



Mount Thorley Warkworth

2017 Annual Review

MARCH 2018

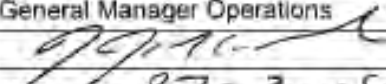
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YANCOAL

兗煤澳大利亞有限公司

MT THORLEY WARKWORTH

Name of operation	Mount Thorley Warkworth
Name of operator	Yancoal Australia Ltd
Development consent/ project approval#	SSD-6464 & SSD-6465
Name of holder of development consent / project approval	Yancoal Australia Ltd
Mining lease #	Contained in Section 1.3 of this report
Name of holder of mining lease	Mount Thorley Operations Pty Ltd Warkworth Mining Limited
Water License #	Contained in Section 1.4 of this report
Name of holder of water licence	Contained in Section 1.4 of this report.
MOP/RMP start date	05/02/2016
MOP/RMP end date	30/11/2021
Annual Review start date	01/01/2017
Annual Review end date	31/12/2017
<p>I, Jason McCallum, certify that this audit report is a true and accurate record of the compliance status of Mount Thorley Warkworth for the period 01 January 2017 to 31 December 2017 and that I am authorised to make this statement on behalf of Yancoal Australia Ltd.</p> <p>Note.</p> <p>a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</p> <p>b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</p>	
Name of the authorised reporting officer	Mr Jason McCallum
Title of the authorised reporting officer	General Manager Operations
Signature of Authorised Reporting Officer	
Date	27-3-18

Executive Summary

Mount Thorley Warkworth (MTW) is an integrated operation of two open cut coal mines, Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO). This Annual Review reports on the environmental performance of Mount Thorley Warkworth (MTW) for the period 1 January 2017 to 31 December 2017.

This report has been prepared in accordance with conditions of the development consents and Mining Leases (ML) held by MTW which require a report of the operation's environmental performance to be provided on an annual basis. The structure of the 2017 Annual Review intends to align with the NSW Government *Post-approval requirements for State significant mining developments – Annual Review Guideline (October 2015)*.

MTW produced 17.0 million tonnes of run-of-mine (ROM) coal during 2017, and 11.82million tonnes of saleable coal, against an approved ROM coal production rate of 28 million tonnes per annum (mtpa).

Noise

There were no non-compliances recorded against MTW's consented noise limits. A total of 857 hours of mine stoppage were recorded due to proactive and reactive measures to minimise noise. There was a 78.6% reduction (from 84 to 18) in the number of supplementary attended noise measurements which exceeded the internal trigger levels for corrective action compared to 2016.

Blasting

During the reporting period 308 blast events were initiated at MTW. There were no non-compliances against the airblast overpressure or ground vibration criteria listed in MTW's Environment Protection Licences or Planning Approvals. One (level 4) blast event was reported to the Department of Planning and Environment during the reporting period on 27-April-2017. W29-WHE-PR1 (the Blast) was initiated as per approved MTW Blast Management Plan from WML West Pit where it was observed to travel south east through maintained road closure dissipating at height over MTO (SSD-6465).

Air Quality

During 2017, MTW complied with all short term and annual average air quality criteria. A total of 8,030 hours of mine stoppage was recorded following implementation of proactive and reactive measures to minimise dust. A total of 145.3 ha of land was aurally seeded during autumn to minimise wind eroded dust from overburden areas not yet available for rehabilitation.

Heritage

Two Aboriginal cultural heritage salvage programs were conducted at MTW in 2017, in accordance with the MTW *Aboriginal Cultural Heritage Management Plan*. An ACHMP compliance inspection was also conducted during the reporting period. The compliance inspection was conducted by representatives of the Aboriginal community and were assisted by internal mine site personnel. A total

of 20 Aboriginal cultural heritage sites were inspected during this program. There were no incidents or any unauthorised disturbance to historic heritage sites at MTW during 2017.

Surface Water

2017 was another dry year with a substantial reduction in water inputs from rainfall runoff compared to 2016. The amount of water imported from the Hunter River and neighbouring mines has increased to offset this deficit. Improvements to water management in 2017 have focused on reducing the risk of unauthorised water releases from site. A diversion channel at the base of the Abbey Green (MTO) rehabilitation area was constructed in 2017 to segregate clean and dirty water. Other works completed in 2017 include construction of Dam 48N, and SSD-05 dam for sediment control in Warkworth Pit.

Following rainfall on 4 December 2017, approximately 20 kL of stormwater overtopped a contour drain and flowed underneath Wallaby Scrub Road into a dam on land owned by MTW. Regulators were immediately notified. No environmental harm occurred as a result of the incident, it is currently under investigation by the EPA.

Warkworth Mine was convicted by the NSW Land and Environment Court for overflow of stormwater from a dam in 2016.

Groundwater

Groundwater monitoring activities were undertaken in 2017 in accordance with the MTW Water Management Plan and groundwater monitoring programme. The monitoring results are used to establish and monitor trends in physical and geochemical parameters of surrounding groundwater potentially influenced by mining.

Groundwater monitoring data is reviewed on a quarterly basis. There were no non-compliances related to groundwater in 2017.

Visual Amenity

The second stage of Warkworth's West Pit visual bund (adjacent to Putty Road) was constructed in 2017.

Rehabilitation and Land Management

A total of 124 ha rehabilitation was completed during 2017 against a MOP target of 107.1 ha. Total disturbance undertaken was 74.9 ha, slightly higher than the 2017 MOP projection of 72.8 ha. Capping of Tailings Dam 2, at the north of the operations, began in 2017. The net rehabilitation progress (i.e. rehabilitation minus rehabilitation disturbance) for the current MOP period (2015 to 2017) is 218.8ha, which is 10.5ha lower than the MOP target of 229.3ha. This is due to more rehabilitation disturbance being undertaken than planned. Cumulative new disturbance over the MOP period is approximately 40ha below the MOP forecast for the same period due mainly to a delay in clearing for the Rural Fire Service track.

Biodiversity and Offset Management

Restoration of the Warkworth Sands Woodland vegetation community continued in the Northern Biodiversity Area, with over 10,000 seedlings planted. Restoration activities for the Ironbark woodland continued in the Southern Biodiversity Area, with over 13,000 seedlings planted. Weed control, vertebrate pest management activities, fence repairs and waste removal were conducted during 2017 in the Regional Biodiversity Areas in accordance with the Offset Management Plans.

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APPENDIX 4 – 2017 INDEPENDENT REVIEW – RESPONSE TO RECOMMENDATIONS

APPENDIX 5 – ANNUAL GROUND WATER IMPACTS REVIEW

1. STATEMENT OF COMPLIANCE

Table 1 is a Statement of Compliance against the relevant approvals. Table 2 provides a brief summary of the non-compliances and a reference to where these are addressed within this Annual Review.

TABLE 1: REFERENCE TABLE

Were all conditions of the relevant approval(s) complied with?

DA SSD-6465 (MTO)	Yes
DA SSD-6464 (WML)	No

TABLE 2: NON-COMPLIANCES

Relevant approval	Condition number	Condition description (summary)	Compliance status	Where addressed in Annual Review
DA SSD-6464 (WML)	Schedule 3 Condition 24	Water Discharges / Pollution of Waters	Non-Compliant (Low)	11.1

COMPLIANCE STATUS KEY FOR TABLE 2

Risk level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with : <ul style="list-style-type: none"> Potential for serious environmental consequences, but is unlikely to occur; or Potential for moderate environmental consequences, but is unlikely to occur
Low	Non-compliant	Non-compliance with : <ul style="list-style-type: none"> Potential for moderate environmental consequences, but is unlikely to occur; or Potential for low environmental consequences, but is unlikely to occur

Administrative non- compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)
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Source: NSW Government *Post-approval requirements for State significant mining developments – Annual Review Guideline* (October 2015).

2. INTRODUCTION

Mount Thorley Warkworth Coal Mine (MTW), is an integrated operation consisting of Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO) (Figure 1), situated 14 km southwest of Singleton, in the Upper Hunter Valley region of NSW. MTW is managed and operated by Yancoal Australia Limited (YAL)¹.

2.1 DOCUMENT PURPOSE

This report summarises the environmental performance of MTW in accordance with conditions of the development consents and Mining Leases (ML) held by site. The structure of the 2017 Annual Review intends to align with the NSW Government Post-approval requirements for State significant mining developments – Annual Review Guideline (October 2015).

¹ *On 1 September 2017, Yancoal Australia Limited acquired Rio Tinto's interest in Coal & Allied Industries Limited, including 80% of Mount Thorley mine and 55.6% of Warkworth mine. Yancoal also exercised a call option to further acquire Mitsubishi Development's 28.9% interest in the Warkworth mine.*

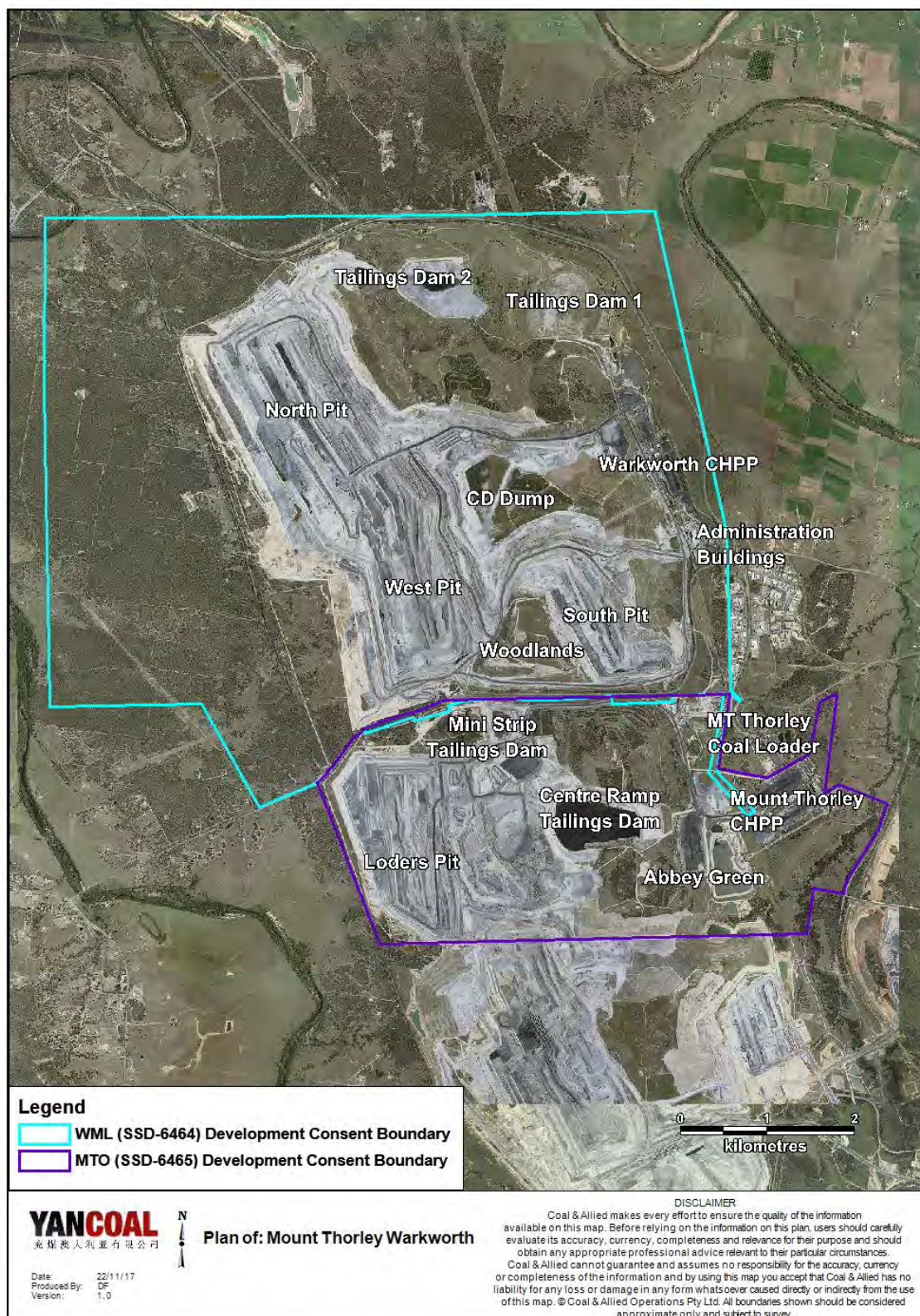


FIGURE 1: MTW SITE LAYOUT AND LOCALITY PLAN

2.2 MINE CONTACTS

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Andrew Speechly	Manager – Environment and Community
	Phone (02) 6570 0497
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3. APPROVALS

3.1 APPROVALS, LEASES AND LICENSES

3.1.1 Current Approvals

The status of MTO and WML development consents, licenses and relevant approvals at 31 December 2017 are summarised in Table 3 to Table 9.

TABLE 3: OPERATIONS APPROVALS- WARKWORTH

Approval Number	Description	Authority	Dates
EPBC 2009/5081	Approval under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) to extend the existing Warkworth Coal Mine over an additional 705 hectares of land at Warkworth NSW including associated modifications to existing mine infrastructure	DSEWPaC	9/8/2012 – 31/3/2033
EPBC 2002/629	Approval under the EPBC Act to construct and operate an open cut coal mine extension at the Warkworth Coal Mine	DSEWPaC	18/2/2004 (varied on 6/4/2004, 24/5/2004, 19/11/2004 and 13/7/2012) – 25/2/2039
SSD-6464	Warkworth Continuation Project	DP&E	26/11/2015

TABLE 4: OPERATIONS APPROVALS - MOUNT THORLEY

Approval Number	Description	Authority	Dates
SSD-6465	Mount Thorley Continuation Project	DP&E	26/11/2015

TABLE 5: LICENCES AND PERMITS

Licence Number	Description	Authority	Expiry Date
Warkworth			
EPL1376	Environment Protection Licence	EPA	N/A
50661122	Radiation Licence	EPA	02 May 2018
XSTR100160	Licence to Store – Explosives Act	WorkCover NSW	13 November 2018

Mount Thorley

EPL24	Environment Protection Licence	EPA	N/A
EPL1976	Environment Protection Licence	EPA	N/A
5061110	Radiation Licence	EPA	31 July 2018

Note: Environment Protection Licences remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

TABLE 6: MINING TENEMENTS

Mining Tenement	Type	Purpose	Status	Dates
Warkworth				
CCL 753	Consolidated Coal Lease	Prospecting and Mining Coal	Granted	23/05/1990 - 17/02/2023
ML 1412	Mining Lease	Prospecting and Mining Coal	Renewal Pending	11/01/1997 - 10/01/2018
ML 1590	Mining Lease	Prospecting and Mining Coal	Granted	27/02/2007 - 26/02/2028
ML 1751	Mining Lease	Prospecting, Mining Coal and Purposes	Granted	17/03/2017 16/03/2038
Mount Thorley				
CL 219	Coal Lease	Prospecting and Mining Coal	Granted	23/09/1981 - 22/09/2023
(Part) ML 1547	Sub-Lease	Mining Purposes	Registered	The part sublease area known as the "Dam 22 Long Term Mining Sublease" was registered on 10 th January 2018 for a term until 3 April 2025.
EL 7712	Exploration Licence	Prospecting Coal	Granted	23/2/2011 - 22/02/2016
ML 1752	Mining Lease	Prospecting, Mining Coal and Purposes	Granted	17/03/2017 16/03/2038
Mount Thorley Coal Limited				
MLA 548	Mining Lease Application	Mining Purposes	Application Pending	Mining Lease Application Lodged 13/11/2017

Note: The authority for all mining

TABLE 7: OTHER APPROVALS

Approval	Authority	Dates (current as of)
Emplacement Areas		
Warkworth		
Tailings Dam 2	DPI	22/10/2002
Tailings Dam 2 –130RL	DPI	9/12/2003
Tailings Dam 2 – High Risk Notification (Capping)	DPI	08/06/2016
Mount Thorley		
Section 126 Variation to Reject Emplacement Area	DPI	20/3/2001
Section 126 Construction of Reject Emplacement Area Centre Ramp Tailings Dam	DPI	9/4/2001
Mini Strip 24 Tailings Storage Facility	DPI	8/9/2004
Dam Safety Committee Centre Ramp Tailings Storage Facility Stage 2	DPI	12/2/2004
Section 126 Centre Ramp Tailings Dam – Raising height of embankment	DPI	10/5/2006
Section 126 Abbey Green South Tailings Dam	DPI	10/5/2006
Other Approvals		
Installation of a single 500mm water pipeline under Putty Road	RMS	31/10/2007
Installation of two 600mm tailings pipelines under Putty Road	RMS	1/2/2007
Resource Recovery Exemption for coal washery rejects at Mount Thorley Warkworth	DECC	1/2/2010

TABLE 8: WATER LICENCES

Licence Number	Type	Purpose	Legislation	Description	Renewal Date
20BL168821	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: MTAGP1, MTAGP2, ABGOH07, ABGOH43, ABGOH44, ABGOH45	Perpetuity
20BL171729	Bore	Monitoring Bore	Part 5 Water Act 1912	G3	Perpetuity

Licence Number	Type	Purpose	Legislation	Description	Renewal Date
20BL171841	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1126	Perpetuity
20BL171842	Bore	Monitoring Bore	Part 5 Water Act 1912	OH944	Perpetuity
20BL171843	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1137	Perpetuity
20BL171844	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: OH1123 (E), OH1123 (W)	Perpetuity
20BL171845	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1124	Perpetuity
20BL171846	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: OH786, OH942	Perpetuity
20BL171847	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: OH1127, OH787	Perpetuity
20BL171848	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1125	Perpetuity
20BL171849	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1122	Perpetuity
20BL171850	Bore	Monitoring Bore	Part 5 Water Act 1912	OH1138	Perpetuity
20BL171891	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: OH1121, OH788, OH943	Perpetuity
20BL171892	Bore	Monitoring Bore	Part 5 Water Act 1914	Bores: WOH2153 (PZ2), WOH2154 (PZ1), WOH2155 (PZ4), WOH2156 (PZ3)	Perpetuity
20BL171893	Bore	Monitoring Bore	Part 5 Water Act 1918	Bores: WOH2141 (PZ6), Ground Water Alluvial Modelling	Perpetuity
20BL171894	Bore	Monitoring Bore	Part 5 Water Act 1913	WOH2139 (PZ5)	Perpetuity
20BL172272	Bore	Monitoring Bore	Part 5 Water Act 1912	PZ9S, PZ9D	Perpetuity
20BL172273	Bore	Monitoring Bore	Part 5 Water Act 1912	PZ8S, PZ8D	Perpetuity
20BL172439	Bore	Monitoring Bore	Part 5 Water Act 1912	Windermere	Perpetuity

Licence Number	Type	Purpose	Legislation	Description	Renewal Date
20BL172518	Bore	Monitoring Bore	Part 5 Water Act 1912	Windermere: MBW01, MBW02, MBW03, MBW04	Perpetuity
20BL173276	Bore	Monitoring Bore	Part 5 Water Act 1912	Windermere	Perpetuity
20BL173065	Bore	Monitoring Bore	Part 5 Water Act 1912	SR012	Perpetuity
20FW213276 (formerly 20CW802601)	Flood Work Approval	Block Dam	Water Management Act 2000	Charlton Rd Levee	23 August 2020
20WA209905 (Formerly 20SL051292)	Stream Diversion	Bywash Dams	Water Management Act 2000	Doctors Creek Bywash	31 July 2022
20CA209904 WAL - 19022	Stream Diversion	Bywash Dams	Water Management Act 2000	Sandy Hollow Creek	25 February 2023

TABLE 9: WATER ACCESS LICENCES

Licence Number	Description	Water Source	Water Sharing Plan	Water Source – Management Zone	Approved Extraction (ML)*	Actual Extraction 2017 (ML)
WAL963	Warkworth Mining Limited Hunter River Pump (General Security)	Hunter River	Hunter Regulated River WSP	Zone 2b (Hunter River From Wollombi Brook Junction To Oakhampton Rail Bridge)	243	0
WAL10543	Mount Thorley Joint Venture (MTJV) water supply scheme, held by Singleton Shire Council (our share 1,012 units + 1000 units from temporary transfer)	Hunter River	Hunter Regulated River WSP	Zone 2b (Hunter River From Wollombi Brook Junction To Oakhampton Rail Bridge)	2,012	1025
WAL10544	(Hunter Regulated River –	Hunter River	Hunter Regulated River WSP	Zone 2b (Hunter River From Wollombi Brook Junction To	5	0

Licence Number	Description	Water Source	Water Sharing Plan	Water Source – Management Zone	Approved Extraction (ML)*	Actual Extraction 2017 (ML)
	Domestic and Stock)			Oakhampton Rail Bridge)		
WAL18233	Old Farm	Hunter River Alluvium	Hunter Unregulated and Alluvial Water Sources WSP	Hunter Regulated River Alluvial Water Source – Downstream Glennies Creek Management Zone	5	3 [#]
WAL18558	Hawkes	Wollombi Brook	Hunter Unregulated and Alluvial Water Sources WSP	Lower Wollombi Brook Water Source	50	9 [#]
WAL19022	Sandy Hollow Creek	Unregulated River	Hunter Unregulated and Alluvial Water Sources WSP	Singleton Water Source	60	0
WAL40464 (previously 20BL17001 1)	Mt Thorley Pit Excavation	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16) Previously Water Act 1912	Sydney Basin – North Coast Groundwater Source	180	110 [#]
WAL40465 (previously 20BL17001 2)	Warkworth Pit Excavation	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16) Previously Water Act 1912	Sydney Basin – North Coast Groundwater Source	750	140 [#]

* Approved extraction limits are for a financial year.

Passive take / groundwater inflows to pit.

3.1.2 Management Plans, Programmes and Strategies

Table 10 details the Management Plans and strategies which are required under the Warkworth (SSD-6464) and Mount Thorley (SSD-6465) Development Consent instruments.

A Mining Operations Plan (MOP) was developed to replace the previous MOP and cover the existing MTW operations, as well as the approved operations outlined in the Environmental Impact Statements for the Warkworth Continuation 2014 and Mt Thorley Operations 2014. The MOP outlines the proposed operational and environmental management activities planned for MTW. Details regarding the submission and approval dates for the current MOP are shown in Table 11.

TABLE 10: STATUS OF MANAGEMENT PLANS REQUIRED UNDER WARKWORTH CONTINUATION (SSD-6464) AND MOUNT THORLEY OPERATIONS (SSD-6465) PROJECT APPROVALS

Plan / Program / Strategy	Status (approval date)
Air Quality Management Plan	07/02/2018
Noise Management Plan	07/02/2018
Blast Management Plan	07/02/2018
Water Management Plan	12/02/2018
WML Biodiversity Management Plan	03/02/2016
Rehabilitation Management Plan (addressed in MOP)	05/02/2016
Environmental Management Strategy	03/02/2016
MTW Historic Heritage Management Plan - Draft	11/10/2017
MTW Aboriginal Heritage Management Plan	07/02/2018
Wollombi Brook Aboriginal Cultural Heritage Conservation Area Conservation Management Plan - draft	11/10/2017
Management Plan for Goulburn River Biodiversity Area	26/06/2017 (DP&E)
Management Plan for Bowditch Biodiversity Area	26/06/2017 (DP&E)
Management Plan for Southern Biodiversity Area	26/06/2017 (DP&E)
Management Plan for Northern Biodiversity Area	26/06/2017 (DP&E)
Management Plan for Norther Rothbury Biodiversity Area	26/06/2017 (DP&E)
Warkworth Sands Woodland Integrated Management Plan (Condition 34)	Pending (Submitted 15/02/2017)

Plan / Program / Strategy	Status (approval date)
Warkworth Sands Woodland Performance Criteria (Condition 32a)	Pending (Submitted 15/02/2017)

TABLE 11: MOP APPROVAL STATUS FOR MOUNT THORLEY WARKWORTH

Mining Operations Plan	Date Submitted	Date Approved
Mount Thorley Warkworth MOP 2016	30/11/2015	05/02/2016

4. OPERATIONS SUMMARY

4.1 SUMMARY OF MINING ACTIVITIES

Areas to be mined are geologically modelled, a mine plan is formed and the relevant mining locations are surveyed prior to mining. Figure 2 illustrates the mining process. MTW have no active underground workings.

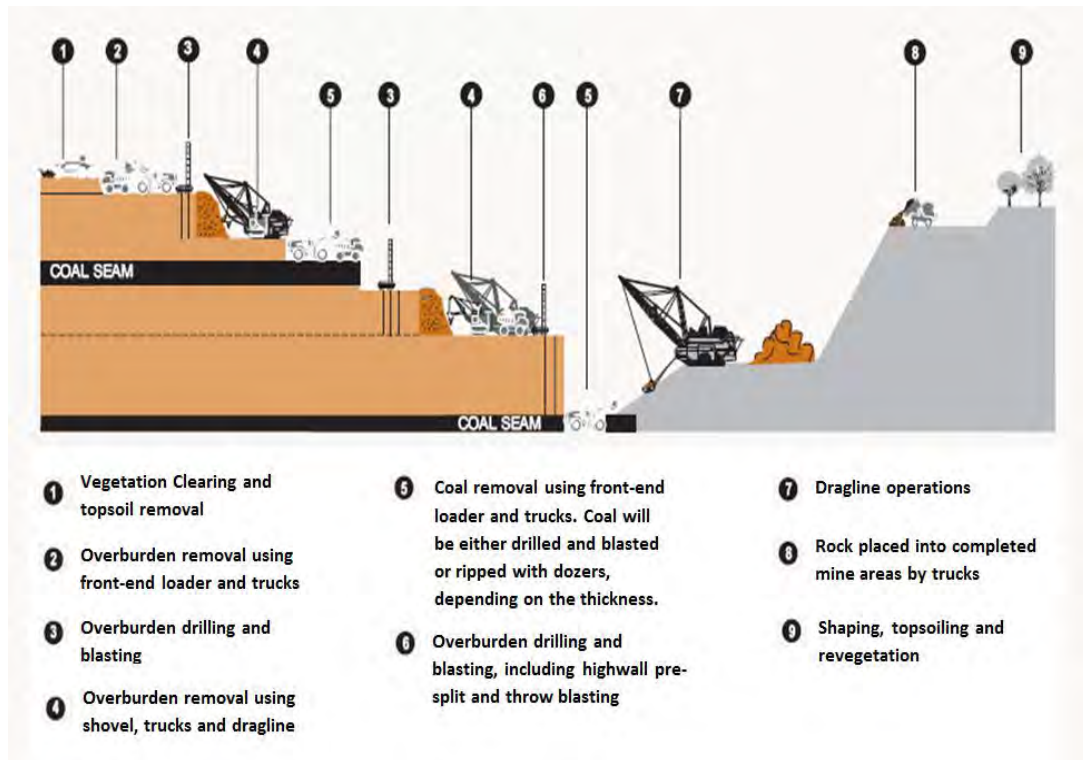


FIGURE 2: MINING PROCESS

Within the Warkworth lease, mining activities will continue to advance in a westerly direction in both North and West Pits. South Pit has reached its final limit with regard excavation. This area is currently being utilised for dumping activity. Within the Mount Thorley lease, mining has reached the western limit with remaining reserves to be mined to depth over the coming two years. All mining related activity is in line with the current MOP.

