30 | 42 | 22 | 35 |
| Mar 22 | Inaudible | 41 | Inaudible | 37 | 32 | 35 | Inaudible | 42 | 34 | 35 |
| Apr 22 | 38 | 41 | 34 | 37 | 34 | 35 | 35 | 42 | Inaudible | 35 |
| May 22 | Inaudible | 41 | Inaudible | 37 | Inaudible | 35 | 28 | 42 | Inaudible | 35 |
| Jun 22 | Inaudible | 41 | Inaudible | 37 | Inaudible | 35 | Inaudible | 42 | Inaudible | 35 |
| Jul 22 | 39 | 41 | 27 | 37 | 22 | 35 | 39 | 42 | Inaudible | 35 |
| Aug 22 | 22 | 41 | 29 | 37 | 28 | 35 | 27 | 42 | Inaudible | 35 |
| Sep 22 | Inaudible | 41 | Inaudible | 37 | Inaudible | 35 | Inaudible | 42 | Inaudible | 35 |
| Oct 22 | <20 | 41 | Inaudible | 37 | Inaudible | 35 | <20 | 42 | Inaudible | 35 |
| Nov 22 | Inaudible | 41 | Inaudible | 37 | Inaudible | 35 | Inaudible | 42 | Inaudible | 35 |

**Noise Monitoring Results – MCC Contribution $LA1_{1min}$**

| Month | R13 Sandy Creek Rd | R15 Queen St | R17 Queen St | R25 Sandy Creek Rd | R32 Muscle Creek Rd | Criteria |
|---|---|---|---|---|---|---|
| Jan 22 | 25 | <25 | Inaudible | <25 | Inaudible | 25 |
| Feb 22 | 40 | 25 | Inaudible | 38 | 27 | 40 |
| Mar 22 | Inaudible | Inaudible | 37 | Inaudible | 41 | Inaudible |
| Apr 22 | 42 | 40 | 38 | 40 | Inaudible | 42 |
| May 22 | Inaudible | Inaudible | Inaudible | 32 | Inaudible | Inaudible |
| Jun 22 | Inaudible | Inaudible | Inaudible | Inaudible | Inaudible | Inaudible |
| Jul 22 | 44 | 30 | 25 | 43 | Inaudible | 44 |
| Aug 22 | 25 | 36 | 38 | 33 | Inaudible | 25 |
| Sep 22 | Inaudible | Inaudible | Inaudible | Inaudible | Inaudible | Inaudible |
| Oct 22 | <20 | Inaudible | Inaudible | <20 | Inaudible | <20 |
| Nov 22 | Inaudible | Inaudible | Inaudible | Inaudible | <20 | Inaudible |

# Appendix 5: Complaints Summary

## SUMMARY OF COMPLAINTS

| Date of Complaint | Time of Complaint | Date of Incident | Time of Incident | Location | Type of Complaint | Mode of Contact | Nature of Complaint | Action Taken |
|---|---|---|---|---|---|---|---|---|
| 14-Apr-22 | 10:54 AM | 13-Apr-22 | 9:04 AM | Kayuga Road | ODOUR | Email from EPA | Smoke and odour believed to be associated with spontaneous combustion | EPA received a call. Caller stated they were impacted by sulphur odour and smoke from MCC. The caller witnessed smoke erupting from the mine on 12 April at 9:15am. MCC believe that the incident described is likely a result of spontaneous combustion control activity. At the time referred to by the caller there were two locations being controlled by water carts. A written response was provided to the EPA. |
| 18-Apr-22 | 8:40 AM | 18-Apr-22 | 8:40 AM | Muscle Creek | ODOUR | Environmental Hotline - OCE responded | Detecting strong sulphur smell at complainant's house | Complainant stated there is a strong sulphur smell at their residence. Operations were processing self-heating ROM Coal at the time of the complaint. Environmental Officer called the complainant back on the 19 April 22 and left a message. |
| 19-Apr-22 | 4:30 AM | 19-Apr-22 | 4:30 AM | Muscle Creek | ODOUR | Direct call to MCC office - OCE responded | Detecting strong sulphur smell at complainant's house | Complainant called the OCE directly stated there was a strong sulphur smell at their residence. OCE explained operations had watercarts focusing on hot material at the time of the complaint. Environmental Officer called the complainant back on the 19 April 22 and left a message. |
| 03-May-22 | 2:30 PM | 28-Apr-22 | 11:28 AM | Sandy Creek Road | ODOUR | Email from EPA | Affected by thick smoke and coal-burning odour, attributed to Muswellbrook Coal | EPA received a call. Complainant stated they were impacted by thick smoke and coal-burning odour, attributed to Muswellbrook Coal. EPA attended a site inspection on 2 May 2022 to get an understanding of the spontaneous combustion control activities on site. EPA sent details of complaint via email 3 May 22. |

| Date of Complaint | Time of Complaint | Date of Incident | Time of Incident | Location | Type of Complaint | Mode of Contact | Nature of Complaint | Action Taken |
|---|---|---|---|---|---|---|---|---|
| 23-May-22 | 9:14 AM | 23-May-22 | 9:14 AM | Muswellbrook | VISUAL | Environmental Hotline - OCE responded | Asking about mine closure and concerns on spontaneous combustion | Complainant called the Environmental hotline asking questions about mine closure and how much longer until the spontaneous combustion would stop. Operations had been mining through hot material in Strip 25 and dumping on RL150 Dump. OCE called back the complainant and explained he had relocated the excavator away from the hot material, manned 3 watercarts and sent them to cool the material and repositioned the infusion sprays to cool and soak the hot area. Environmental Superintendent called complainant at 9:30am on 23 May 22 to further discuss the mine closure process and their spontaneous combustion concerns. |
| 22-Jun-22 | 6:26 AM | 21-Jun-22 | 6:26 PM | Woodlands Ridge | ODOUR | Direct call to MCC office | Anonymous spontaneous combustion odour complaint left on office voicemail | Caller left a voicemail without name or return contact number. Caller lives in Woodlands Ridge and complains of smelling being able to smell spontaneous combustion and see "coal smoke" in the air. At the time of the complaint, an excavator was loading out coal and three truck were running coal to the ROM. A water cart was controlling spontaneous combustion. No follow-up was possible due to anonymous complaint. |
| 03-Aug-22 | 10:00 AM | 03-Aug-22 | 10:00 AM | Muscle Creek | VISUAL | Phone call from EPA to Environmental Superintendent | Visible Smoke | EPA received a call from a complainant in Muscle Creek regarding visible spontaneous combustion. Infusion spray and water cart were operating to manage spontaneous combustion at the time of the complaint. Hot coal on the ROM is processed in a timely manner and dumps are selectively capped where required to mitigate spontaneous combustion. Current management and timeframe to complete mining was discussed with the EPA officer. The EPA were satisfied that no further action was required. |