The planned 2018 production and waste schedule for MTW is summarised below:

- 17.0 Mt ROM coal;
- 11.8 Mt Product coal;
- 124 Mbcm overburden (including rehandle); and
- 5.2 Mt Tailings and reject

The Planned ROM coal production represents approximately 61% of the approved maximum ROM coal production for MTW.

Coal will continue to be transported via conveyer to the Mount Thorley Coal Loader and railed to the port.

4.2 MINERAL PROCESSING

All processing and rejects/tailings disposal activities undertaken in 2017 were consistent with the approved MOP and no changes were made to the processing and rejects/tailings disposal methods.

The currently active tailing emplacements are the Centre Ramp Tailings Storage Facility and Abbey Green South Tailings Storage Facility. During 2017 capping works on Tailings Dam 2 commenced.

4.3 PRODUCTION STATISTICS

Under the Project approvals in place during the reporting period, extraction of up to 28 million tonnes of ROM coal from MTW is permitted in a calendar year, comprising up to 18 million tonnes from ROM coal from the Warkworth Mine and 10 million tonnes from the Mount Thorley Mine. MTW Production Statistics for the previous, current and future reporting period are summarised in Table 12.

TABLE 12: SUMMARY OF PRODUCTION AT MTW IN 2017

Material	Approved Limits	Reporting Period 2016	Reporting Period 2017	Forecast for 2018
Prime Waste (kbcm)	N/A	96,938	101,669	101,834
MTO ROM Coal (Mtpa)	10 (SSD-6465)	3.96	4.08	2.32
WML ROM Coal (Mtpa)	18 (SSD-6464)	14.09	13.59	14.66
ROM Coal (Mtpa)	28 (Combined)	18.05	17.69	16.98
Coarse Reject (kt)	N/A	3,791	3,504	3,021
Fine Reject – Tailings (kt)	N/A	1,588	2,435	2,178
Product (kt)	N/A	12,396	11,817	11,831

4.4 SUMMARY OF CHANGES (DEVELOPMENTS AND EQUIPMENT UPGRADES)

- Some additional and replacement heavy equipment was purchased in 2017, including 5 new 320t haul trucks, one 360t replacement Excavator and a new 500t Excavator.
- Mining activity during the reporting period with regard to volumes, location and equipment was consistent with 2016
- South Pit accelerated rehabilitation plan has progressed in line with the consent condition
- Construction Putty Road underpass commenced in 2017 with planned project completion in May 2018. The underpass will service as the main linkage of the Mount Thorley and

Warkworth operations reducing hauling length of Prime Waste (overburden) as the Warkworth Pit progresses west. Update of project progress in figures



FIGURE 3: PUTTY ROAD COMPLETED ROAD SURFACE OVERPASSING THIRD CROSSING – LOOKING WEST BOUND TOWARDS BULGA



FIGURE 4: PUTTY ROAD THIRD CROSSING - MINE VIEW LOOKING SOUTH

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL ENVIRONMENTAL MANAGEMENT REVIEW

An annual environmental inspection was not undertaken by DP&E. DRG issued a notice of satisfactory AEMR on 08 August 2017 with the below terms (to be included in the 2017 AEMR).

TABLE 13: RESPONSE TO ACTIONS ARISING FROM DGE REVIEW OF 2016 AR

Recommended Action	Annual Review section
Include monitoring results exceeding TARP trigger levels, the actions undertaken in response are included in the report.	6.2, 6.4, 7.3, 7.4
Report rehabilitation progress against commitments in the MOP, with an explanation/justification for any identified variance to the commitments. Variance may include the area rehabilitated or the location(s)	8.1, 8.3

6. ENVIRONMENTAL PERFORMANCE

6.1 METEOROLOGICAL DATA

Meteorological data is collected to assist in day to day operational decisions, planning, and environmental management and to meet Project Approval requirements. MTW operates a real time meteorological (weather) station which is located on Charlton Ridge. The meteorological station measures wind speed, wind direction, temperature, humidity, solar radiation, rainfall, and sigma theta. The meteorological station instruments are installed, calibrated, and maintained according to the relevant Australian Standard AS 3580.14 (2011). Meteorological data is available to employees and contractors via an intranet page. This service provides the mining operations with the trend assessment details required for informed operational decisions aimed at minimising impacts from the operation. Daily Meteorological data summaries are presented in the Monthly Environmental Monitoring reports, available via the website: <http://insite.yancoal.com.au>.

6.2 NOISE

6.2.1 Management

MTW manages noise to ensure compliance with permissible noise limits at nearby private residences. A combination of both proactive and reactive control mechanisms are employed on a continuous basis to ensure effective management of noise emissions is maintained. Noise management strategies and processes employed at MTW are detailed in the MTW Noise Management Plan available for viewing via the website: <http://insite.yancoal.com.au>.

MTW's noise performance improved significantly in 2017, demonstrated across a number of key metrics:

- Community noise complaints received – reduced by 42% from 2016
- Number of Community Response Officer (CRO) (supplementary) noise measurements which exceed the internal trigger level for action – reduced by 79% from 2016; and
- Number of equipment downtime hours logged in response to noise management triggers – reduced by ~52% from 2016.

A range of projects and processes were undertaken during 2017 to deliver this improved performance. These are described herein.

6.2.2 Real Time Noise Management

MTW's Real-Time noise management framework provides an effective tool for managing instances of elevated noise, ensuring compliance is maintained, and responding to community concerns.

MTW utilise CROs to provide an interface between the mine and community. They are effective in implementing the management framework, validating real-time alerts through supplementary handheld noise measurements and audible observations, driving operational change as required, and responding to community complaints. A summary of supplementary handheld noise measurements conducted by the CROs in 2017 is presented in **Table 14**.

MTW's "InSite" website allows members of the general public to access noise, meteorological, air quality data as well as any operational changes made during shift via an interactive website. Viewer access: <http://insite.yancoal.com.au>

TABLE 14: SUMMARY OF SUPPLEMENTARY ATTENDED NOISE MONITORING CONDUCTED BY COMMUNITY RESPONSE OFFICERS 2017

Monitoring Location	Number of Assessments	Number of measurements >WML trigger^	Number of measurements > MTO trigger^	Average WML noise level (L _{Aeq} 5min dB(A))*	Average MTO noise level (L _{Aeq} 5min dB(A))*
Wollemi Peak Road (Bulga RFS)	1,293	7	8	32.4	32.3
Bulga Village	542	1	-	31.4	31.7
Inlet Road	229	2	-	32.5	31.6
Inlet Road West	318	-	-	27.1	27.6
Long Point	751	-	-	30.4	30.5
Other	26	-	-	-	-
South Bulga	0	-	-	-	-
Wambo Road	80	-	-	34.0	32.8
Total	3,239	10	8	-	-

^Triggers are internally set thresholds for operational response and are specified in the MTW Noise Management Plan. The number of measurements greater than the trigger cannot be used as an assessment or interpretation of compliance. Compliance assessment is provided in 6.2.3 and 6.2.4.

*Average noise levels do not take account of measurements taken where the noise source of interest was recorded as inaudible.

In response to the events listed in Table 14 which exceeded the trigger, up to 841 hours of equipment downtime were recorded to manage noise during 2017. This is a significant decrease (approximately 52%) in the number of downtime hours recorded in 2016 and resembles the reduction in number of supplementary noise measurements completed which exceed the trigger for management action.

6.2.3 Performance

A total of 96 compliance measurements were undertaken by an independent acoustic specialist in accordance with the MTW Noise Monitoring Programme during the reporting period. Each measurement involves an assessment of mine noise against the various L_{Aeq} and L_{A1,1min} noise criteria in place under the Warkworth and Mount Thorley Approvals. Noise monitoring results are presented

in the monthly Environmental Monitoring Reports, available via the website <http://insite.yancoal.com.au>

In accordance with Section 4 of the NSW Industrial Noise Policy, MTW has assessed measured noise levels collected during the attended compliance programme for low frequency content, and applied the modifying factor adjustment where applicable. The application of the modifying factor results in 7 exceedances of the WML L_{Aeq} Impact Assessment Criteria and four exceedances of the MTO L_{Aeq} Impact Assessment Criteria (refer to Table 15). The Department of Planning and Environment was notified in writing of each measurement.

MTW reports these measurements so as to ensure full disclosure, however it remains MTW's position that the prescribed methodology is unsuitable when applied to receptors at large distances from mine noise sources due to the nature of noise attenuation. Excess attenuation of noise with distance is greater for high frequency noise than it is for low frequency noise. At significant distance from a noise source (such as private residences from the MTW complex) this often results in large differentials between L_{Aeq} and L_{Ceq} . The NSW Industrial Noise Policy requires the penalty to be applied in these instances, irrespective of actual low frequency affectation. As such, MTW does not consider these instances to constitute non-compliance with the conditions of approval.

In October 2017, NSW EPA released the Noise Policy for industry. The guideline sets out a new framework for the assessment of low frequency noise emissions from industrial premises. MTW has adopted the new methodology for assessing low frequency affectation as of November 2017.

TABLE 15: ATTENDED NOISE MEASUREMENTS EXCEEDING CONSENT CONDITIONS FOLLOWING APPLICATION OF INP LOW FREQUENCY PENALTY

Location	Date/Time	Relevant Criteria	Criterion (dB)*	L_{Aeq} (dB)	Revised L_{Aeq} (dB)	Exceeds by (dB)
Inlet Road	09/01/2017	MTO L_{Aeq} impact assessment criteria	37	33	38	1
Bulga RFS	19/05/2017	MTO L_{Aeq} impact assessment criteria	37	36	41	4
Bulga RFS	06/07/2017	MTO L_{Aeq} impact assessment criteria	37	34	39	2
South Bulga	02/08/2017	MTO L_{Aeq} impact assessment criteria	36	32	37	1
Inlet Road	09/01/2017	WML L_{Aeq} impact assessment criteria	37	33	38	1
Inlet Road	09/02/2017	WML L_{Aeq} impact assessment criteria	37	33	38	1
Bulga RFS	19/05/2017	WML L_{Aeq} impact assessment criteria	37	34	39	2

Location	Date/Time	Relevant Criteria	Criterion (dB)*	L _{Aeq} (dB)	Revised L _{Aeq} (dB)	Exceeds by (dB)
Bulga RFS	15/06/2017	WML L _{Aeq} impact assessment criteria	37	35	40	3
South Bulga	15/06/2017	WML L _{Aeq} acquisition criteria	35	32	37	2
Bulga Village	16/10/2017	WML L _{Aeq} impact assessment criteria	38	38	43	5
Wambo Road	16/10/2017	WML L _{Aeq} impact assessment criteria	37	35	40	3

6.2.4 Comparison against Last Years' Results

A comparison of non-compliances and exceedances between years is used as a measure of the effectiveness of noise management measures employed on site. Non-compliance is determined with reference to the applicable conditions of consent and the *NSW Industrial Noise Policy*.

Details of this comparison are provided in Table 16, which demonstrates a continuation of the effective management delivered in 2016.

TABLE 16: COMPARISON OF 2017 NOISE MONITORING RESULTS AGAINST PREVIOUS YEARS'

Year	Number of assessments	Number of measurements greater than allowable noise limits (under applicable met conditions)	Number of non-compliances
2017	576	0	0
2016	576	0	0
2015	665	0	0
2014	700	0	0
2013	456	11	7
2012	562	13	3
2011	572	11	4
2010	561	3	3
2009	569	10	4

Given the large dataset available, a comparison between the results collected through the supplementary noise monitoring regime from year to year is also considered valuable. Improved noise performance is demonstrated through this data, with reductions in the number of

measurements which exceed the noise management trigger at all monitoring locations. Further, reductions in the average noise levels measured across the reporting period are evident at the majority of monitoring locations with the exception of the Long Point and Wambo Road monitoring locations which have largely remained the same. There has been a slight increase in the number of assessments undertaken in 2017 compared to 2016, despite coinciding with a general reduction in measured average noise levels and a ~ 42% reduction in noise complaints.

Table 17: Comparison of CRO (supplementary) noise measurement performance

Monitoring Location	Number of Assessments		Number of measurements >WML trigger [^]		Number of measurements > MTO trigger [^]		Average WML noise level (L _{Aeq} 5min dB(A))*		Average MTO noise level (L _{Aeq} 5min dB(A))*	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Wollemi Peak Road (Bulgarfs)	1,284	1293	46	7	27	8	32.8	32.4	33.5	32.3
Bulgarfs Village	309	542	0	1	1	-	32.4	31.4	32.4	31.7
Inlet Road	-	229	-	2	-	-	-	32.5	-	31.6
Inlet Road West	278	318	0	-	0	-	29.0	27.1	28.4	27.6
Long Point	506	751	2	-	0	-	31.3	30.4	28.0	30.5
South Bulgarfs	4	0	0		0		32.0	-	33.3	-
Wambo Road	471	80	8	-	1	-	33.3	34.0	32.5	32.8
Total	2852	3239	56	10	29	8	NA	NA	NA	NA

[^]Triggers are internally set thresholds for operational response and are specified in the MTW Noise Management Plan. The number of measurements greater than the trigger cannot be used as an assessment or interpretation of compliance. Compliance assessment is provided in 6.2.3 and 6.2.4.

*Average noise levels do not take account of measurements taken where the noise source of interest was recorded as inaudible.

6.2.5 Comparison against EA Predictions

Table 18 provides a comparison of 2017 attended monitoring data and the predicted noise levels modelled in the 2014 Warkworth Continuation EIS. Comparison has been made against the modelled worst case noise levels for Year 3 of the development (nominally 2017). The comparison data has been sourced from the modelled noise levels at the nearest residential receivers to the current monitoring locations. Reported 2017 data is the calculated quarterly average of WML contribution to measured L_{Aeq} (15 minute) results obtained through compliance assessment (irrespective of applicability of noise criteria due to meteorological conditions).

Where a monitoring event has been assessed as being “inaudible” or “not measurable”, a conservative value of 25dB has been used to calculate the L_{Aeq} average for the quarter. The comparison shows that measured noise is lower than that predicted.

TABLE 18: PREDICTED NIGHT TIME WML (EIS 2014) L_{Aeq} (15 MINUTE) NOISE LEVELS AND AVERAGED 2017 MONITORING RESULTS

Monitoring Location	Year 3 Modelled Noise	Quarter 1 2016 average	Quarter 2 2016 average	Quarter 3 2016 average	Quarter 4 2016 average
	L_{Aeq} (15 minute) (dB)	L_{Aeq} (15 minute) (dB)	L_{Aeq} (15 minute) (dB)	L_{Aeq} (15 minute) (dB)	L_{Aeq} (15 minute) (dB)
Wollemi Peak Road*/Bulga RFS	≤38	26.3	31.3	25	27
Bulga Village	≤38	27.3	33.3	26.7	29.3
Gouldsville Road	≤35	28.3	27	30	28.3
Inlet Road	≤37	30.3	31	27.7	28.3
Inlet Road West*	≤35	26	26.7	26.7	26.7
Long Point*	≤35	26.7	24	26.7	25
South Bulga	≤38	25	28.7	25	25
Wambo Road	≤38	30 ¹	30.3	26.7	29.3
Wollemi Peak Road*/Bulga RFS	≤38	26.3	31.3	25	27

*Denotes – No nearby receiver location modelled

¹ – No attended monitoring occurred at this location in January due to security concerns

6.3 BLASTING

6.3.1 Blasting Management

The objective of blasting operations at MTW is to ensure that optimal fragmentation is obtained whilst minimising dust and fume generation, adhering to safety standards and conforming to approvals criteria for ground vibration and airblast overpressure.

During the reporting period, MTW blast monitoring network operated in accordance with AS2187.2-2006 to measure ground vibration and airblast overpressure of each event at a high sampling frequency. Monitors function as regulatory compliance instruments in accordance with the MTW Blast Monitoring Programme (appended to Blast Management Plan) and are located on (or in

locations representative of) privately owned land. During 2017 monitors were situated at the following locations (Figure 5):

- Abbey Green (Abbey Green Station, Putty Road, Glenridding);
- Bulga Village (Wambo Road, Bulga);
- Putty Road, Mount Thorley (known as MTIE -)
- Wambo Road (Wambo Road, Bulga);
- Warkworth Village (former Warkworth Public School, Warkworth); and
- Wollemi Peak Road (intersection of Putty & Wollemi Peak Roads, Bulga).



FIGURE 5: BLAST MONITORING LOCATIONS

6.3.2 Performance

During the reporting period MTW detonated 311 blast events. Results of ground vibration and airblast overpressure recorded during 2017 are presented in Figure 6 to Figure 11. All blasts returned results below the relevant airblast overpressure / ground vibration criteria for all monitoring locations.

Road closures occurred for all blasts within 500 metres of a public road. Public roads were also closed on occasions to mitigate potential impact upon road users from dust or when blast fume management zones encompassed public roads.

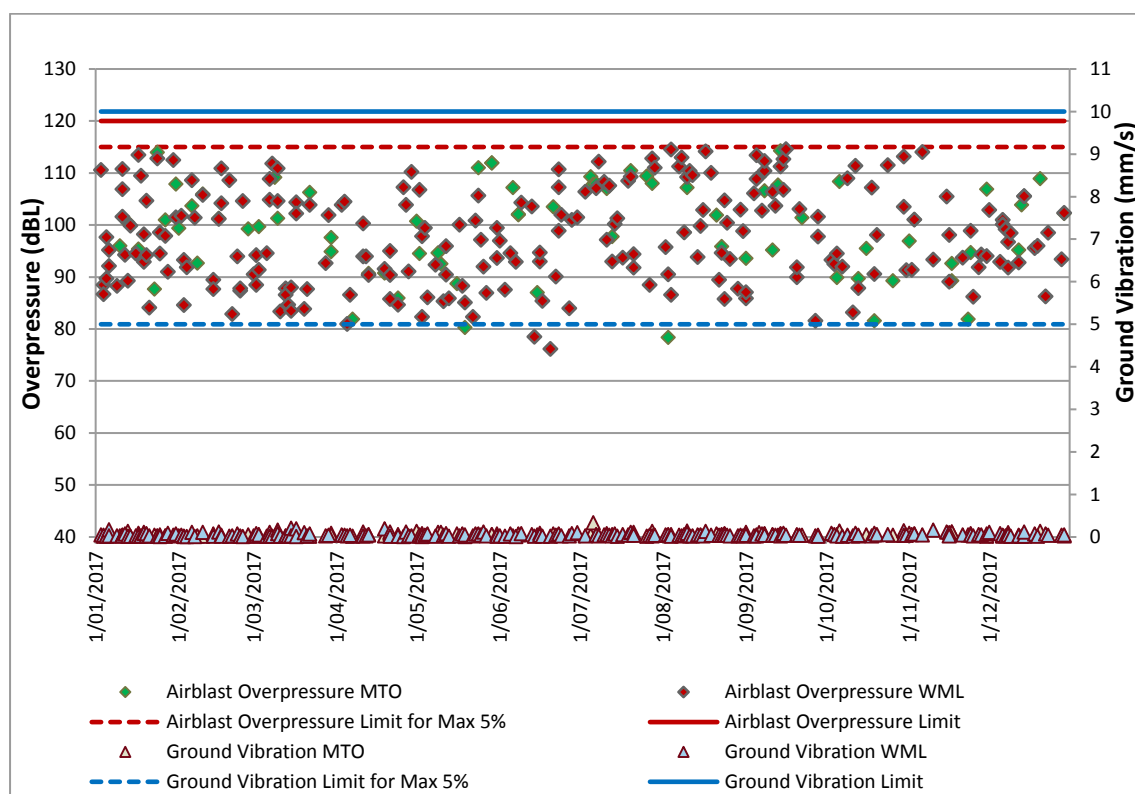


FIGURE 6: ABBEY GREEN BLASTING RESULTS

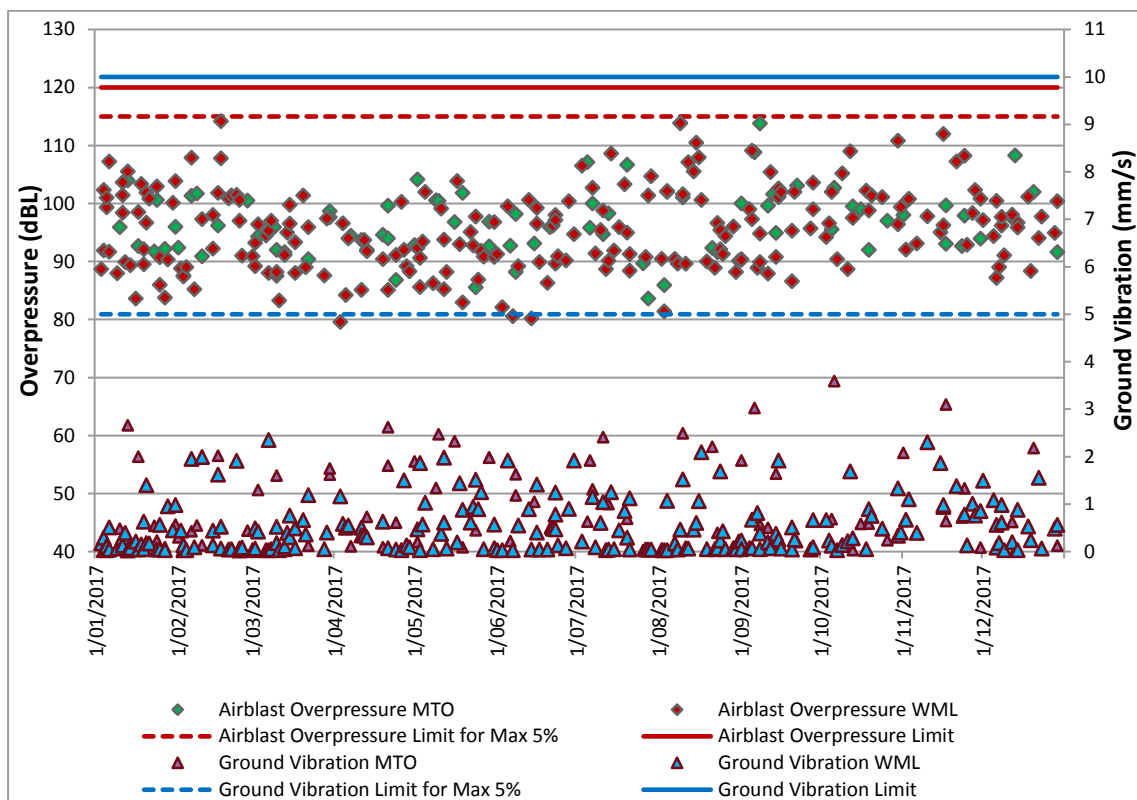


FIGURE 7: BULGA VILLAGE BLAST RESULTS

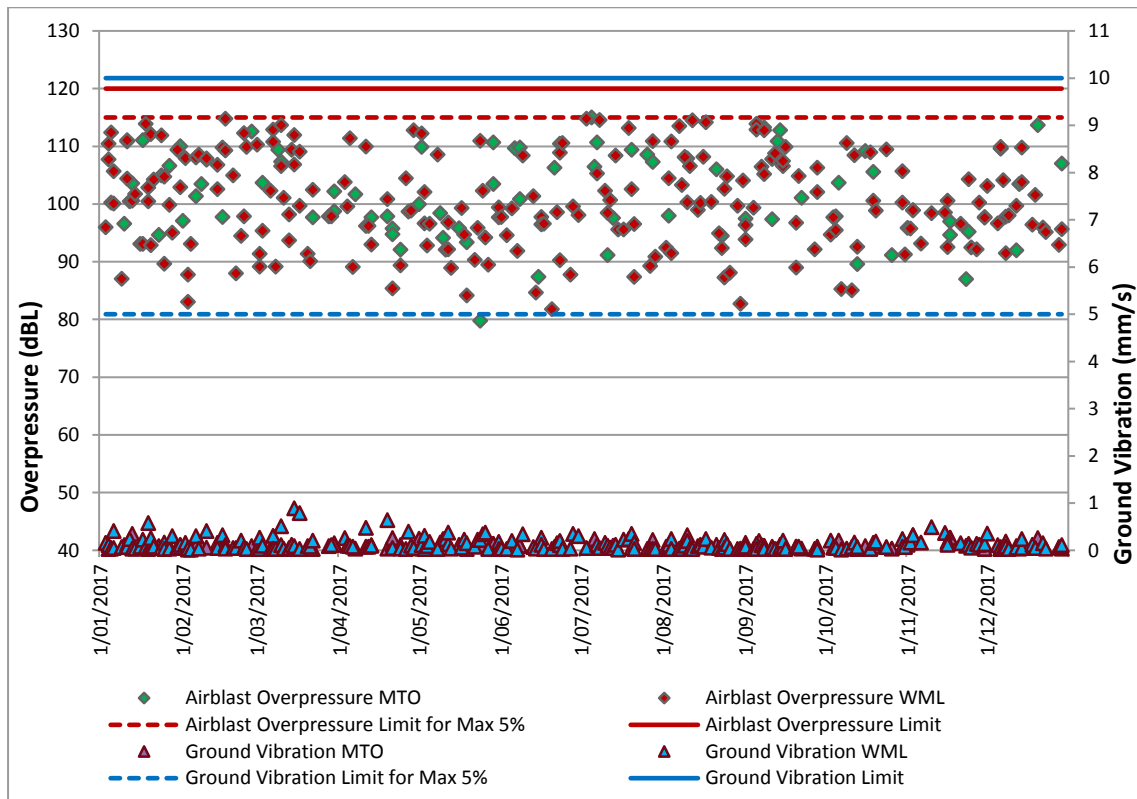


FIGURE 8: MTIE BLAST RESULTS

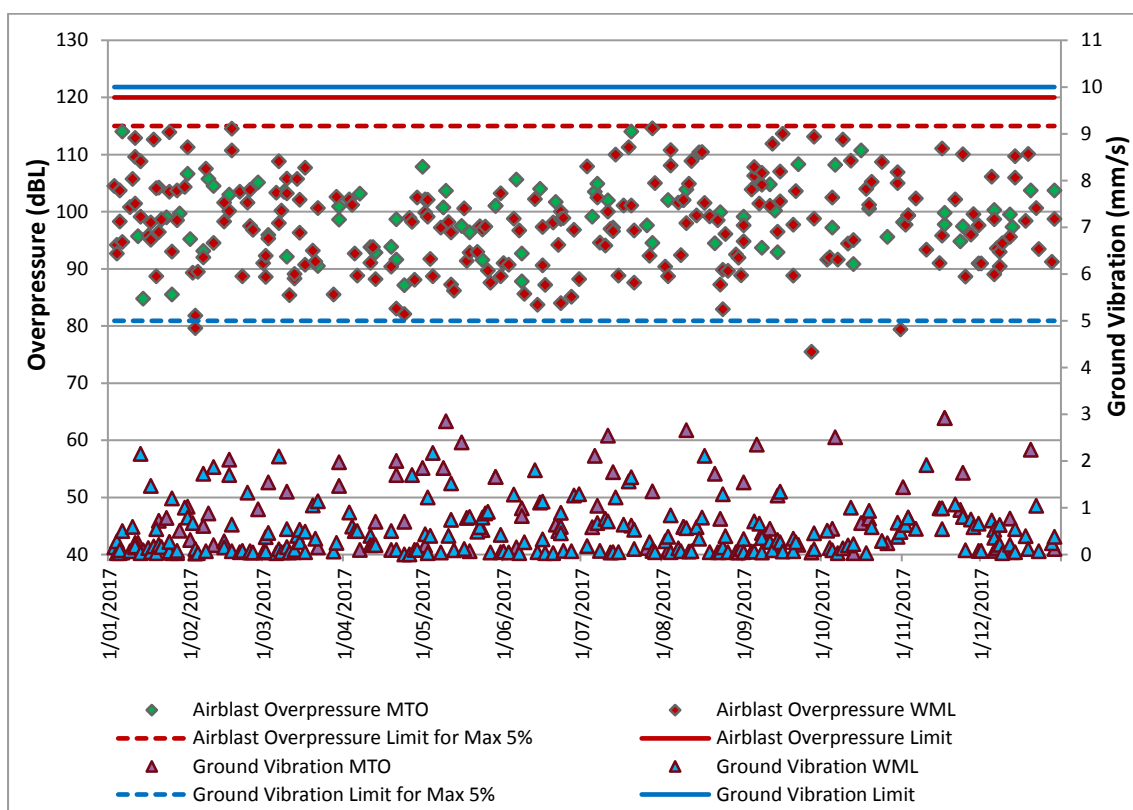


FIGURE 9: WOLLEMI PEAK ROAD BULGA BLAST RESULTS

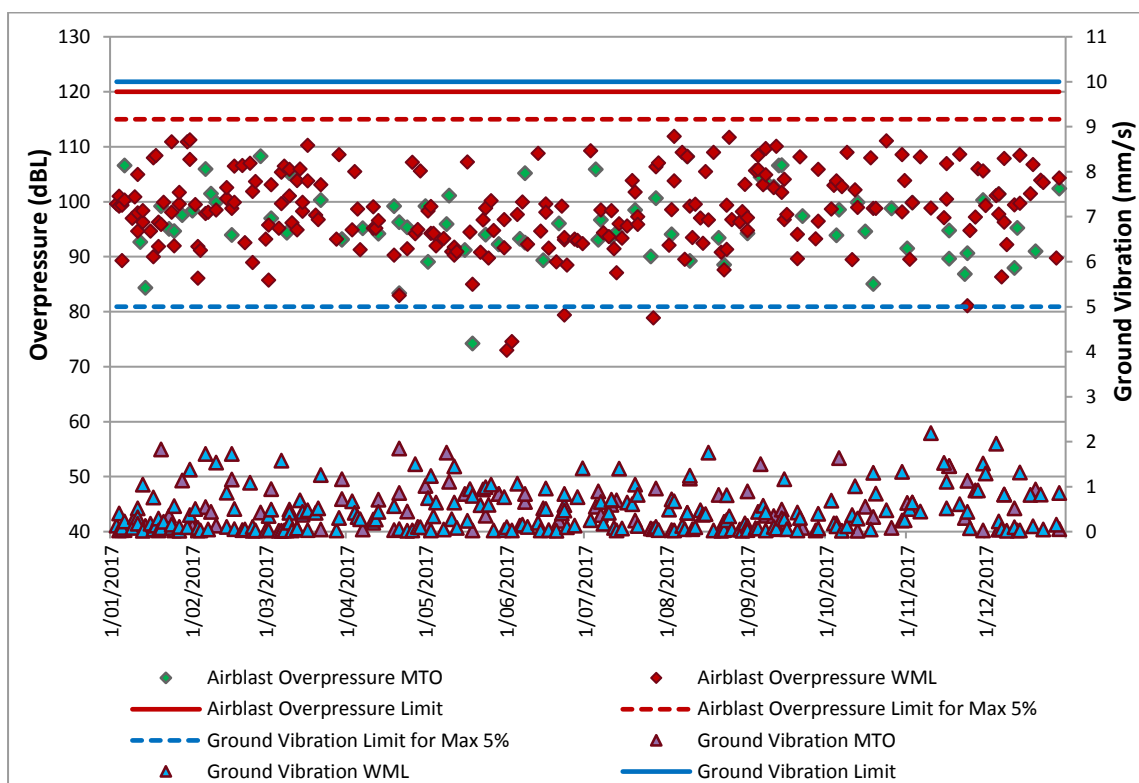


FIGURE 10: WAMBO ROAD BLAST RESULTS

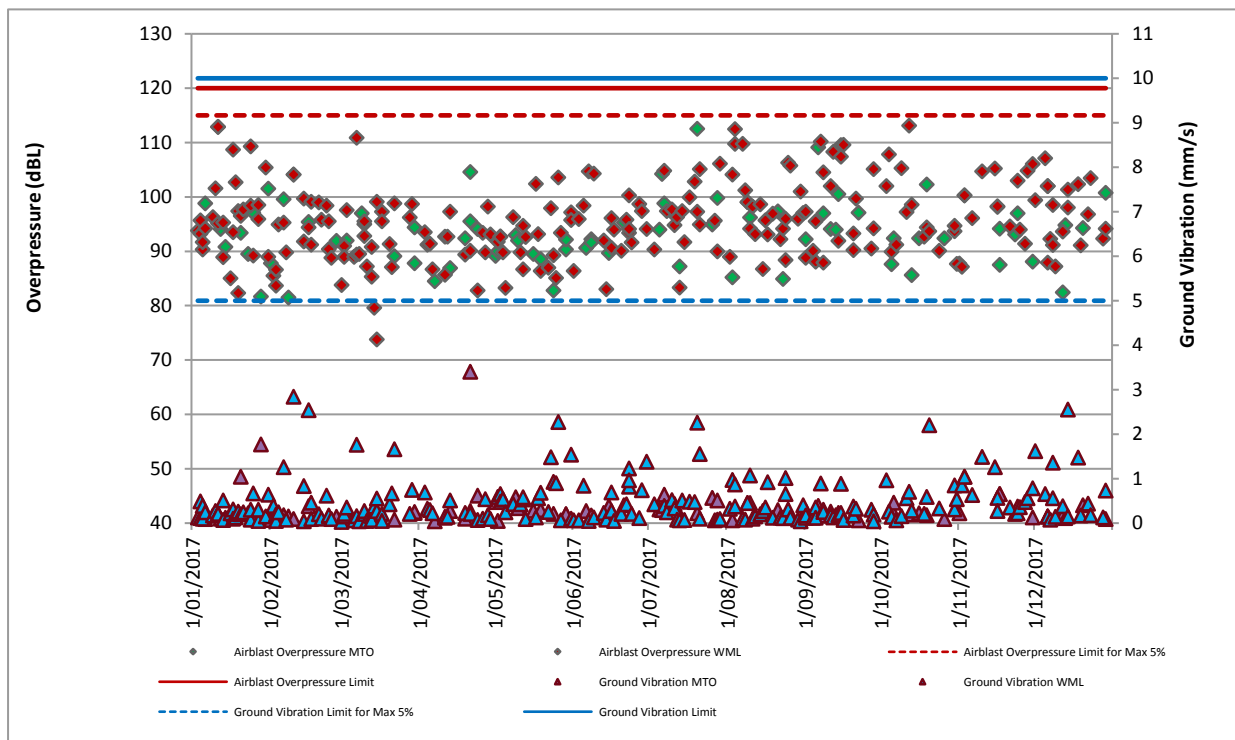


FIGURE 11: WARKWORTH BLAST RESULTS

6.3.3 Blast fume management

MTW operates a Post Blast Fume Generation Mitigation and Management Plan. This document outlines the practices to be utilised to reduce generation of post blast fume, and reduce potential offsite impact from any fume which may be produced. This includes risk assessment of the likelihood of fume production, specialised blasting design, appropriate product selection, on-bench water management, implementation of fume management zones and use of blasting permissions to identify likely path of any fume which may be produced.

All blasts are observed for fume and any fume produced is ranked according to the Australian Explosive Industry & Safety Group (AEISG) Scale.

During 2017, one blast produced visible post-blast fume with a post-blast ranking Level 4 according to the AEISG Scale.

A category four (4) blast fume event was notified to the DP&E on 27 April 2017, in accordance with notification requirements specified in the MTW Blast Management Plan which states:

“Notify the Department of Planning and Environment compliance office in Singleton of any blast producing post-blast fume that rates 3 at its highest extent and leaves the site (see definition below), and any blast that rates 4 or 5”.

A report was subsequently provided to DP&E for the event on 11 May 2017. The blast fume originated from a blast fired in the West Pit of the Warkworth premises. The plume left the MTW premises, crossing the Putty Road and re-entering the Mount Thorley lease where it dissipated at height.

Rankings for visible blast fume according to the AEISG scale for shots fired during 2017 and comparison to rankings distribution during previous years is provided in Table 19.

TABLE 19: VISIBLE BLAST FUME RANKINGS ACCORDING TO THE AEISG COLOUR SCALE

AEISG Ranking	2017	2016	2015
0	329	294	374
1	31	43	56
2	25	27	27
3	2	14	9
4	1	0	0
5	0	0	0
Total*	378	378	442

* Where a number of individual blasts were fired as a blast event, fume was assessed for each individual blast pattern rather than for the event as a whole.

6.3.4 Comparison of Monitoring Results Against Previous Years' Performance and EA Predictions

Blasting results recorded in 2017 are similar to results recorded in previous years and are consistent with EA predictions.

6.4 AIR QUALITY

6.4.1 Management

Air quality management at MTW is prescribed by the Air Quality Management Plan (available at <http://insite.yancoal.com.au>), the management plan;

- Describes procedures required to ensure compliance with the approval conditions relating to air quality including the measures that MTW will use to manage air quality.
- Details the management framework and mitigation actions to be taken while operating
- Provides a mechanism for assessing air quality monitoring results against the relevant impact assessment criteria.

6.4.2 Air Quality Performance

6.4.2.1 Real-Time Air Quality Management

MTW's real-time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits.

1,603 real-time alarms for air quality and wind conditions were received and acknowledged during 2017. In response, 8,030 hours of equipment downtime was recorded due to air quality management. A detailed breakdown of air quality related equipment stoppages (per month, per equipment type) is presented in Figure 12.

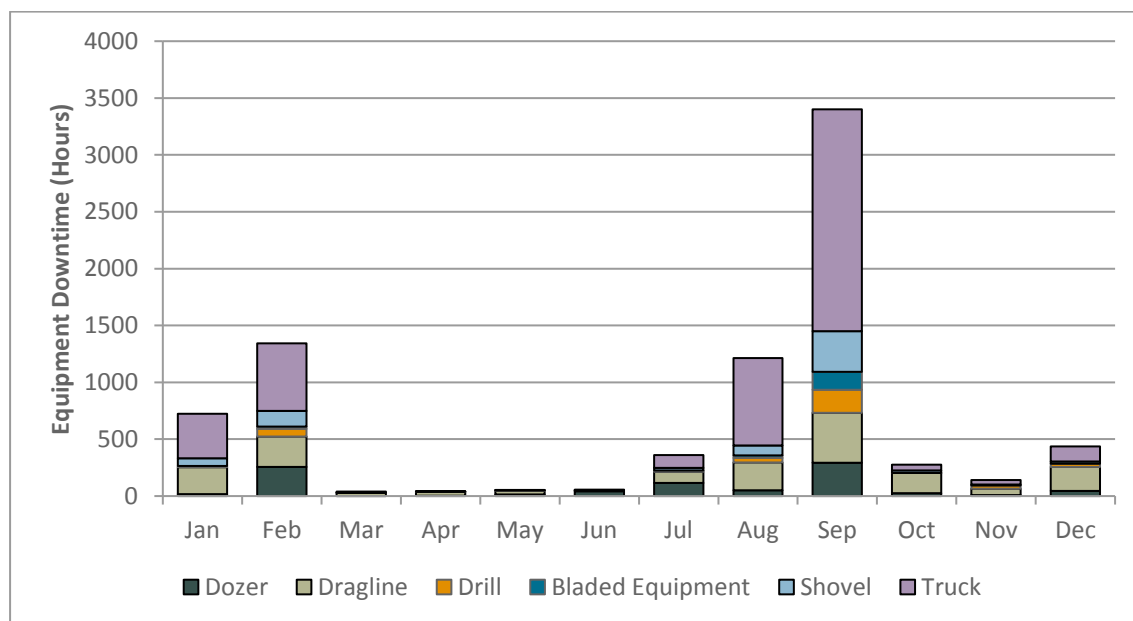


FIGURE 12: EQUIPMENT DOWNTIME FOR DUST MANAGEMENT BY MONTH

6.4.2.2 Temporary Stabilisation

The aerial seeding programme was undertaken in 2017 to reduce airborne dust from inactive waste dumps and ahead of mining areas. 145.3 hectares of area seeded (see Figure 13) using an exotic pasture grass and legume mix suitable for autumn sowing. A starter fertiliser was mixed with the seed prior to loading to provide sufficient nutrients for plant growth.

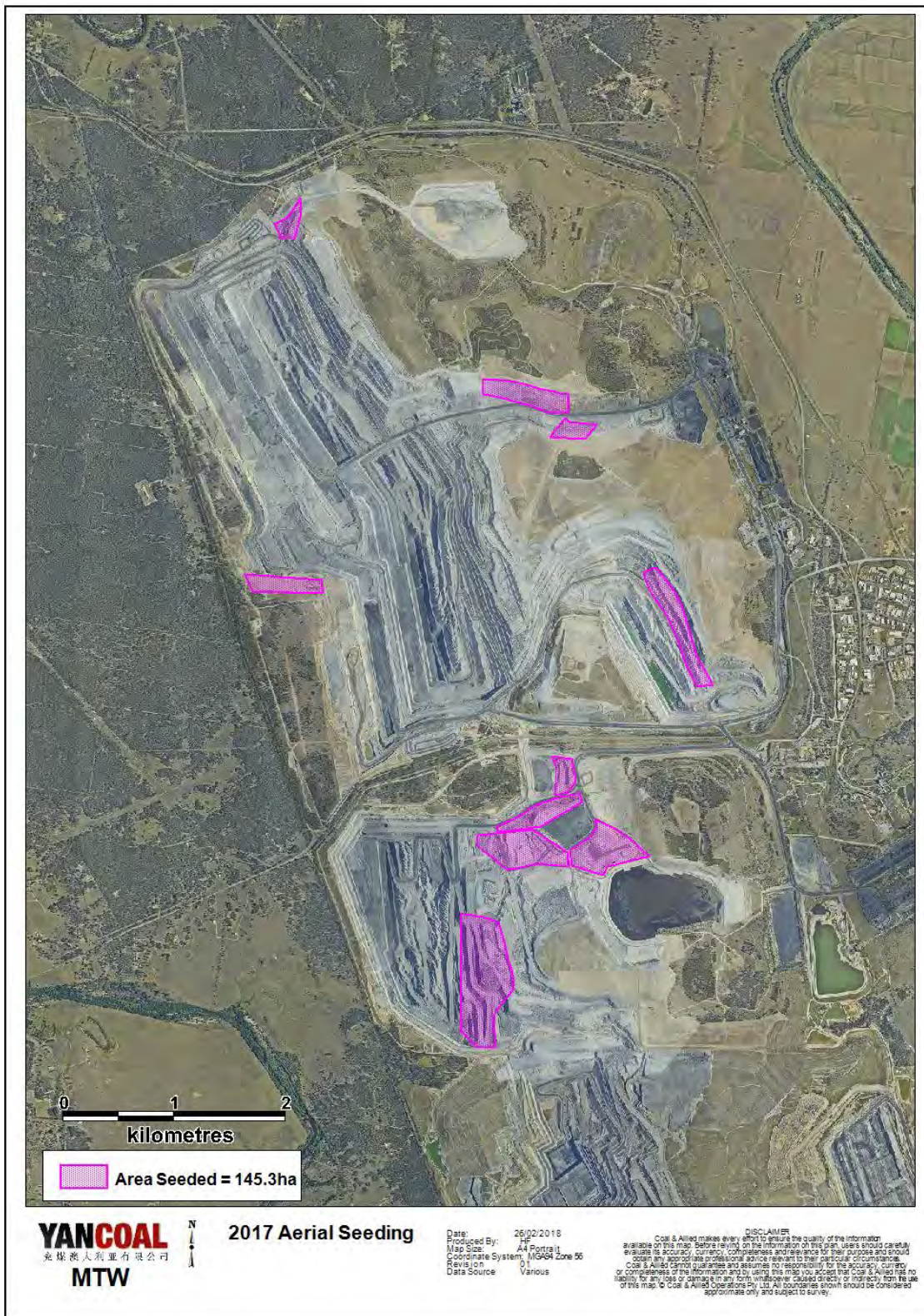


FIGURE 13: 2017 AERIAL SEEDING AREAS

6.4.3 Air Quality Monitoring

Air quality monitoring at MTW is undertaken in accordance with the MTW Air Quality Monitoring Programme and protocol for evaluating non-compliances. The monitoring network comprises an extensive array of monitoring equipment which is utilised to assess performance against the relevant **conditions of MTW's approvals and Environment Protection Licences**. Air quality monitoring locations are shown in Figure 14. During 2017, MTW complied with all short term and annual average air quality criteria.

Air quality compliance criteria are shown in Table 20, **along with a summary of MTW's performance** against the criteria. Whilst MTW operates under two separate planning approvals the following **compliance assessment has been undertaken on a 'whole of MTW site' basis, rather than individually** assessing the contribution of each approval area to the measured results.

Air quality monitoring data is made publically available through the MTW Monthly Environmental Monitoring Report and daily data can be accessed on <http://insite.yancoal.com.au>

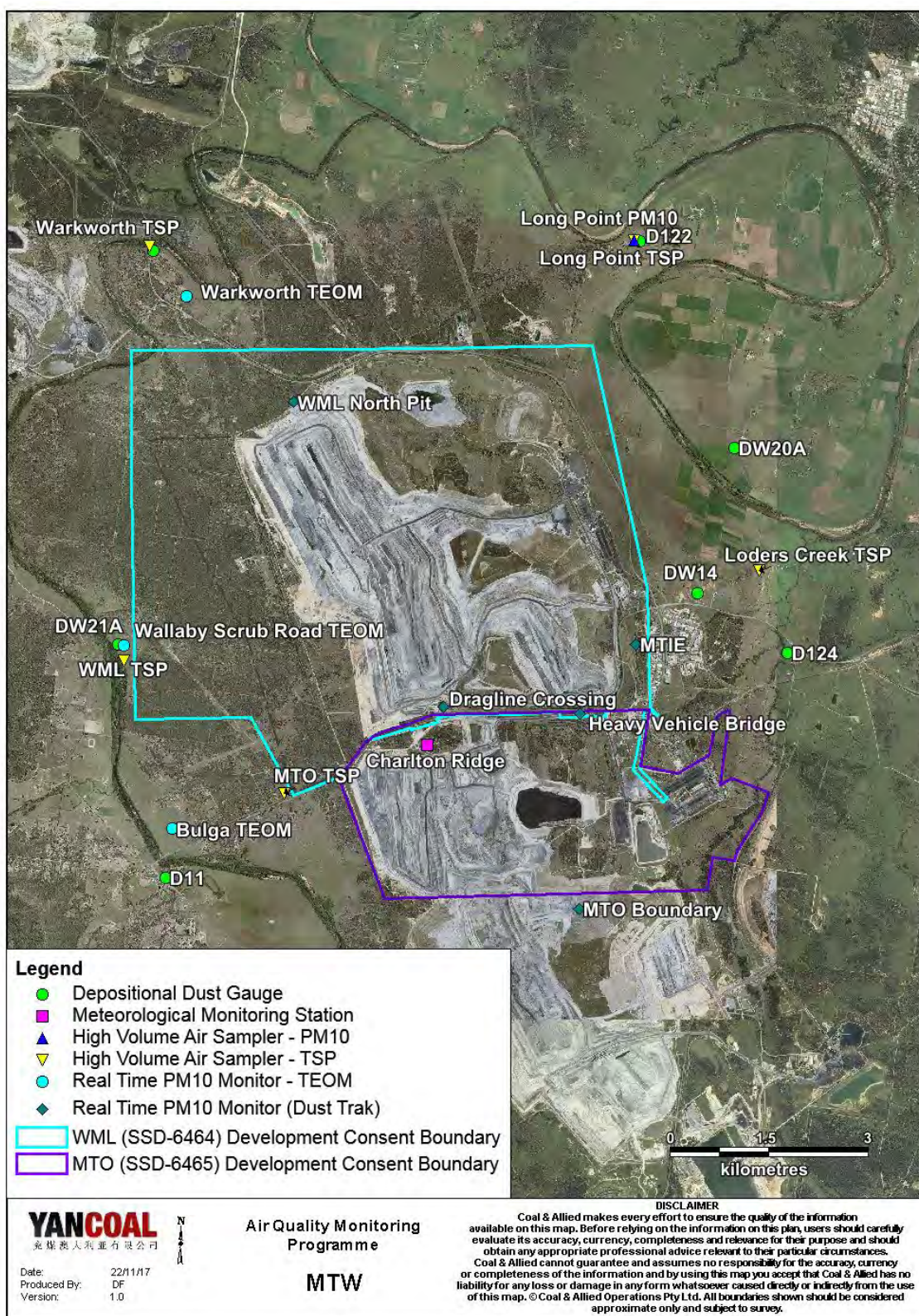


FIGURE 14: AIR AND METEOROLOGICAL MONITORING LOCATIONS MTW 2016

TABLE 20: AIR QUALITY IMPACT ASSESSMENT CRITERIA AND 2017 COMPLIANCE ASSESSMENT

Pollutant	Criterion	Averaging Period	Compliance
Deposited Dust	4 g/m ² /month	Maximum total deposited dust level	100%
	2 g/m ² /month	Maximum increase in deposited dust level	100%
Total Suspended Particulate matter (TSP)	90 µg/m ³	Long Term (Annual)	100%
Particulate matter <10µm (PM ₁₀)	30 µg/m ³	Long Term (Annual)	100%
	50 µg/m ³	Short Term (24 hour)	100%

6.4.3.1 Deposited Dust

Deposited dust is monitored at nine locations situated on, or representative of privately-owned land, in accordance with AS3580.10.1 (2003). The annual average insoluble matter deposition rates in **2017 compared with the impact assessment criterion and previous years' data is shown in Figure 13.**

During 2017, all annual average insoluble matter deposition rates recorded on privately owned land were compliant with the long-term impact assessment criteria. All monitoring locations also demonstrated compliance with the maximum allowable insoluble solids increase criteria of 2g/m²/month (Figure 16).

There were two exceedances of the long-term impact assessment criteria, for maximum total deposited dust level, recorded at DW20A and Warkworth monitoring locations. An external consultant was engaged to conduct an investigation which determined maximum MTW contribution to be not more than 1.2g/m²/month, or 41% of the total level of 4.1g/m²/month at DW20A and also not more than 1.05g/m²/month or 25% of the total level of 4.2g/m²/month at Warkworth. As per **MTW's approved Air Quality Management Plan, this does not** constitute non-compliance and no further action is required. There was also one exceedance of the long-term impact assessment criteria of 2g/m²/month (Maximum increase in deposited dust level) recorded at DW20A. The increase in deposited dust level at DW20A was 2.2 g/m²/month in 2017, however the criteria relates to incremental increase in concentrations due to the development on its own. Investigation determined that maximum total deposited dust level due to activities at MTW was 1.2g/m²/month, which brings the increase in deposited dust level down below criteria. As such, the exceedance does not constitute non-compliance. During 2017 monthly dust deposition rates equal to or greater than the long-term impact assessment criteria of 4g/m²/month were recorded at a number of sites. Where field observations denote a sample as contaminated (typically with insects, bird droppings or vegetation), the results are excluded from Annual Average compliance assessment. Meteorological conditions and the results of nearby monitors for the sampling period are also considered when **determining MTW's level of contribution to any elevated result. Details of excluded results are**

presented in the relevant MTW Monthly Environmental Monitoring Report. The graphs below illustrate a general trend in increased Depositional Dust across the board compared to previous year's. This is consistent with adverse meteorological conditions of low rain fall and consistent wind days.

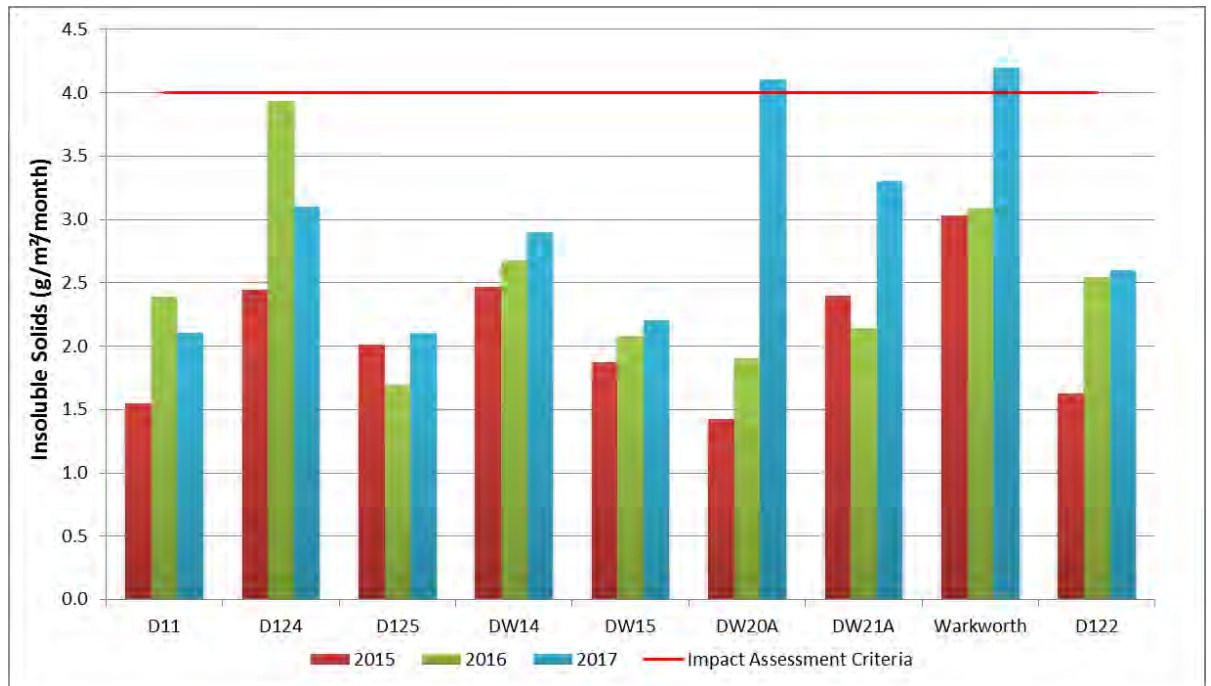
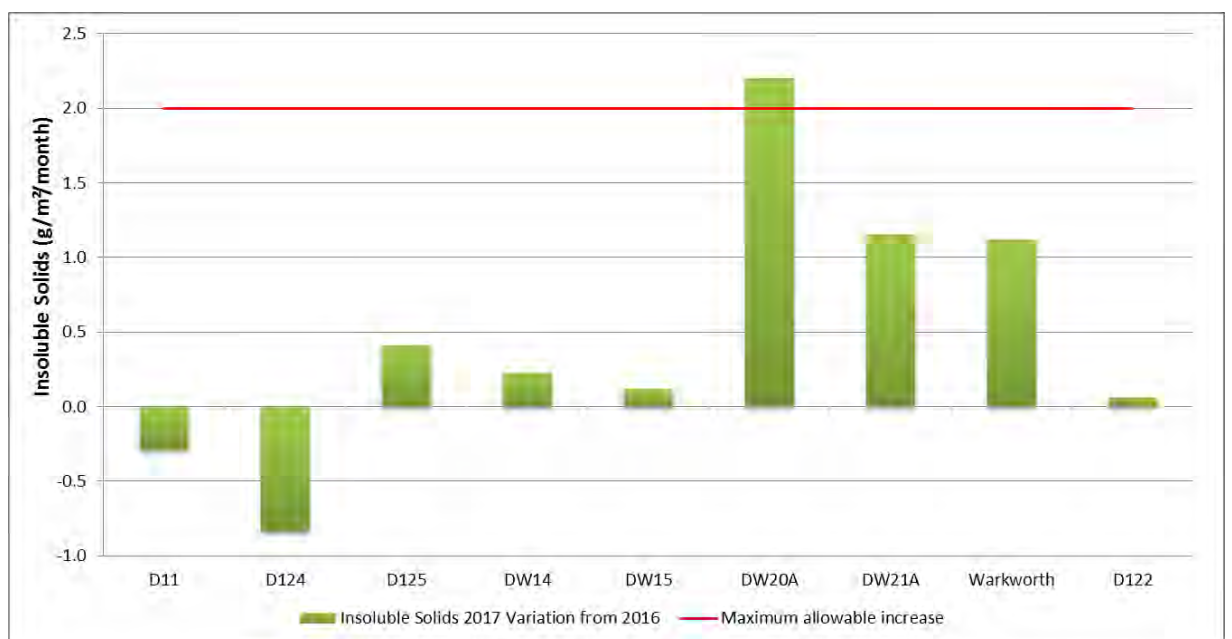


FIGURE 15: 2017 DEPOSITIONAL DUST RESULTS COMPARED AGAINST THE IMPACT ASSESSMENT CRITERIA AND PREVIOUS YEARS' RESULTS



**FIGURE 16: VARIATION IN INSOLUBLE SOLIDS DEPOSITION RATE FROM 2016 TO 2017
COMPARED AGAINST THE IMPACT ASSESSMENT CRITERIA**

6.4.3.2 Total Suspended Particulates (TSP)

Total Suspended Particulates (TSP) are measured at five locations situated on or representative of privately owned land in accordance with AS3580.9.3 (2003). Annual average TSP concentrations recorded in 2017 compared against the long term **impact assessment criterion and previous years'** data, are shown Figure 17. During 2017 all annual average results were compliant with the impact assessment and land acquisition criteria.

One high volume air sample exceeded the annual TSP impact assessment criteria during the reporting period. This was investigated to determine the level of contribution from MTW activities in accordance with the compliance protocol outlined in the MTW Air Quality Management Plan. The recorded exceedance was determined to be compliant with the relevant criteria.

A summary of the investigation undertaken for the annual TSP exceedance is provided in Table 21

TABLE 21 : ANNUAL TSP INVESTIGATION - 2017

Date	Site	Annual Average PM₁₀ result (µg/m³)	Calculated Annual TSP (µg/m³)	Discussion
2017	Long Point HVAS PM10	95.3	86.9	<p>An external consultant was engaged to investigate the exceedance, which determined that the result, excluding extraneous livestock dust impacted days (from livestock "immediately" adjacent to the monitor), is below the criterion of 90µg/m³. As the measured result is not solely attributable to MTW, it does not constitute non-compliance, as per MTW's approved Air Quality Management Plan and so no further action is required.</p> <p>A horse round yard and a chicken coop, which were "immediately" adjacent to the monitor creating exposed soil, were relocated further away in response to the elevated conditions.</p>

During the reporting period, 10 out of 300 TSP measurements were not able to be collected on the scheduled sampling date (based on a sampling frequency of every six days) due to power failures and technical issues with the monitors.

The annual average TSP concentrations recorded in 2017 are higher than those recorded in previous years, which is likely related to well below average rainfall for the year (Figure 17).

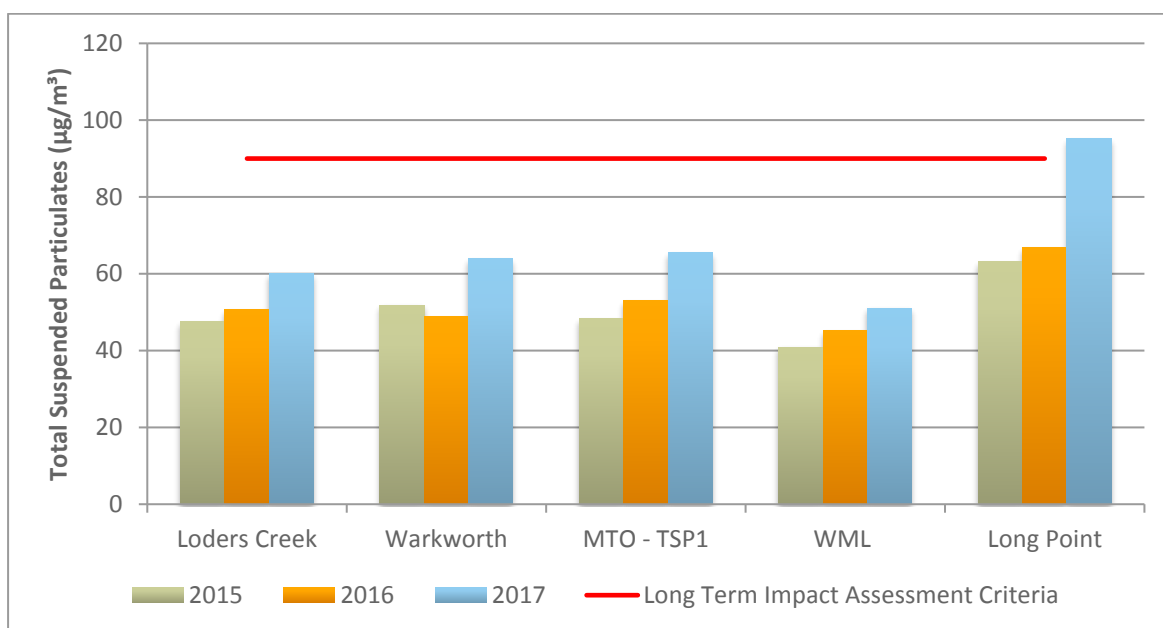


FIGURE 17: 2017 TSP ANNUAL AVERAGE COMPARED AGAINST THE IMPACT ASSESSMENT CRITERIA AND PREVIOUS YEARS' RESULTS

6.4.3.3 Particulate Matter <10µm (PM₁₀)

Compliance assessment for Particulate Matter <10µm (PM₁₀) is measured at five locations on privately owned land in accordance with AS3580.9.6 (2003). During 2017, all short term and annual average results were compliant with the impact assessment criteria.

6.4.3.4 Short term PM₁₀ impact assessment criteria

Monitoring results for PM₁₀ (24 hour) collected through the High-Volume Air Sampler monitoring network are compared against the short-term impact assessment criteria (Figure 18). All 24hr average results recorded by MTW's surrounding network of TEOM monitors are presented on a quarterly basis in Figure 19 to Figure 22.

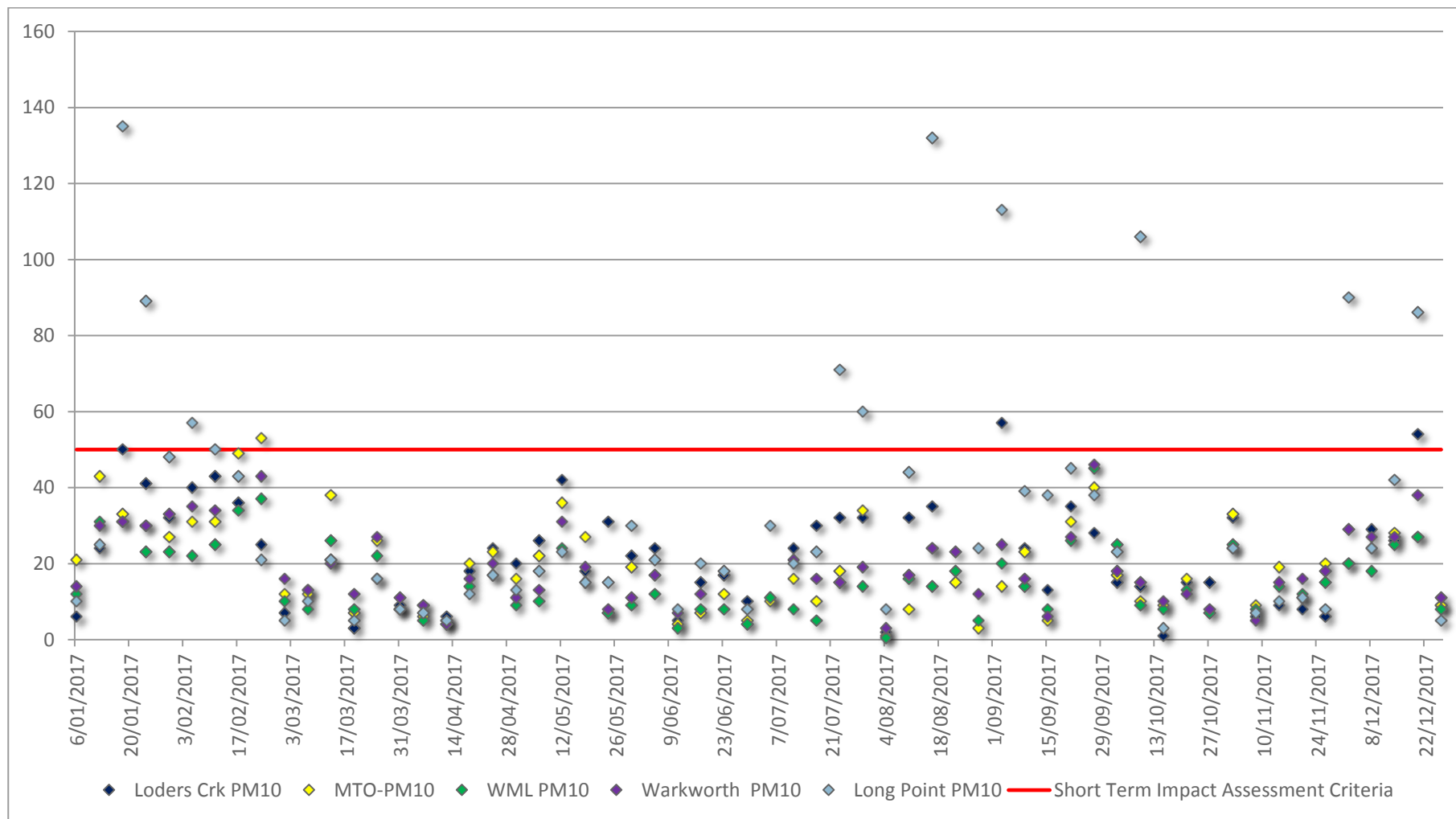


FIGURE 18: PM₁₀ 24HR MONITORING RESULTS (MEASURED BY MTW PM₁₀ HVAS NETWORK)

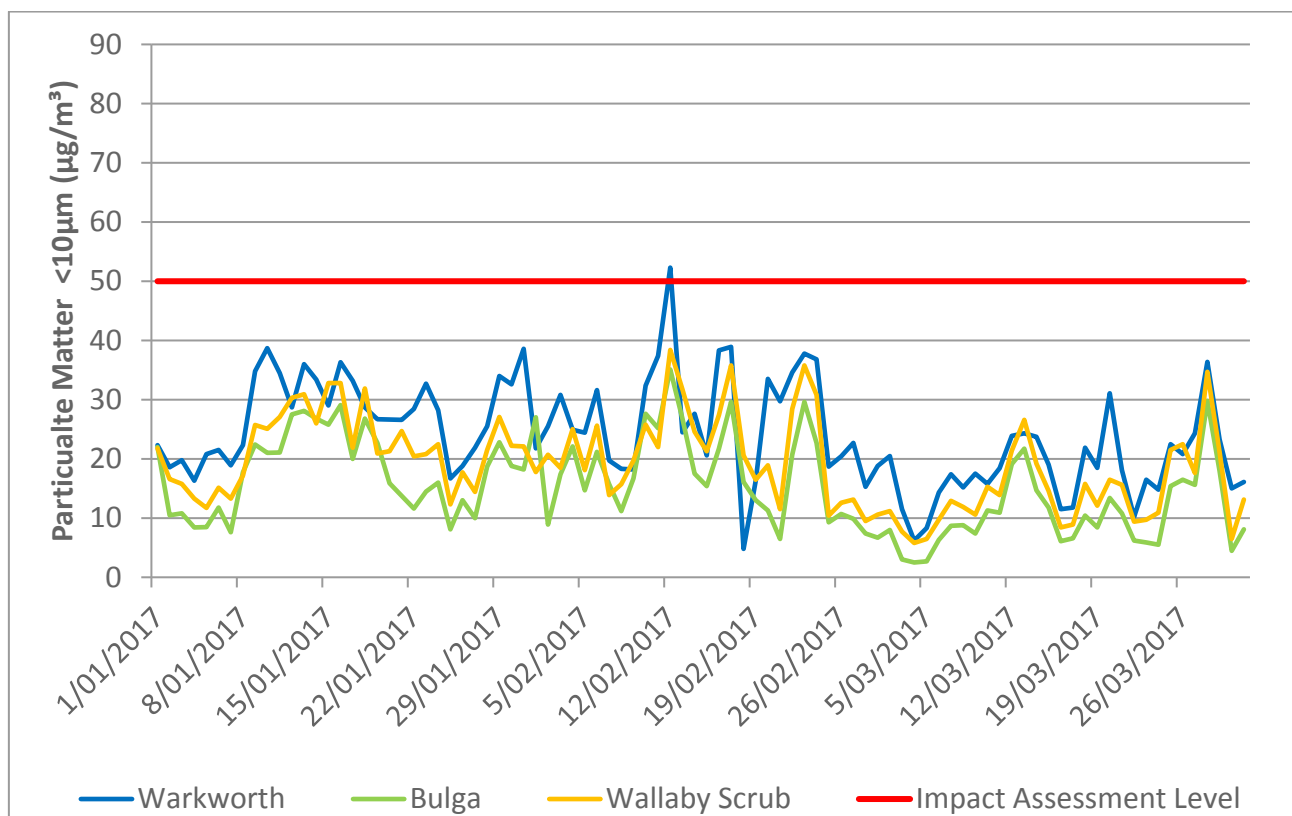


FIGURE 19: 24HR AVERAGE PM₁₀ MEASURED AT TEOM MONITORS SURROUNDING MTW - QUARTER ONE 2017

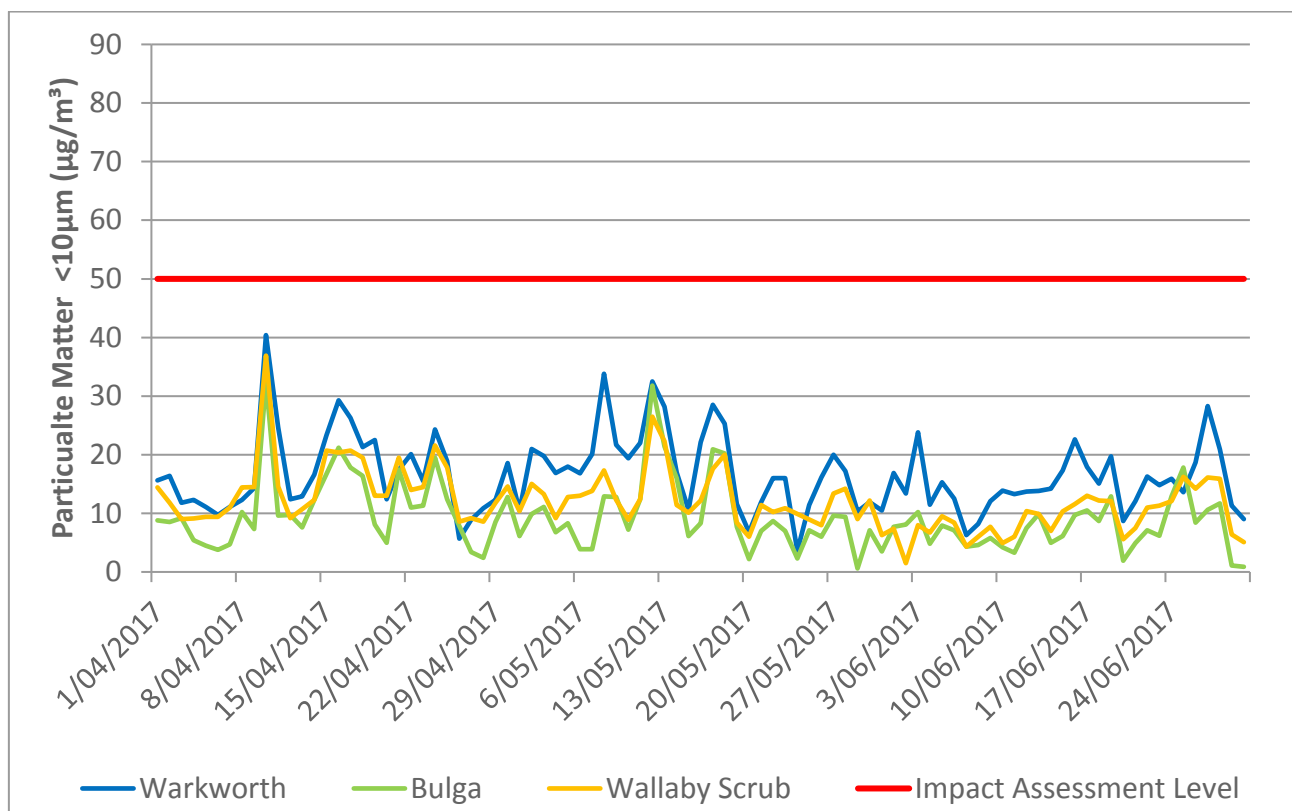


FIGURE 20: 24HR AVERAGE PM₁₀ MEASURED AT TEOM MONITORS SURROUNDING MTW - QUARTER TWO 2017

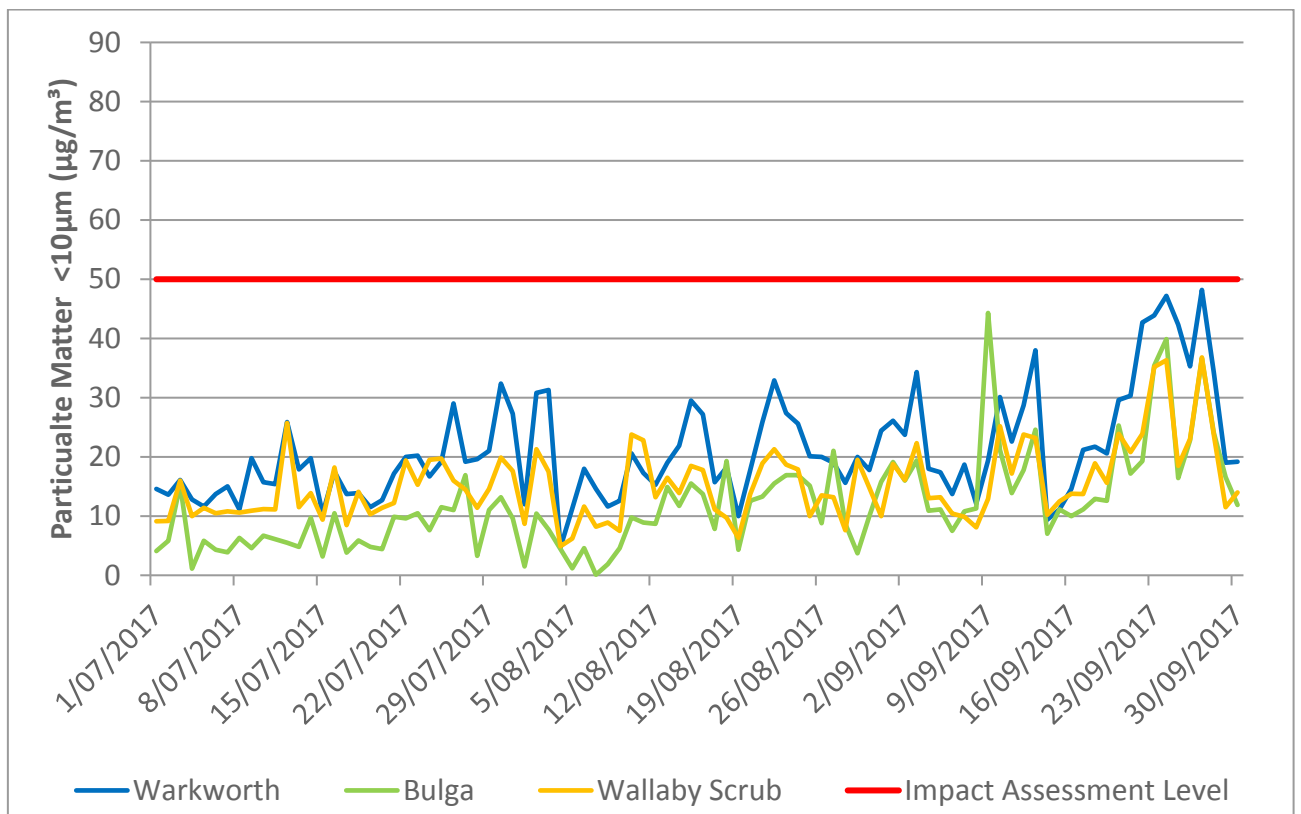


FIGURE 21: 24HR AVERAGE PM₁₀ MEASURED AT TEOM MONITORS SURROUNDING MTW - QUARTER THREE 2017

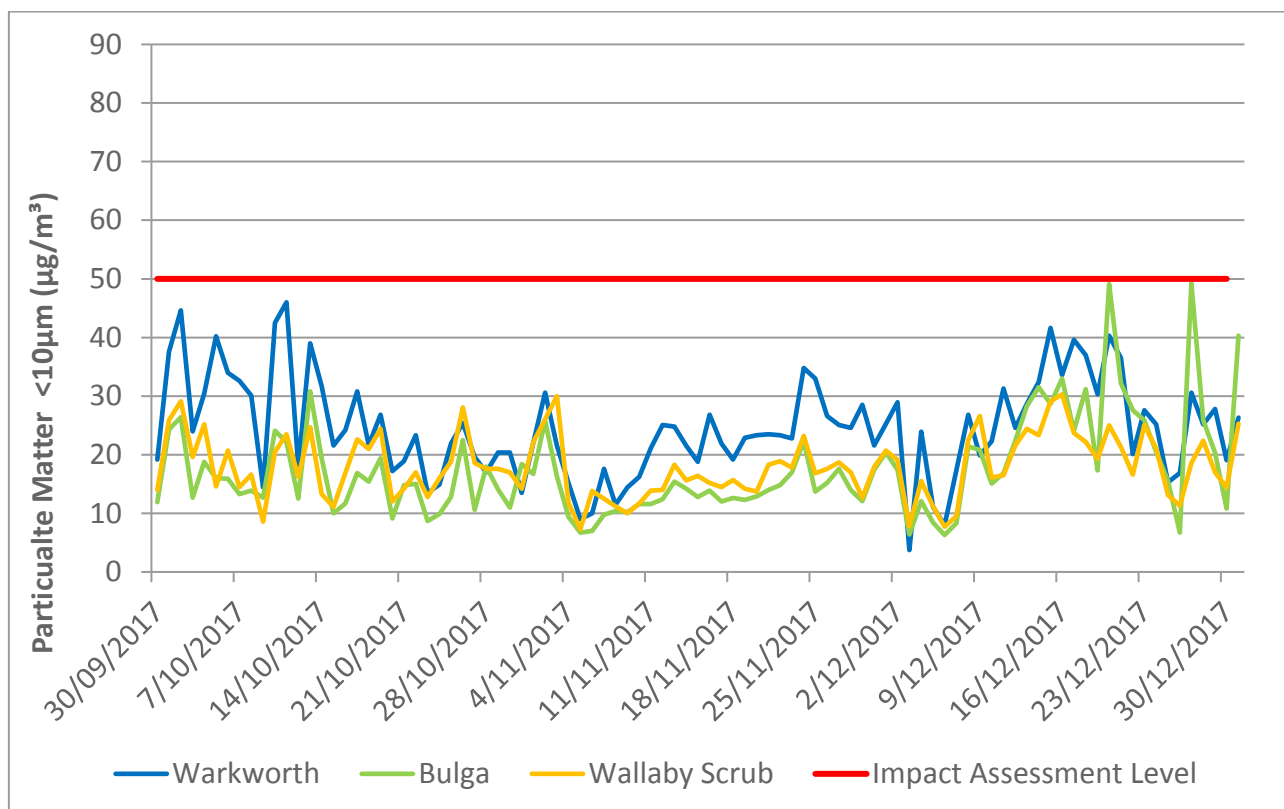


FIGURE 22: 24HR AVERAGE PM₁₀ MEASURED AT TEOM MONITORS SURROUNDING MTW - QUARTER FOUR 2017

11 high volume air samples and one TEOM PM₁₀ measurement exceeded the 24 hour short term impact assessment criteria during the reporting period. Each was investigated to determine the level of contribution from MTW activities in accordance with the compliance protocol outlined in the MTW Air Quality Management Plan. All recorded exceedances were determined to be compliant with the relevant criterion.

A summary of the investigations undertaken for each short term PM₁₀ exceedance are provided in Table 22.

TABLE 22 : 24 HOUR PM₁₀ INVESTIGATIONS - 2017

Date	Site	24hr PM ₁₀ result (µg/m ³)	Estimated contribution from MTW (µg/m ³)	Discussion
12/02/2017	Warkworth OEH TEOM	52.3	27.8	Analysis of meteorological Data has determined the maximum potential MTW contribution to the result to be in the order of 27.8µg/m ³ or ~53% of the measured result, determined by assessing contribution due to meteorological conditions.
05/02/2017	Long Point HVAS PM10	57	-	An analysis of meteorological data has determined that the Long Point monitoring location was predominantly upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was a significant contributor to the result and thus an estimation of contribution has not been calculated.
23/02/2017	MTO HVAS PM10	53	28	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 28µg/m ³ or ~53% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
23/07/2017	Long Point HVAS PM10	71	-	An analysis of meteorological data has determined that the Long Point monitoring location was predominantly upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant contributor to the result and thus an estimation of contribution has not been calculated.
29/07/2017	Long Point HVAS PM10	60	-	An analysis of meteorological data has determined that the Long Point monitoring location was generally upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant

				contributor to the result and thus, an estimation of contribution has not been calculated.
16/08/2017	Long Point HVAS PM10	132	-	An analysis of meteorological data has determined that the Long Point monitoring location was generally upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant contributor to the result and thus an estimation of contribution has not been calculated.
03/09/2017	Long Point HVAS PM10	113	23	An analysis of meteorological data has determined that the Long Point monitoring location was generally upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant contributor to the result.
03/09/2017	Loders Creek HVAS PM10	57	34.5	An analysis of Meteorological data combined with up wind analysis has determined the maximum potential MTW contribution to the result to be in the order of 35µg/m3 or ~61% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
09/10/2017	Long Point HVAS PM10	106	-	An analysis of meteorological data has determined that the Long Point monitoring location was predominantly upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant contributor to the result and thus an estimation of contribution has not been calculated.
02/12/2017	Long Point HVAS PM10	90	-	An analysis of meteorological data has determined that the Long Point monitoring location was predominantly upwind of MTW throughout the day. Therefore, it is unlikely that MTW operations was significant contributor to the result and thus an estimation of contribution has not been calculated.
20/12/2017	Long Point HVAS PM10	86	-	An analysis of meteorological data has determined that the Long Point monitoring location was Predominantly up upwind of MTW throughout the day. Therefore, it is

				unlikely that MTW operations was significant contributor to the result and thus an estimation of contribution has not been calculated.
20/12/2017	Loders Creek HVAS PM10	54	23	An analysis of Meteorological data combined with up wind analysis has determined the maximum potential MTW contribution to the result to be in the order of 23µg/m3 or ~43% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.

6.4.3.5 Long term PM10 impact assessment criteria

Annual average PM₁₀ concentrations have been compared with the long term PM₁₀ impact assessment **criterion and previous years' data** (Figure 23). All annual average PM₁₀ concentrations recorded on privately owned land were compliant with the assessment criterion.

One high volume air sample exceeded the annual PM₁₀ impact assessment criteria during the reporting period. The result was investigated by external consultant to determine the level of contribution from MTW activities in accordance with the compliance protocol outlined in the MTW Air Quality Management Plan. The exceedance was determined to be compliant with the relevant criteria.

A summary of the investigation undertaken for the annual PM₁₀ exceedance is provided in Table 22

TABLE 23 : ANNUAL PM₁₀ INVESTIGATION - 2017

Date	Site	Annual Average PM ₁₀ result (µg/m ³)	Calculated Annual PM ₁₀ (µg/m ³)	Discussion
2017	Long Point HVAS PM10	33.3	29.2	An external consultant was engaged to investigate the exceedance, which determined that the result, excluding extraneous livestock dust impacted days (from livestock "immediately" adjacent to the monitor), is below the criterion of 90µg/m3. As the measured result is not solely attributable to MTW, it does not constitute non-compliance, as per MTW's approved Air Quality Management Plan and so no further action is required.

				A horse round yard and a chicken coop, which were “immediately” adjacent to the monitor creating exposed soil, were relocated further away in response to the elevated conditions.
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During the reporting period, 12 out of 300 PM₁₀ measurements were not able to be collected on the scheduled sampling date (based on a sampling frequency of every six days) due to power failures and technical issues with the monitors.

All monitoring locations recorded increases in PM₁₀ compared to 2016. This is likely related to below average rainfall for the year, substantially lower than the 2016 total.

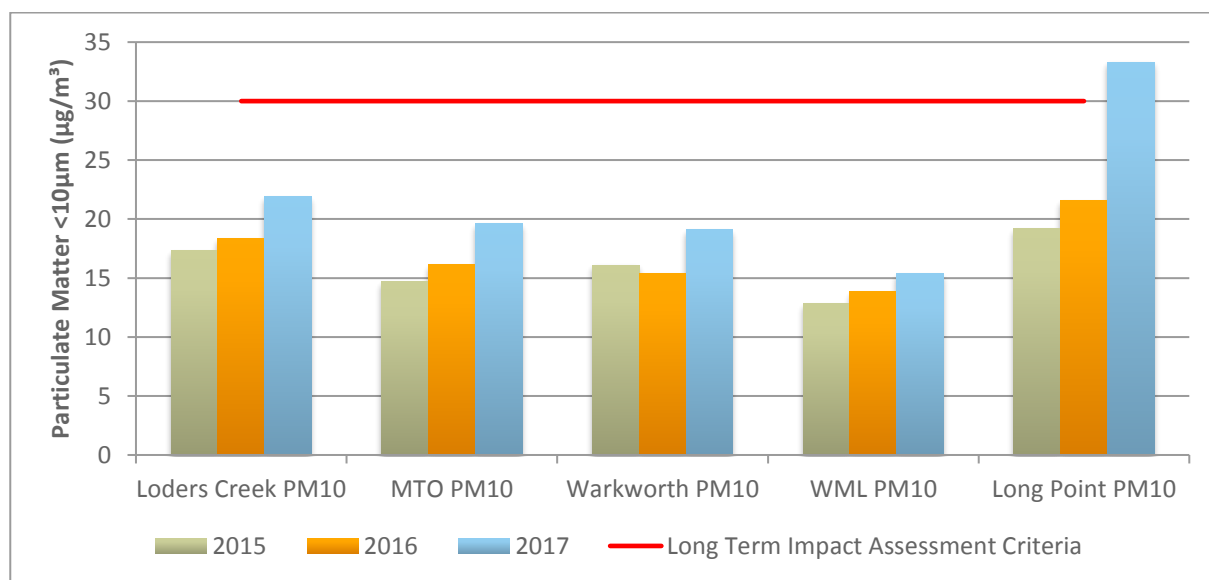


FIGURE 23: ANNUAL AVERAGE HVAS PM₁₀ RESULTS 2015 TO 2017

6.4.3.6 Comparison of 2017 Air Quality data against EA predictions

Table 24 and Table 25 show a comparison between 2017 air quality data and the predictions made in the 2014 Warkworth Continuation Environmental Impact Statement (EIS). Comparisons have been made against the predictions listed in the EIS for Year 3 (2017) for the nearest private residence to each monitoring location.

Annual average PM₁₀, with the exception of Long Point, were consistent or below the modelled range for Year 3 of the development (nominally 2017). Long Point PM₁₀ recorded an annual average result of 33.3µg/m³, exceeding the predicted annual average (16µg/m³). Given prevailing winds in the Hunter Valley and the location of the monitor relative to MTW operations it is unlikely that the measured increases are primarily a direct result of MTW activity.

TABLE 24: 2017 PM₁₀ ANNUAL AVERAGE RESULTS COMPARED AGAINST CUMULATIVE PREDICTIONS FOR YEARS 3 - WARKWORTH CONTINUATION EIS (2014).

Monitoring Location	Long Term (annual average) PM ₁₀ criteria	
	Year 3 (µg/m ³)	2017 Annual Average (µg/m ³)
MTO PM ₁₀	23	19.6
Loders Creek PM ₁₀	19	21.9
WML PM ₁₀	16	15.4
Warkworth PM ₁₀	30	19.1
Long Point PM ₁₀	16	33.3

TSP annual averages at all monitoring locations except Warkworth TSP were higher than modelled predictions for the Year 3 scenario. The difference between modelled predictions and the measured result can be explained as a function of model inputs which do not account for TSP contribution from regional particulate events such as bushfires, stock movement, dust from local roads and driveways and agricultural activity.

TABLE 25: 2017 TSP ANNUAL AVERAGE RESULTS COMPARED AGAINST CUMULATIVE PREDICTIONS FOR YEAR 3 – WARKWORTH CONTINUATION EIS (2014).

Monitoring Location	Long Term (annual average) TSP criteria	
	Year 3 (µg/m ³)	2017 Annual Average (µg/m ³)
MTO TSP1	52	65.5
Loders Creek TSP	43	60.1
WML- HV2a	39	51.1
Warkworth	65	63.9
Long Point	38	95.3

6.5 HERITAGE SUMMARY

6.5.1 Aboriginal Heritage

6.5.1.1 Aboriginal Archaeological and Cultural Heritage Investigations

Two Aboriginal cultural heritage salvage programs were conducted at MTW in 2017, in accordance with the MTW *Aboriginal Cultural Heritage Management Plan*. A salvage mitigation program was conducted on 22/23 July 2017 covering 25 isolated artefact sites to the west of the existing West Pit. Also, in December, a work program commenced to remove the Site M grinding grooves & relocate these features to, ultimately, the Wollombi Brook Aboriginal Cultural Heritage Conservation Area. This program will continue & conclude in 2018.

In addition to these programs, an ACHMP compliance inspection was conducted between 18-23 December. This compliance inspection was conducted by representatives of the Aboriginal community selected by MTW and were assisted by internal personnel. A total of 20 Aboriginal cultural heritage sites were inspected during this program. Five new Aboriginal cultural heritage sites was identified and recorded into the internal CH database during this audit.

The Coal & Allied Upper Hunter Valley Aboriginal Cultural Heritage Working Group (CHWG) is the primary forum for Aboriginal community consultation on matters pertaining to cultural heritage. The CHWG is comprised of representatives from MTW and Registered Aboriginal Parties (RAPs) from Upper Hunter Valley Aboriginal native title and community groups, corporations and individuals. The CHWG met and discussed cultural heritage management matters associated with MTW on six occasions during 2017: on 14 February, 23 February, 4 May, 8 June, 24 August & 9 November.

6.5.1.2 Audits and Incidents

During the reporting period there were 28 GDPs assessed for cultural heritage management considerations at MTW. Ground disturbance works were conducted on an Aboriginal cultural heritage sites avoidance basis so that no unsalvaged sites were impacted by these activities. There were no incidents nor any unauthorised disturbance caused to Aboriginal cultural heritage sites at MTW during 2017.

An independent MTW Environmental audit was conducted in 2017. One administrative non-compliance was identified in relation to Cultural Heritage Awareness Training materials not meeting the requirements of consents SSD-6464 and SSD-6465 and associated Aboriginal Heritage Management Plan (see attached Appendix 4).

6.5.2 Historic Heritage

6.5.2.1 Historic Heritage Activities

In 2012 the Community Heritage Advisory Group (CHAG) was established as a community consultation forum for all matters pertaining to management of historic (non-Indigenous) heritage located on MTW lands. The CHAG is comprised of community representatives with particular knowledge and interests in the historic heritage of the region such as historical groups, individuals and local government. The CHAG met four times over 2017 to discuss the results and recommendations arising from historic heritage surveys conducted over the entirety of MTW mining leases.

There were no incidents nor any unauthorised disturbance caused to historic heritage sites at MTW during 2016.

6.6 VISUAL AMENITY AND LIGHTING

6.6.1 Management

MTW aims to minimise visual amenity impacts from its operations. Two of the main controls used are lighting management and visual screening

Lighting

MTW aims to provide sufficient lighting for work to be undertaken safely, whilst minimising disturbance to neighbouring residents and public roads, particularly nearby residents in Bulga Village, Mount Thorley, Warkworth Village, Long Point, and Milbrodale; and vehicular traffic on the Putty Road and Golden Highway.

Actions undertaken in 2017 to manage lighting impacts include:

- Routine night shift inspections conducted by Community Response Officers to observe operating practices and to ensure lights are not shining towards nearby residential areas or affecting public roads.
- Yellow lights are used in preference to white lights in areas based on risk and external exposure.
- Alternate sheltered dumps are operated or work areas are shut down if lighting or visual amenity issues arise and cannot be sufficiently managed.
- MTW continue to modify the lighting plant plan in the Tipping and Dumping strategy to reflect changes in the operating area

Visual Screening

Visual screening of MTW operations uses various methods to best suit the terrain and infrastructure constraints around the boundary of the mine.

Bunding has an immediate screening effect, providing complete screening in areas where vegetation would be inadequate to filter views or where additional height is required. Bunds will be vegetated for visual amenity and to mitigate erosion.

Built screens (i.e. solid fences or walls) will be used as an alternative when bunds and tree screens are not practicable. Temporary screens (i.e. fencing and shade mesh) will be used as required for interim screening. Stage two of the Putty Road visual bund was completed in 2017. The bund will be vegetated with native seed mix in 2018.

Further rehabilitation of the eastern side of Warkworth in 2017 continues to improve the visual amenity when looking from the east.

7. WATER MANAGEMENT

7.1 WATER BALANCE

7.1.1 Water Management

An adaptive management approach is implemented at MTW to achieve the following objectives for water management:

- Fresh water usage is minimised;
- Impacts on the environment and MTW neighbours are minimised; and
- Interference to mining production is minimal.

This is achieved by:

- Preferentially using mine water for coal preparation and dust suppression where feasible;
- An emphasis on control of water quality and quantity at the source;
- Segregating waters of different quality where practical;
- Recycling on-site water;
- Ongoing maintenance and review of the water management system; and
- Releasing water to the environment in accordance with statutory requirements.

Plans showing the layout of all water management structures and key pipelines are shown in Figure 24. The MTW Water Management Plan contains further detail on management practices and is available on the webpage <https://insite.yancoal.com.au>.

Improvements to water management in 2017 have focused on reducing the risk of unauthorised water releases from site. A diversion channel at the base of the Abbey Green rehabilitation area was constructed in 2017. Revegetation of the construction area for the diversion channel is in progress. Other works completed in 2017 include construction of the Dam 48N, and SSD-05 dam to contain runoff from disturbance areas as mining progresses west in Warkworth Pit. MTW gained operational control of Dam 10S sediment dam (Ramp 22 Dam) following its construction by Bulga mine and the **relinquishment of its “Dam Mining Sublease” (sublease part of CL 219)**. MTW is now responsible for ongoing management of the dam as rehabilitation works progress along the common boundary shared with Bulga mine. Dam 10S receives rehabilitation runoff from both Bulga and MTW mine.

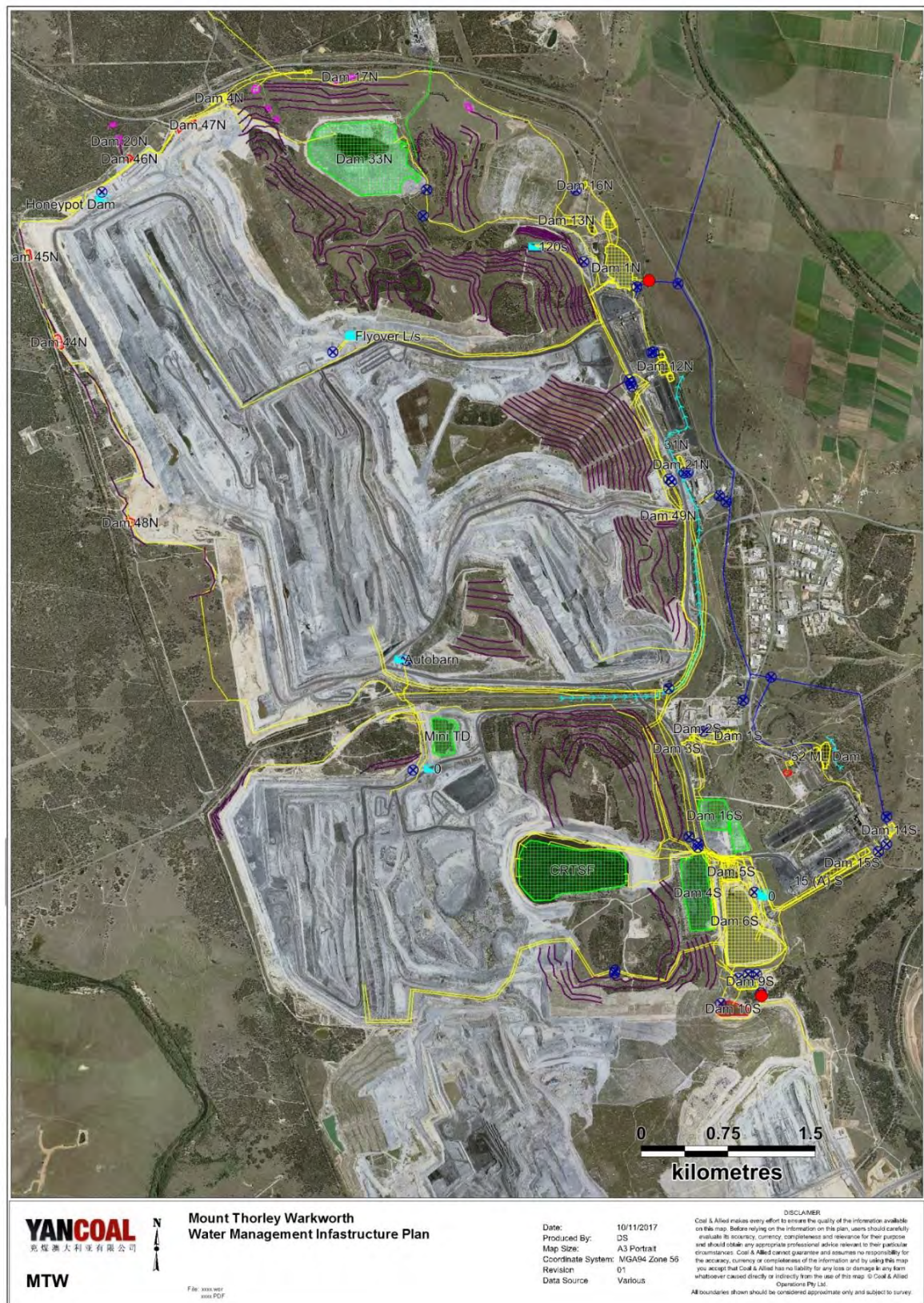


FIGURE 24: WATER MANAGEMENT INFRASTRUCTURE PLAN

7.2 WATER PERFORMANCE

7.2.1 Water Balance

MTW uses a water balance to record and assess water flux, but also to forecast and plan water management needs. These annual site water balances are then compared to previous results. A 2017 static water balance for MTW is presented in Table 26 and a simplified schematic of this balance is included Figure 25. A salt flux schematic is shown in Figure 26.

TABLE 26: STATIC MODEL RESULTS, ANNUAL WATER BALANCE

Water Stream	Volume (ML) (% Total)
Inputs	
Rainfall Runoff	3,368 (39%)
Hunter River (MTJV supply scheme)	1,790 (21%)
Potable (Singleton Shire Council / trucked)	18 (<1%)
Groundwater	517 (6%)
Recycled to CHPP from tailings (not included in total)	4,097
Imported (LUG bore)	1,533 (18%)
Imported (Hunter Valley Operations)	300 (4%)
Water from ROM Coal	1,044 (12%)
Total Inputs	8,570
Outputs	
Dust Suppression	3,131 (40%)
Evaporation – mine water dams	987 (13%)
Entrained in process waste	1,876 (24%)
Discharged (HRSTS)	0 (0%)
Water in coarse reject	704 (9%)
Water in product coal	1,028 (13%)
Miscellaneous use (wash-down etc.)	110 (1%)
Total Outputs	7,836
Change in storage (increased)	733

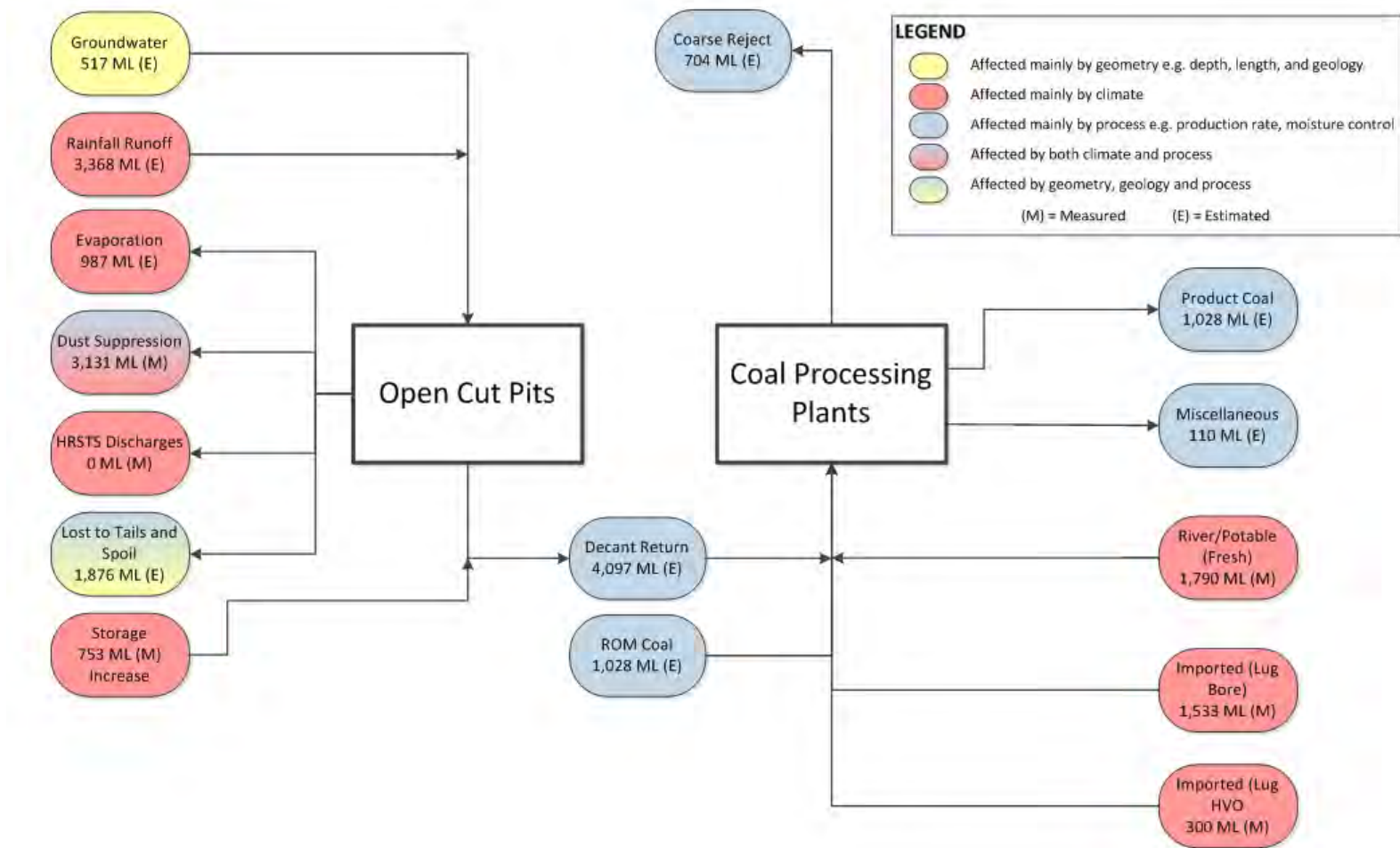


Figure 25: Schematic Diagram MTW Water Flux

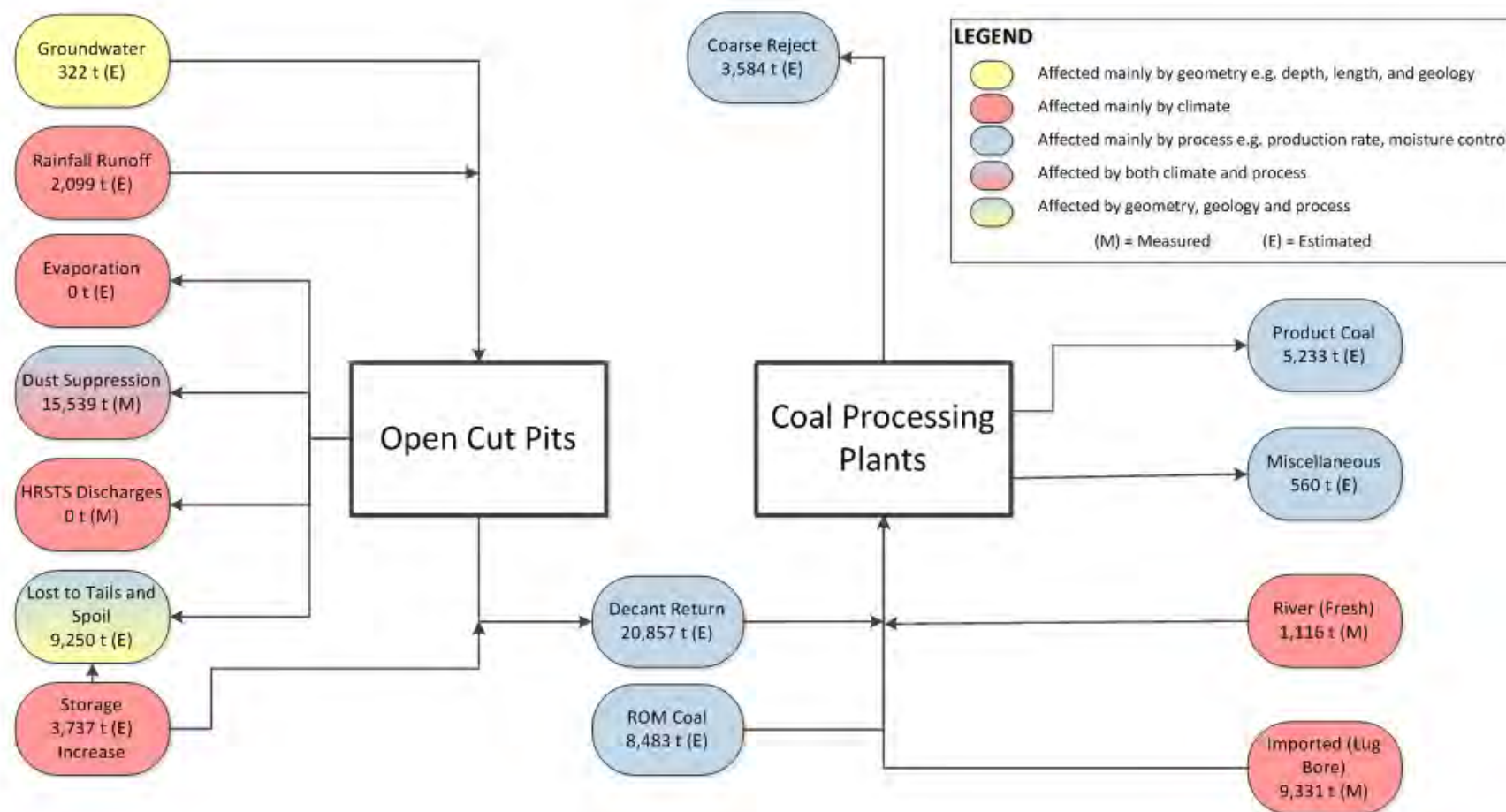


Figure 26: Schematic Diagram MTW Salt Flux

7.2.2 Water Inputs

A total of 444.4 mm of rainfall was recorded at MTW in 2017 producing a calculated 3,368 ML of runoff from developed, disturbed and mining catchments. Water falling on clean water catchments is diverted off site into natural systems where possible. Rainfall runoff was the largest input to the site mine water balance in 2017, however it is significantly less than the runoff captured in the 2016 reporting period (5,028 ML). where the site recorded an annual rainfall depth of 664.2 mm.

As the site water inventory is drawn down, water is imported to meet site demand. During the reporting period 1533 ML was imported from the LUG bore and another 300ML was imported from the Hunter Valley Operations Mine via the inter-site transfer pipeline. The site experienced a significant increase to imported water compared to the 2016 reporting period where the total imported water was 339 ML via the LUG bore.

MTW is able to source water from the Hunter River via the Mount Thorley Joint Venture (MTJV) water supply scheme. Singleton Shire Council holds the high security water licence on behalf of the scheme members. Singleton Shire Council maintains and operates the scheme to supply raw water to MTW, **Glencore's Bulga-Beltana complex, and to meet Council's own needs. MTW's share of the** MTJV allocation is 1,012 ML per financial year. During the reporting period an additional 1000 ML of high security water licenses were secured by MTW and were transferred to the MTJV license to further supplement the operations water supply. A total of 1790 ML of water was abstracted from the Hunter River during the reporting period.

Abstraction of water from the Hunter River in 2017 increased by 1,383 ML compared to 2016. The increase in abstraction can be attributed to a lack of local rainfall, with many rain events not **overcoming the surface saturation threshold to generate runoff to replenish the site's water inventory**. Lack of local rainfall is also the underlying cause of the increased volume of imported water from the LUG bore and neighbouring mines when comparing to the 2016 reporting period. A summary of water take by source is listed in Table 9.

Groundwater Licences under Part 5 of the *Water Act 1912* are held for each mining excavation area, to account for passive take via seepage inflows. Water Licences held by MTW are detailed in Table 8 and Table 9.

Licence conditions require the volume and quality of water taken by the works to be measured and reported on an annual basis. Groundwater inflows via pit wall seepage are at low rates, with a significant proportion evaporating at the coal face. The remainder reports to the pit floor, where it may accumulate along with direct rainfall, rainfall runoff and leakage from spoils. As a result it is not possible to physically measure the volume of water taken by these groundwater licences, nor the quality of waters extracted via seepage to the pits. In line with the Statement of Commitments listed in the 2014 Warkworth Continuation Environmental Impact Statement, a formal annual review of depressurisation of coal measures and alluvium is currently being undertaken.

7.2.3 Water Outputs

Significant water uses at MTW in 2017 were for dust suppression on haul roads, mining areas and coal stockpiles (3,131ML), evaporation from Dams (987ML) and water entrained in Process Waste (1,876ML). Water usage for dust suppression on haul roads slightly increased compared to the 2016 reporting period which can likely be attributed to drier conditions experienced in the current reporting period.

MTW participates in the Hunter River Salinity Trading Scheme (HRSTS) allowing it to discharge from licensed discharge points during declared discharge events associated with increased flow in the Hunter River. HRSTS discharges are undertaken in accordance with HRSTS regulations, EPL 1376 and EPL 1976. MTW maintains two licensed HRSTS discharge monitoring locations:

- Dam 1N, located at WML North, which discharges to Doctor's Creek
- Dam 9S, located at MTO South, which discharges to Loders Creek.

During the reporting period MTW did not discharge under the HRSTS.

7.3 SURFACE WATER

7.3.1 Water Management

Surface water monitoring activities continued in 2017 in accordance with the MTW Water Management Plan and MTW Surface Water Monitoring Programme. MTW maintains a network of surface water monitoring sites located at selected site dams and surrounding natural watercourses as shown in Figure 27. Water quality monitoring is undertaken to verify the effectiveness of the water management system onsite, and to identify the emergence of potentially adverse effects on surrounding watercourses. Primary water storage dams are monitored routinely to verify the quality of mine water, used in coal processing, dust suppression, and other day to day activities around the mine.

Surface water monitoring data review involves a comparison of measured pH, EC and TSS results against internal trigger values which have been derived from the historical data set. The response to measured excursions outside the trigger limits is detailed in the MTW Water Management Plan.

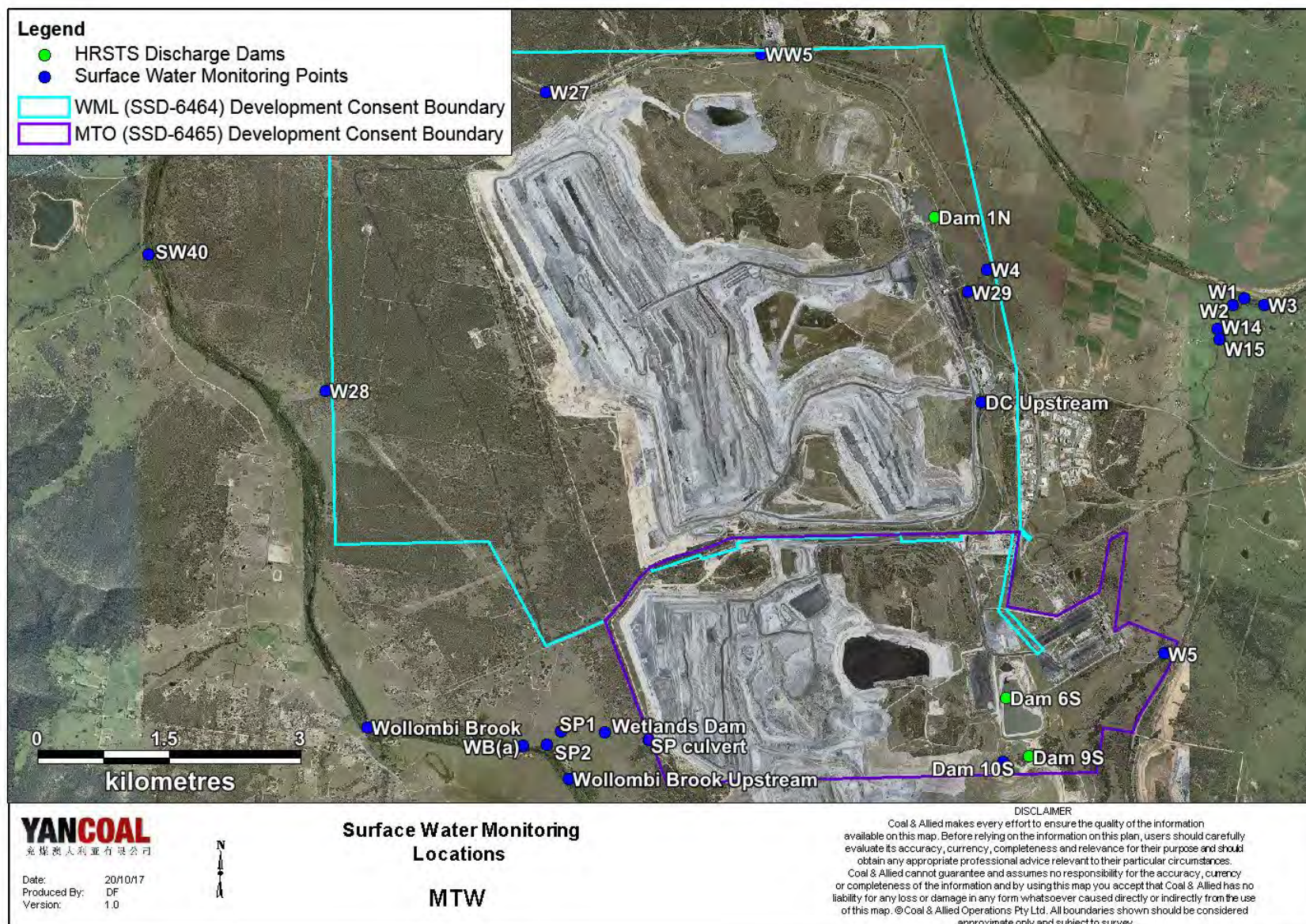


FIGURE 27: SURFACE WATER MONITORING POINTS

7.3.2 Surface Water Monitoring

Routine surface water monitoring was undertaken from 21 sites. Sampling of surface waters was carried out in accordance with AS/NZS 5667.6 (1998). Analysis of surface water was carried out in accordance with approved methods by a NATA accredited laboratory.

Water quality is evaluated through the assessment of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS). All surface water sites were also sampled for comprehensive analysis annually. The sampling frequency for ephemeral water sites was modified in 2016, from quarterly to a rain-event trigger system, in an effort to ensure samples taken were more representative of typical water quality for those streams (up to eight sampling events per annum can now be taken under the revised sampling protocol). Due to dry conditions during the reporting period fewer sampling runs were completed than in 2016 (two instead of four), however there was a marked improvement in data recovery as sites were not recorded as dry during the monitoring event. All required sampling and analysis was undertaken, except as detailed in Table 27. Trigger tracking results are described in Table 28.

TABLE 27: MTW WATER MONITORING DATA RECOVERY FOR 2017 (BY EXCEPTION)

Location	Data Recovery (%)	Comment
W28	50%	No safe access to site in January
WW5	50%	Site recorded as dry in March and December

A summary of all surface water monitoring results is provided in the MTW Monthly Environmental Monitoring Reports, and can be viewed via the Yancoal Australia website.

Figure 28 to Figure 33 show long term water quality trends for the Hunter River, Wollombi Brook, other surrounding tributaries and site dams. Measurements of EC and pH were generally stable during the reporting period and consistent with historical seasonal trends. Electrical conductivity shows an increasing trend during 2017 in site Dams 6S and 9S; drier weather conditions resulted in evapo-concentration of salts in mine water, combined with reduced fresh-water inputs from rainfall runoff.

A number of TSS trigger limits were exceeded in January, June and September, following significant runoff associated with rainfall events; these are outlined below in Table 28. Trigger tracking results are provided where three consecutive measurements of EC or pH are recorded; there were no instances of repeated exceedances of these measures during the reporting period. These are provided in the Monthly reports given on the Yancoal Australia website (<https://insite.yancoal.com.au/>).

TABLE 28: SURFACE WATER MONITORING - TRIGGER TRACKING RESULTS

Location	Date	Trigger Limit	Action taken in response
W5	15/08/2017	EC –95th Percentile	Watching Brief ^f *
	13/09/2017		Watching Brief ^f *
	08/12/2017		Dry weather conditions and lack of surface flow in preceding months likely to have resulted in elevated EC reading, unlikely to be anthropogenic impact. Continue to watch and monitor.
W1	28/03/2017	EC –5th Percentile	Watching Brief ^f *
	08/06/2017		Watching Brief ^f *
W1	13/09/2017	pH –95th Percentile	Natural Variability, watching brief
W2	28/03/2017	pH –5th Percentile	Watching Brief ^f *
W3	13/09/2017	pH –95th Percentile	Watching Brief ^f *
W4	31/03/2017	pH –5th Percentile	Watching Brief ^f *
W5	28/03/2017	pH –5th Percentile	Watching Brief ^f *
	10/04/2017		Watching Brief ^f *
	11/05/2017		Watching Brief ^f *
	08/06/2017		Low flow conditions in Loders Creek; pH low but within historical range. Continue to watch and monitor.
	10/07/2017		Site observations concluded no mining related impact, results within natural variability. Continue to watch and monitor.
	08/12/2017		Watching Brief ^f *
W15	31/03/2017	pH –5th Percentile	Watching Brief ^f *
W27	31/03/2017	pH –5th Percentile	Watching Brief ^f *
W28	31/03/2017	pH –5th Percentile	Watching Brief ^f *
Wollombi Brook	28/03/2017	pH –5th Percentile	Watching Brief ^f *
			Watching Brief ^f *

	10/04/2017		
Wollombi Brook Upstream	28/03/2017	pH –5th Percentile	Watching Brief*
	10/04/2017		Watching Brief*
	11/05/2017		Low flow conditions in Wollombi Brook; pH low but within historical range. Continue to watch and monitor.
W4	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W14	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W15	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W27	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No further action.
W28	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No further action.
W29	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action ⁷ .

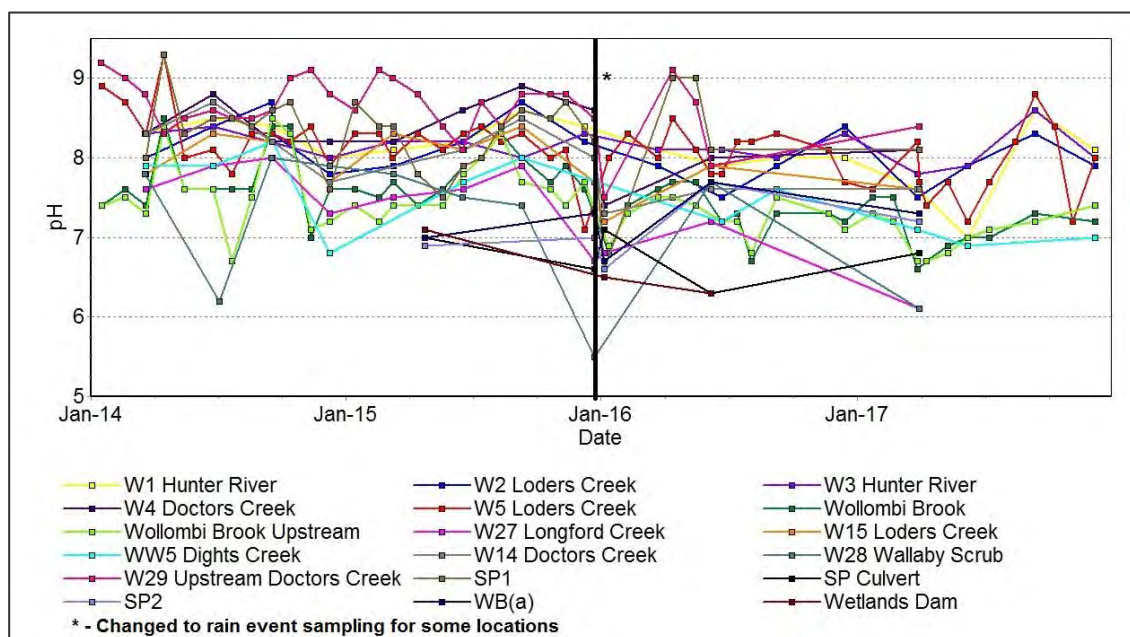


FIGURE 28: WATERCOURSE PH TRENDS 2014 TO 2017

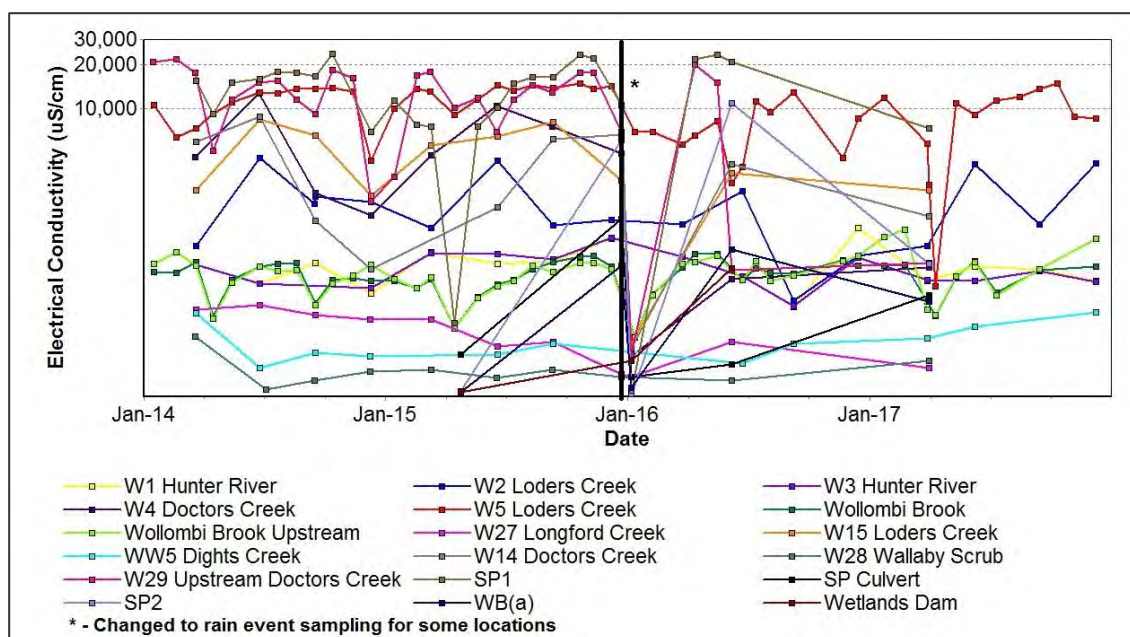


FIGURE 29: WATERCOURSE EC TRENDS 2014 TO 2017

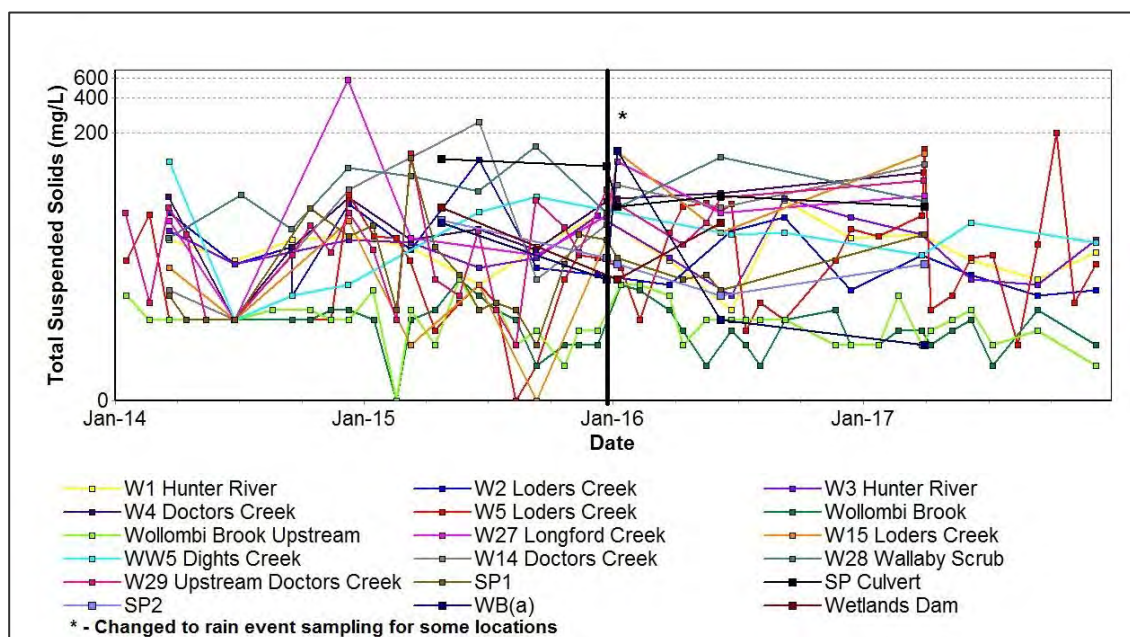


FIGURE 30: WATERCOURSE TSS TRENDS 2014 TO 2017

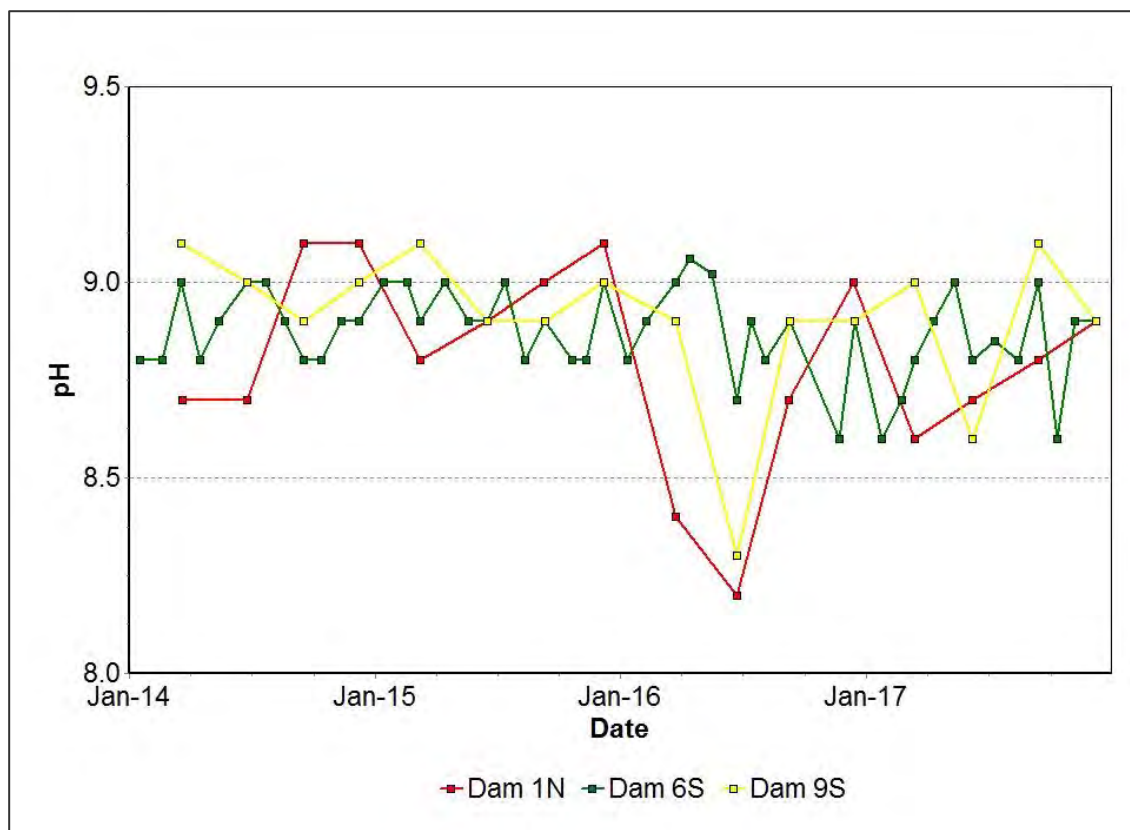


FIGURE 31: SITE DAMS PH TRENDS 2014 TO 2017

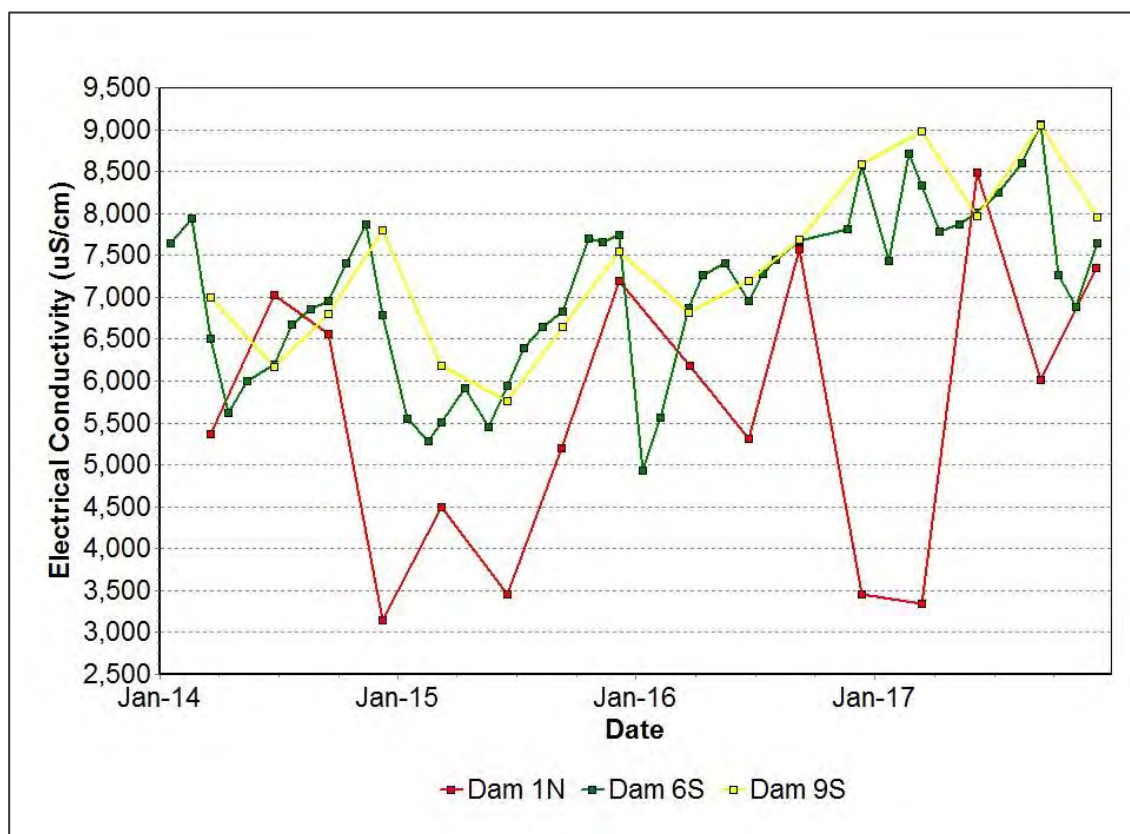


FIGURE 32: SITE DAMS EC TRENDS 2014 TO 2017

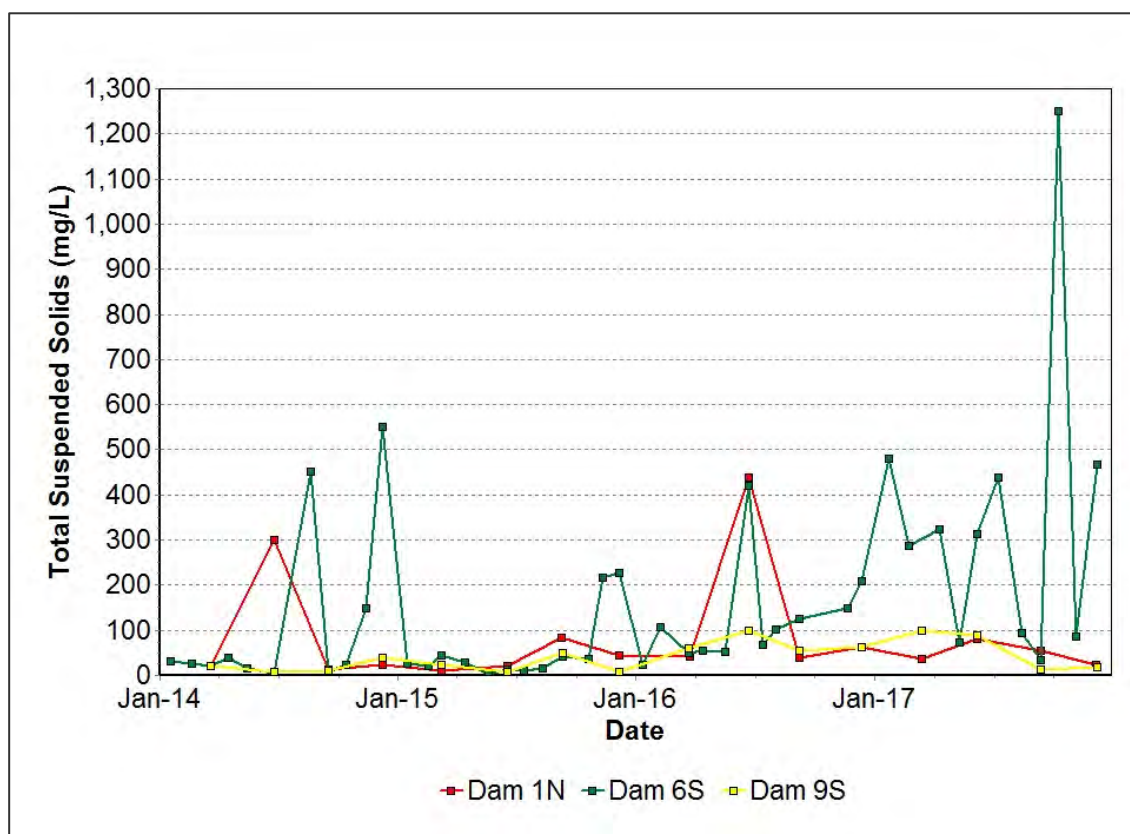


FIGURE 33: SITE DAMS TSS TRENDS 2014 TO 2017

7.3.3 Stream Health and Channel Stability

A programme to monitor and report on the stream and riparian vegetation health in Loders Creek and Wollombi Brook potentially affected by the development commenced in 2016, with baseline surveys completed.

Monitoring includes the following:

- Documenting locations and dimensions of significant erosive or depositional features;
- Photographs upstream, downstream, at both the left and right banks;
- Rating the site with the Ephemeral Stream Assessment protocol developed by the CSIRO to assess the erosional state of the creek at the monitoring location (a measure of channel stability);
- Rating the site with the Rapid Appraisal of Riparian Condition protocol developed by Land & Water Australia. This assesses the ecological condition of riparian habitats using indicators that reflect functional aspects of the physical, community and landscape features of the riparian zone (a measure of stream health); and
- Taking measurements of the channel cross-sections (transects) for comparison purposes for any future monitoring.

Stream health and channel stability monitoring results in 2017 indicated that channel stability in Loders Creek and Wollombi Brook had improved slightly whilst the health of riparian vegetation had slightly declined due to minor changes to habitat features such as leaf litter accumulations etc. The recommendations from the monitoring report suggested continuing the monitoring program on an annual basis and where possible utilising a risk based approach to installation of mitigation measures.

7.3.4 Audits and Reviews

An independent environmental audit of the Mount Thorley Operations and Warkworth Mining Operations was undertaken in May 2017. One non-compliance and one recommendation in relation to surface water management at MTW was identified in the 2017 audit.

The non-compliance was in relation to uncontrolled discharge of sediment water from site on 6th January 2016. A regulatory investigation into unauthorised release of water from a failure in a dam wall located at MTW on 6th January 2016 was also concluded in the Land and Environment Court during the 2017 reporting period. MTW was ordered to pay a penalty of \$50,000 plus investigation costs for the breach of license conditions. Resulting actions in response to the incident indicated no further action necessary to satisfy the finding.

A recommendation was also given to MTW to review the Wollombi Brook Probable Maximum Flood (PMF) RL at the Charlton levee and ensure there is 500mm of freeboard (from PMF to levee top RL) to satisfy of the consents (SSD-6465 and SSD-6464) outlined in Schedule 3, Condition 27 (b).

7.4 GROUNDWATER

7.4.1 Groundwater Management

Groundwater monitoring activities were undertaken in 2017 in accordance with the MTW Water Management Plan and groundwater monitoring programme. The monitoring results are used to establish and monitor trends in physical and geochemical parameters of surrounding groundwater potentially influenced by mining.

The groundwater monitoring programme at MTW measures the quality of groundwater against background data, EIS predictions and historical trends. Ground water quality is evaluated through the parameters of pH, EC, and standing water level. A comprehensive suite of analytes are measured on an annual basis, including major anions, cations and metals. Prior to sampling for comprehensive analysis, bore purging is undertaken to ensure a representative sample is collected.

Groundwater monitoring data is reviewed on a quarterly basis. The review involves a comparison of measured pH and EC results against internal trigger values (5th and 95th percentile) which have been derived from the historical data set. The response to measured excursions outside the trigger limits is detailed in the MTW Water Management Plan.

The monitoring locations are shown in Figure 34, and the annual Ground Water Impacts Review can be found in Appendix 5.

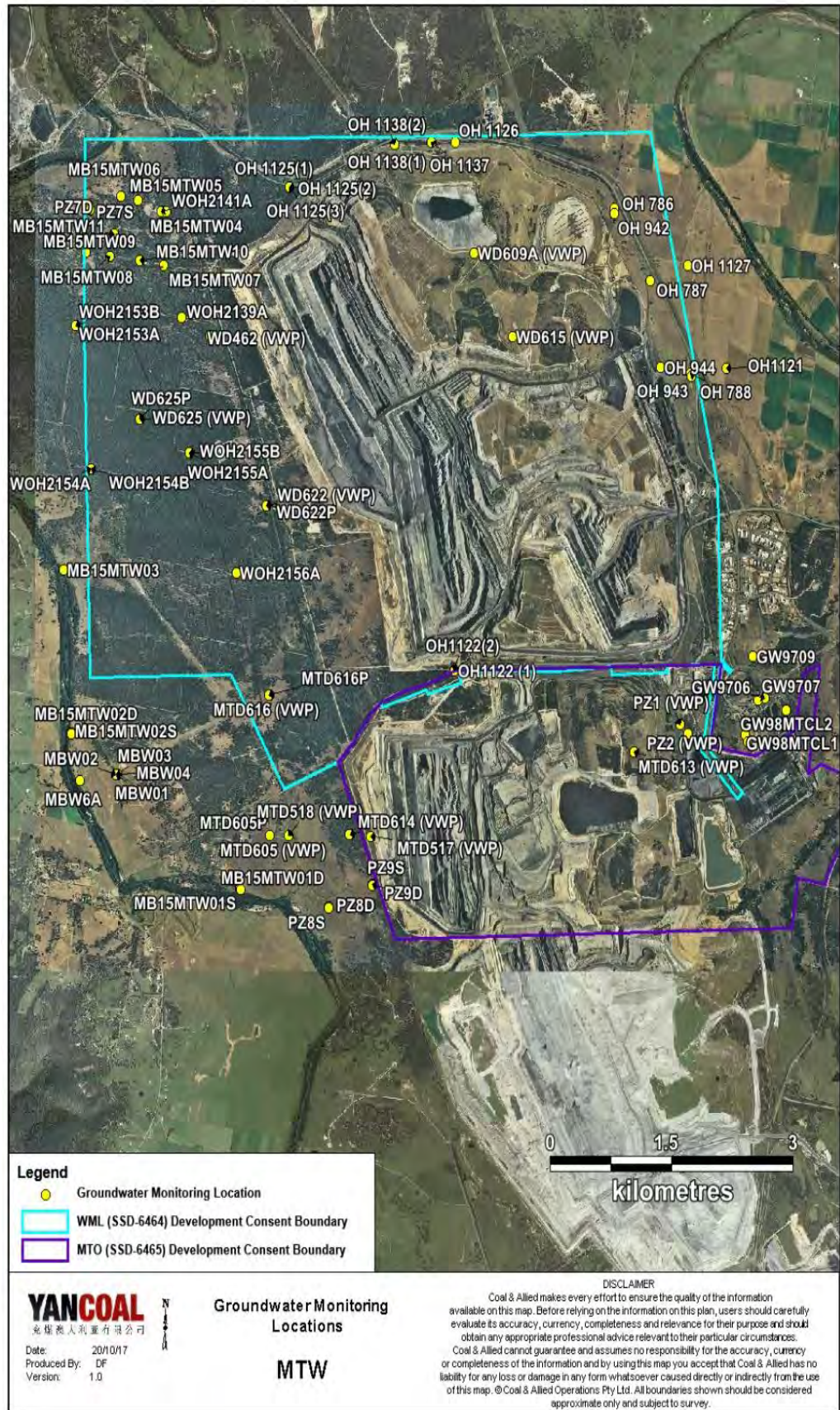


FIGURE 34: GROUNDWATER MONITORING NETWORK AT MTW IN 2017

7.4.2 Groundwater Performance

Sampling of ground waters was carried out on 142 occasions from 39 bores across Mount Thorley Warkworth in accordance with AS/NZS 5667.6 (1998). Where laboratory analysis was undertaken, this was performed by a NATA accredited laboratory. Groundwater sampling and analysis was undertaken as required with the following exceptions detailed in Table 29.

TABLE 29: MTW WATER MONITORING DATA RECOVERY FOR 2017 (BY EXCEPTION)

Location	Data Recovery (%)	Comment
OH 944	0%	Insufficient water for sampling throughout 2017.
OH1122 (1)	75%	Standpipe damaged and subsequently repaired
G3	50%	Removed from Monitoring Programme
MB15MTW04	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW05	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW07	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW08	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW9	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW10	0%	Insufficient water for sampling since added to Monitoring Programme in 2017
MB15MTW11	0%	Insufficient water for sampling since added to Monitoring Programme in 2017

A summary of the monitoring results for MTW Groundwater Sites is provided in the Monthly Environmental Monitoring Reports, available via the Yancoal Australia website (<https://insite.yancoal.com.au>).

7.4.3 Groundwater Monitoring Summary

The following section presents groundwater monitoring data in relation to the geographic locations and target stratigraphy for groundwater monitoring bores. Each location is discussed below, and a summary of monitoring data presented. Where monitoring results

were recorded outside the internal trigger limit, these results are summarised in tables for each location.

7.4.3.1 Bayswater Seam Bores

Groundwater monitoring in the Bayswater seam was undertaken from seven sites during 2017. A total of 28 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 for Bayswater groundwater bores are shown in Figure 35, Figure 36 and Figure 37 respectively. Trigger tracking results are given in Table 30. Results were generally stable and consistent with historical trends.

TABLE 30: BAYSWATER SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
GW9709	10/03/2017	pH – 5 th percentile	Watching Brief *
	11/12/2017		Watching Brief *
GW98MTCL2	10/03/2017	pH – 5 th percentile	Watching Brief *
	23/07/2017		Watching Brief *
	14/09/2017		Results in line with historical data, continue to watch and monitor.
GW9709	14/09/2017	EC – 95 th percentile	Watching Brief *

* = 1st/2nd trigger. Watching Brief established pending outcomes of subsequent monitoring events. No specific actions required

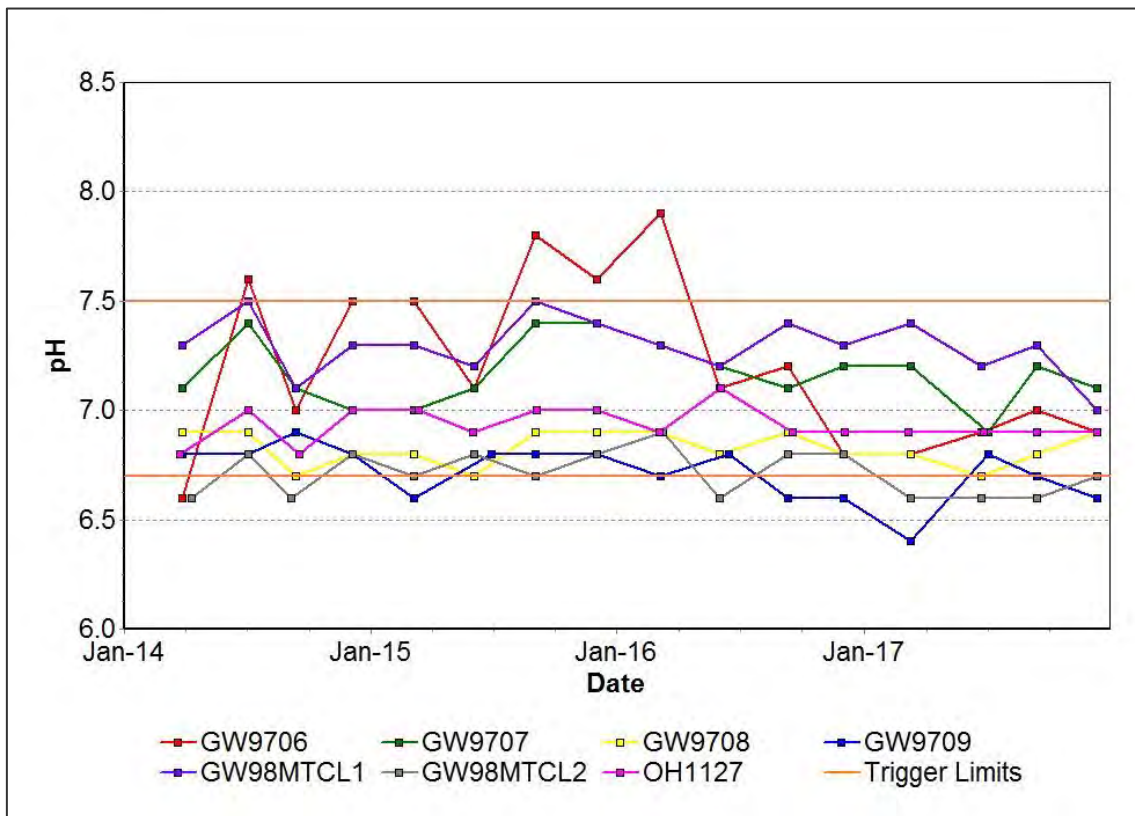


FIGURE 35: BAYSWATER SEAM PH TRENDS 2014TO 2017

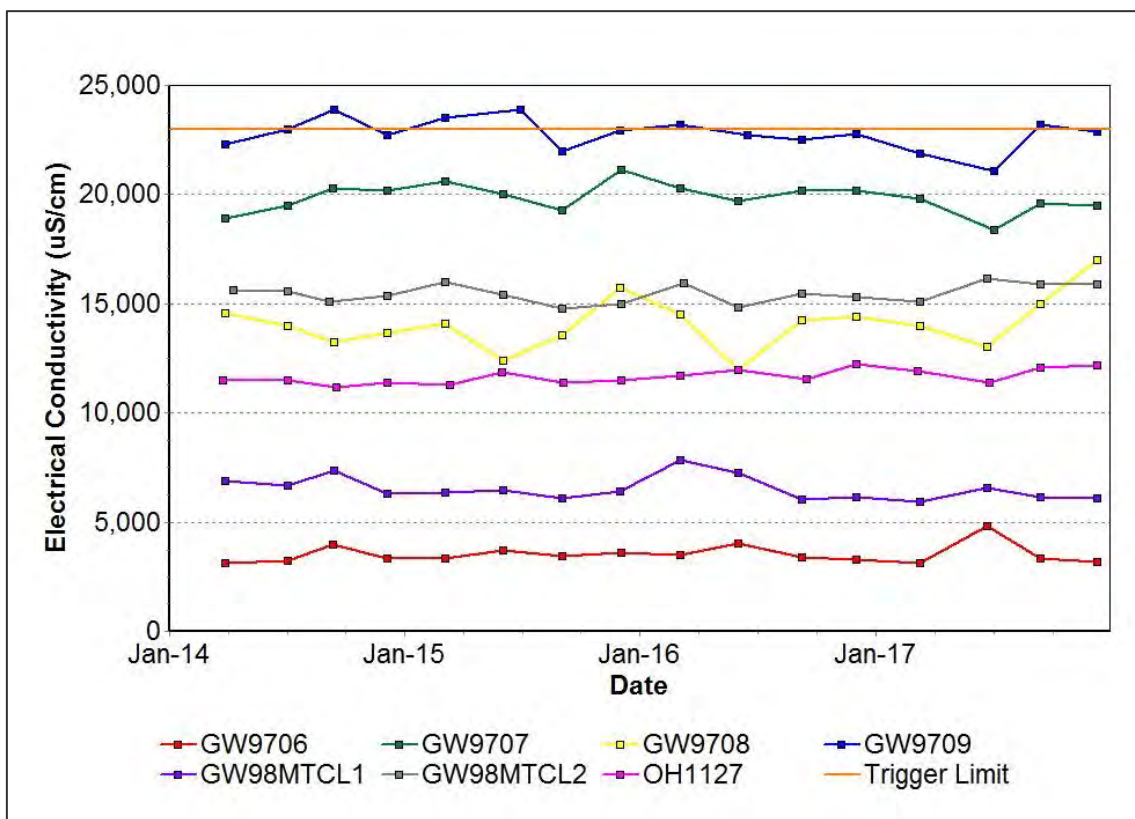


FIGURE 36: BAYSWATER SEAM EC TRENDS 2014 TO 2017

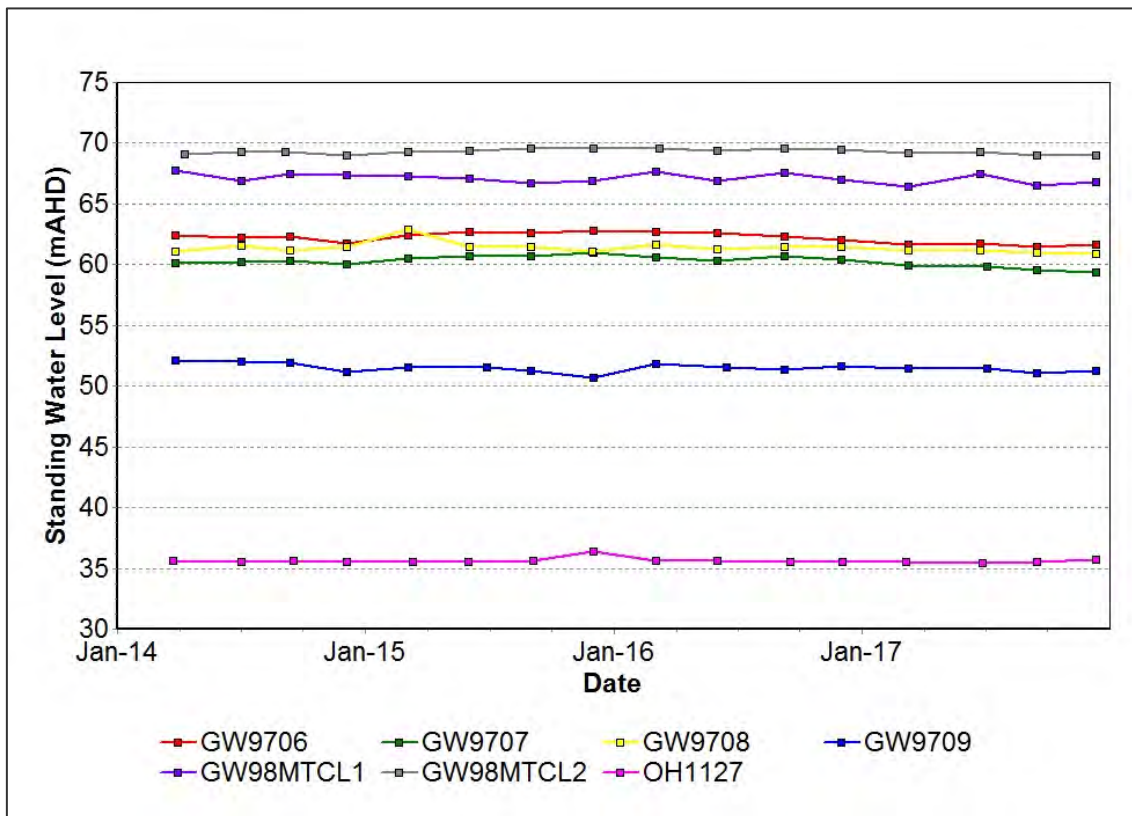


FIGURE 37: BAYSWATER SWL TRENDS 2014 TO 2017

7.4.3.2 Bowfield Seam Bores

Groundwater monitoring in the Bowfield seam was undertaken at one site during 2017. A total of 4 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 are shown in Figure 38, Figure 39 and Figure 40 respectively. Water quality results were similar to historical data.

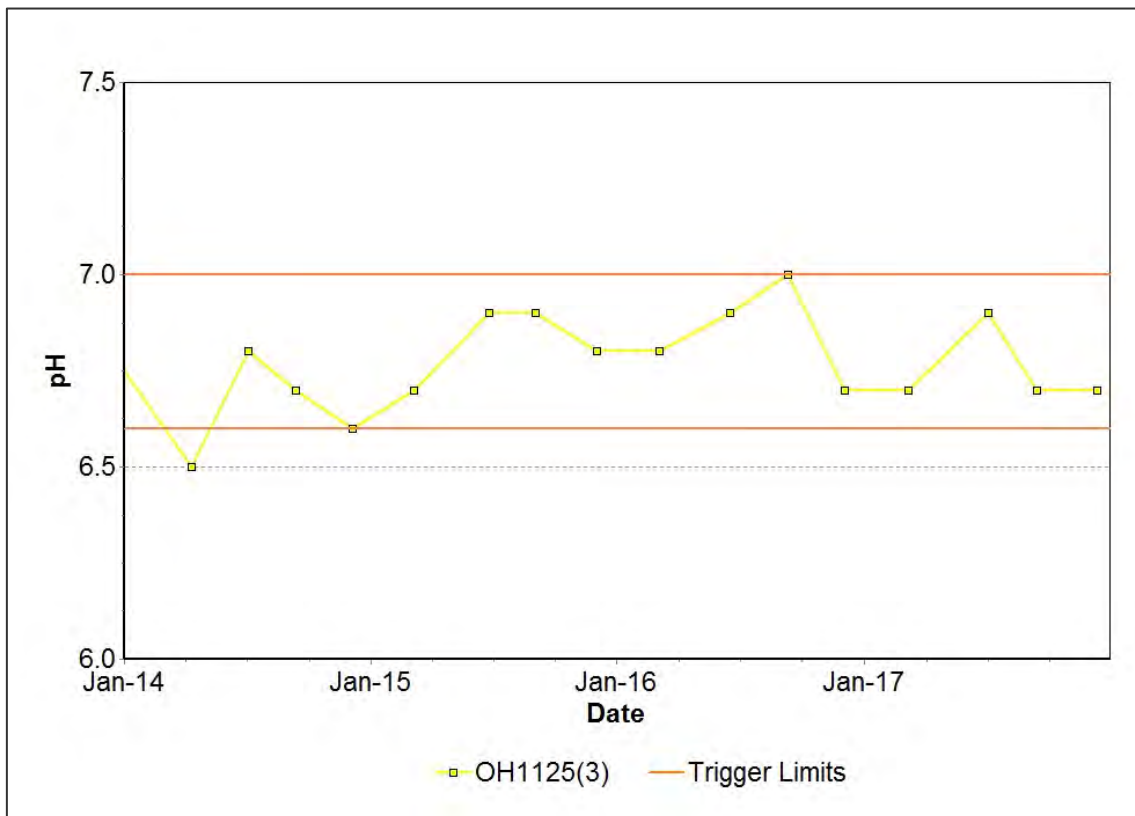


FIGURE 38 : BOWFIELD SEAM PH TREND 2014 TO 2017

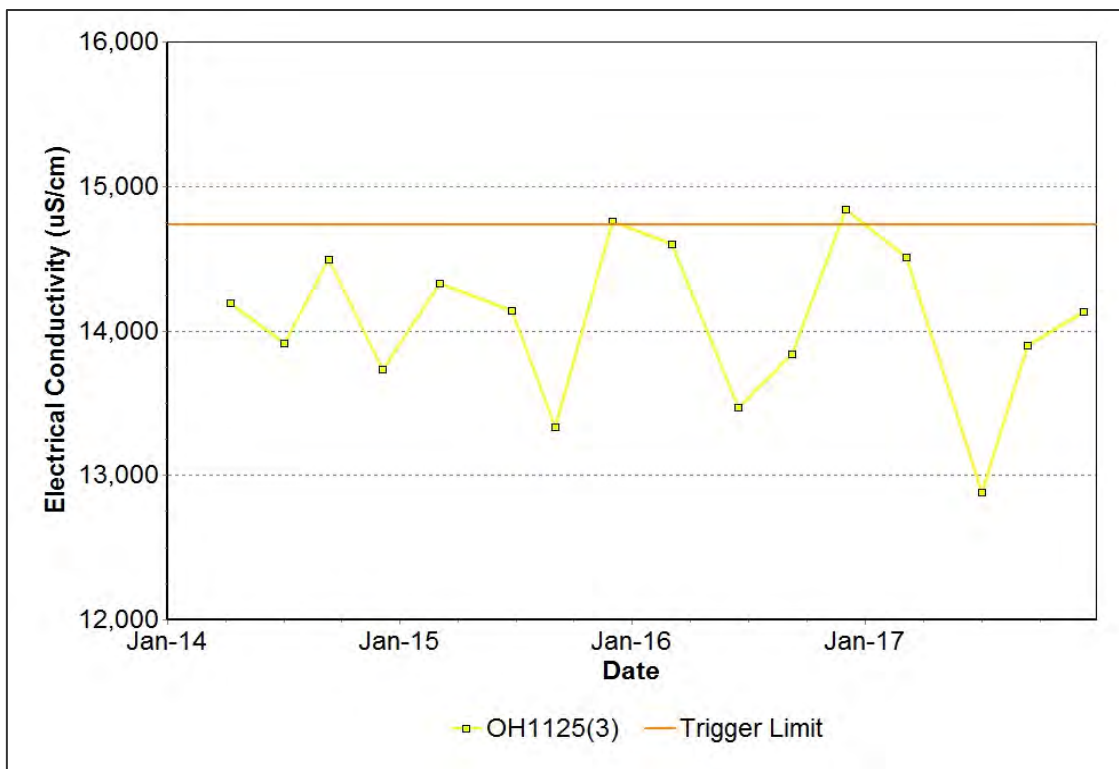


FIGURE 39: BOWFIELD SEAM EC TRENDS 2014 TO 2017

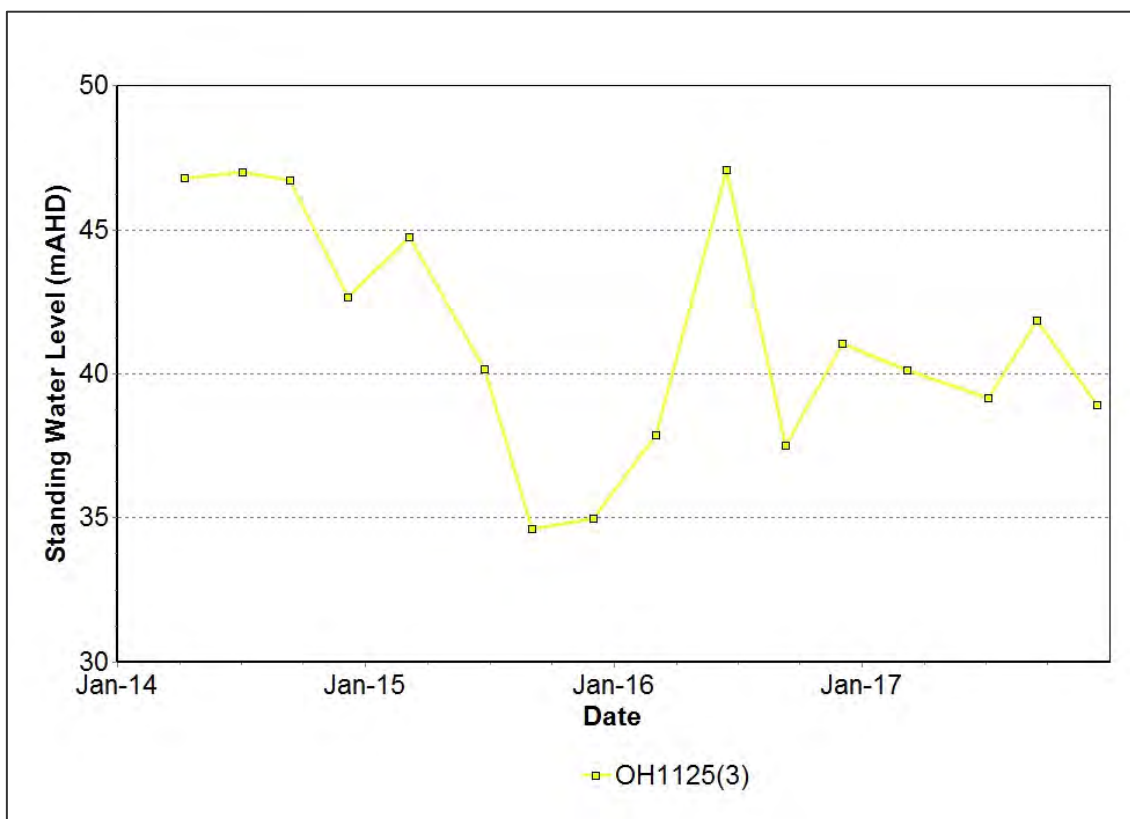


FIGURE 40: BOWFIELD SEAM SWL TREND 2014 TO 2017

7.4.3.3 Blakefield Seam Bores

Groundwater monitoring in the Blakefield seam was undertaken from three sites during 2017. A total of 11 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 are shown in Figure 41, Figure 42 and Figure 43 respectively. Water quality trends were generally steady, however an increasing pH trend was observed in WOH2139A, likely due to coal seam depressurisation as mining advances West, in the direction of the bore (supported by the water trend). Trigger tracking results are given in Table 31.

TABLE 31: BLAKEFIELD SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
WOH2139A	25/08/2017	pH - 95 th percentile	Watching Brief *
	23/11/2017		Watching Brief *
OH1125 (1)	07/03/2017	EC – 95 th percentile	Watching Brief *

* = 1st/2nd trigger. Watching Brief established pending outcomes of subsequent monitoring events. No specific actions required

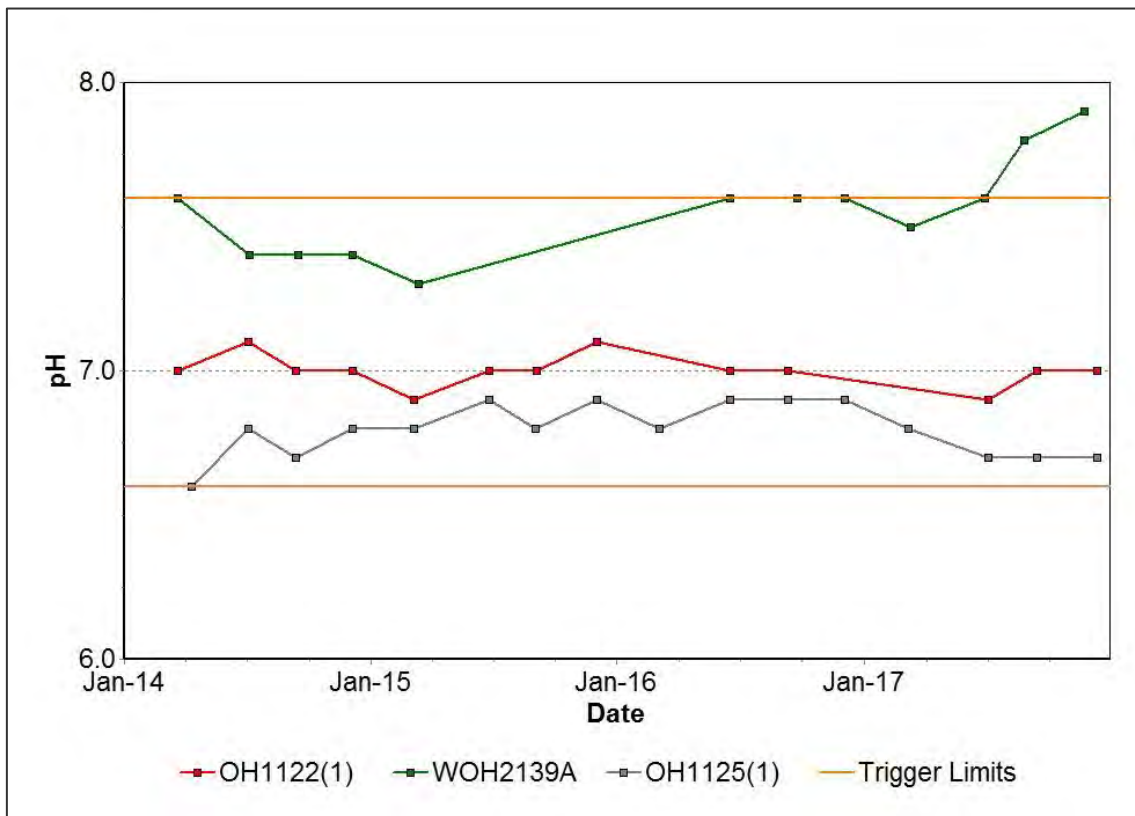


FIGURE 41: BLAKEFIELD SEAM GROUNDWATER PH TRENDS 2014 TO 2017

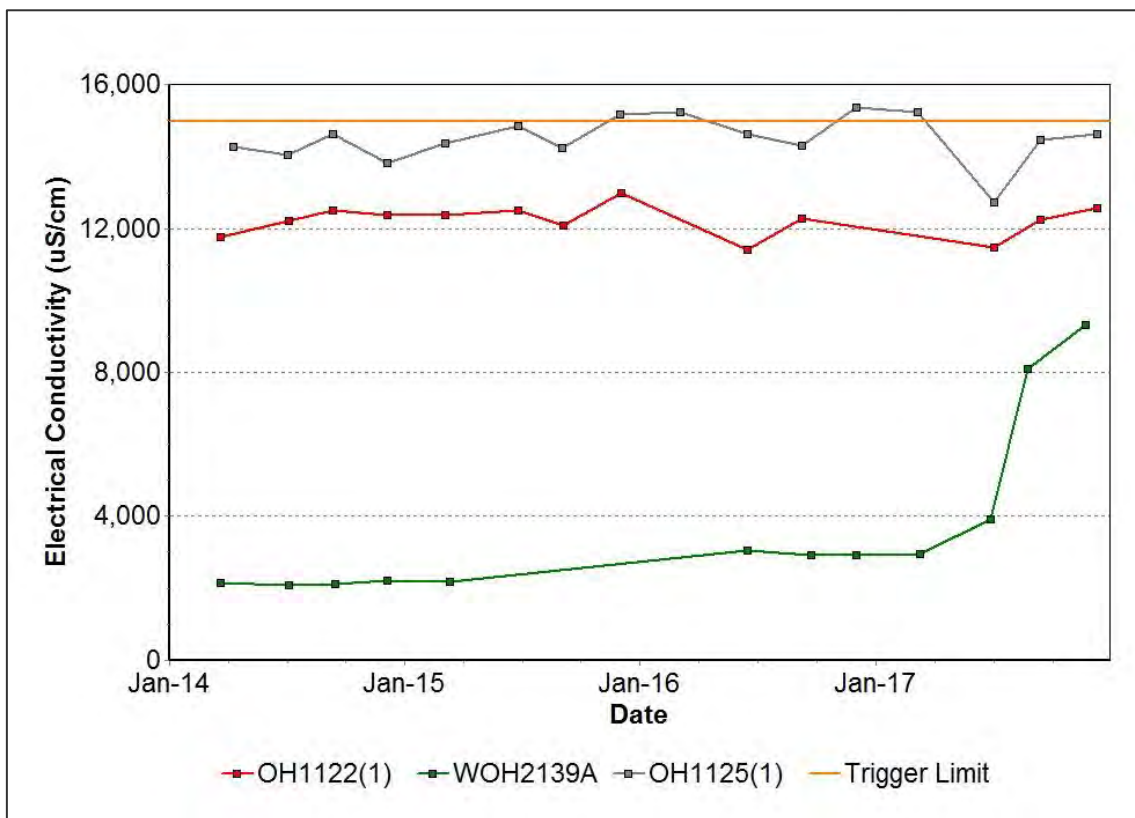


FIGURE 42: BLAKEFIELD SEAM GROUNDWATER EC TRENDS 2014 TO 2017

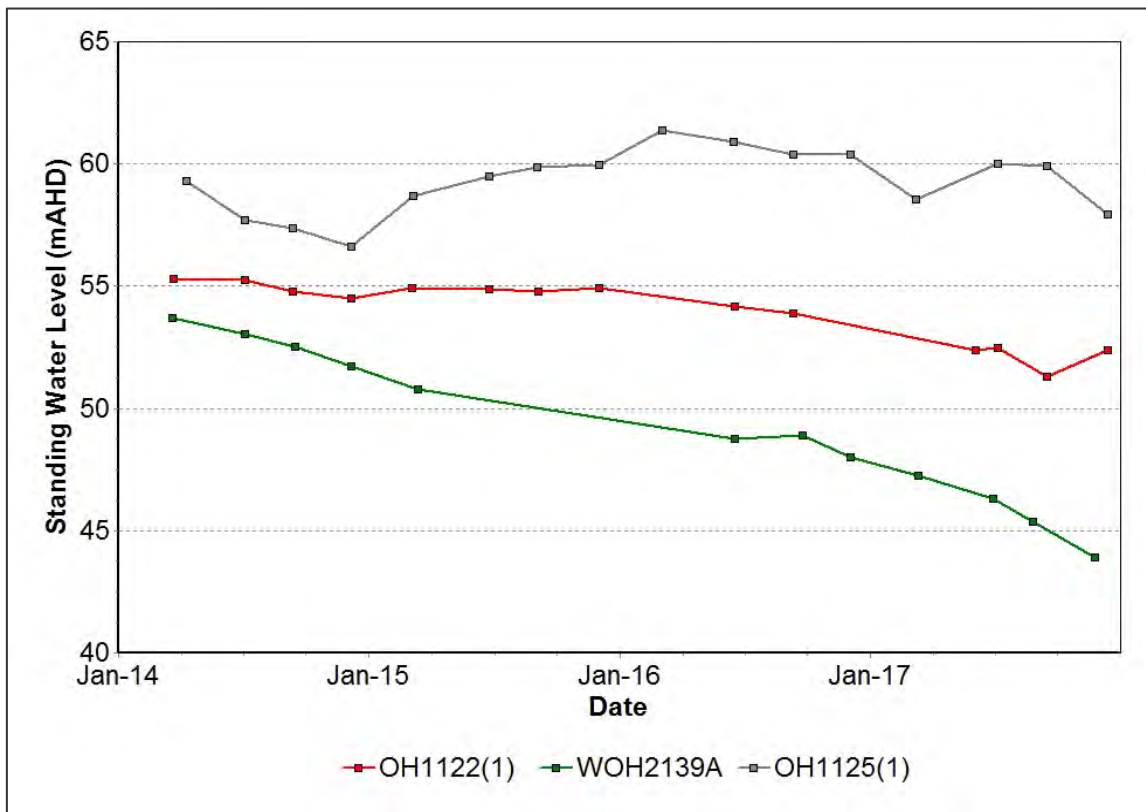


FIGURE 43: BLAKEFIELD SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.4 Hunter River Alluvium Bores

Groundwater monitoring in the Hunter River Alluvium was undertaken from six sites during 2017. A total of 20 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 for Hunter River Alluvium groundwater bores are shown in Figure 44 to Figure 56. Results were generally stable and consistent with historical trends. Monitoring of trends in these bores will continue.

TABLE 32: HUNTER RIVER ALLUVIUM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
OH786	07/03/2017	pH - 5 th percentile	Watching Brief *
	11/12/2017		Watching Brief *
OH786	14/09/2017	EC – 95 th percentile	Watching Brief *
OH787	10/03/2017	pH – 5 th percentile	Watching Brief *
OH787	07/03/2017	EC – 95 th percentile	Watching Brief *
	14/09/2017		Watching Brief *
	11/12/2017		Watching Brief *
OH942	07/03/2017	EC 95 th percentile	Watching Brief *
	14/09/2017		Watching Brief *
	11/12/2017		Watching Brief *
OH788	14/09/2017	pH – 5 th percentile	Watching Brief *
	11/12/2017		Watching Brief *

* = 1st/2nd trigger. Watching Brief established pending outcomes of subsequent monitoring events. No specific actions required

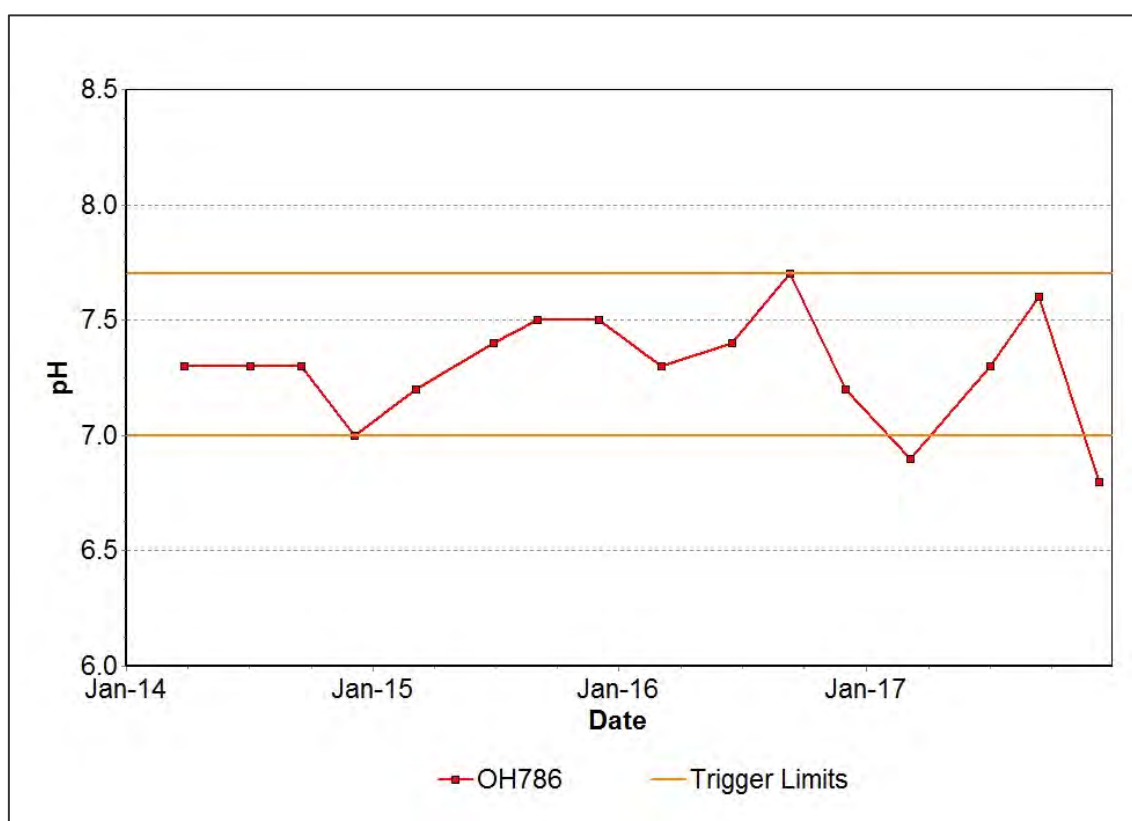


FIGURE 44: HUNTER RIVER ALLUVIUM BORE OH786 PH TREND 2014 TO 2017

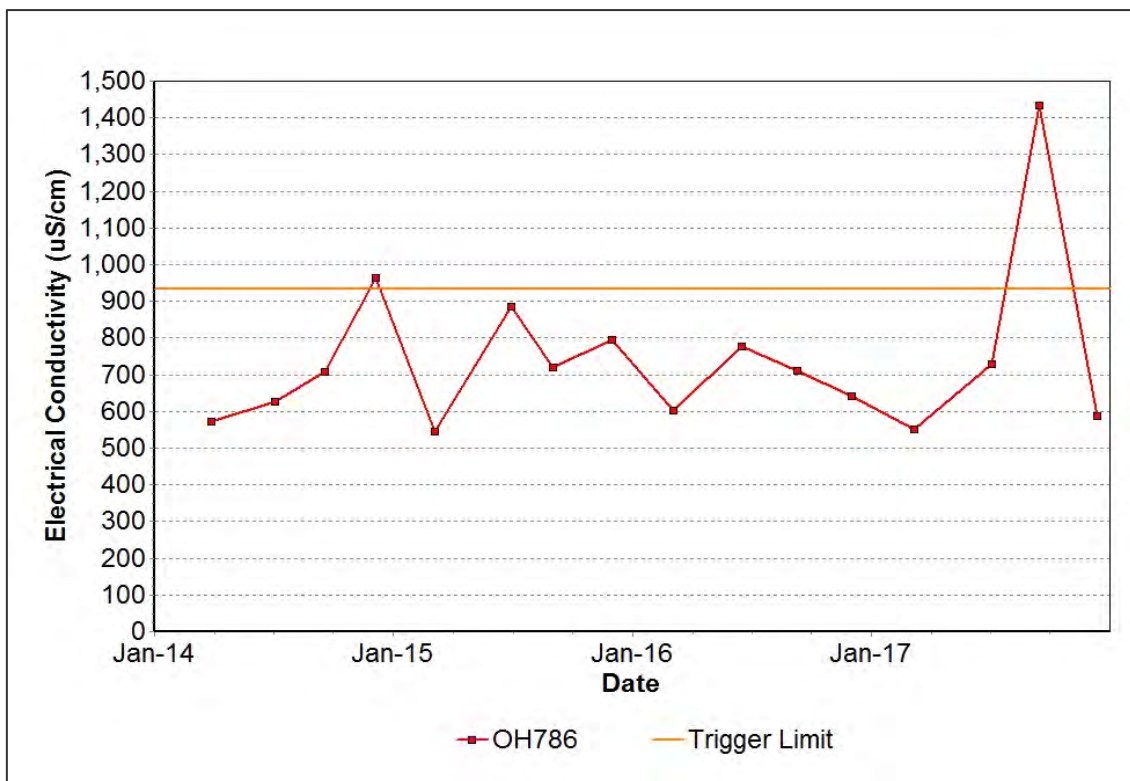


FIGURE 45: HUNTER RIVER ALLUVIUM BORE OH786 EC TREND 2014 TO 2017

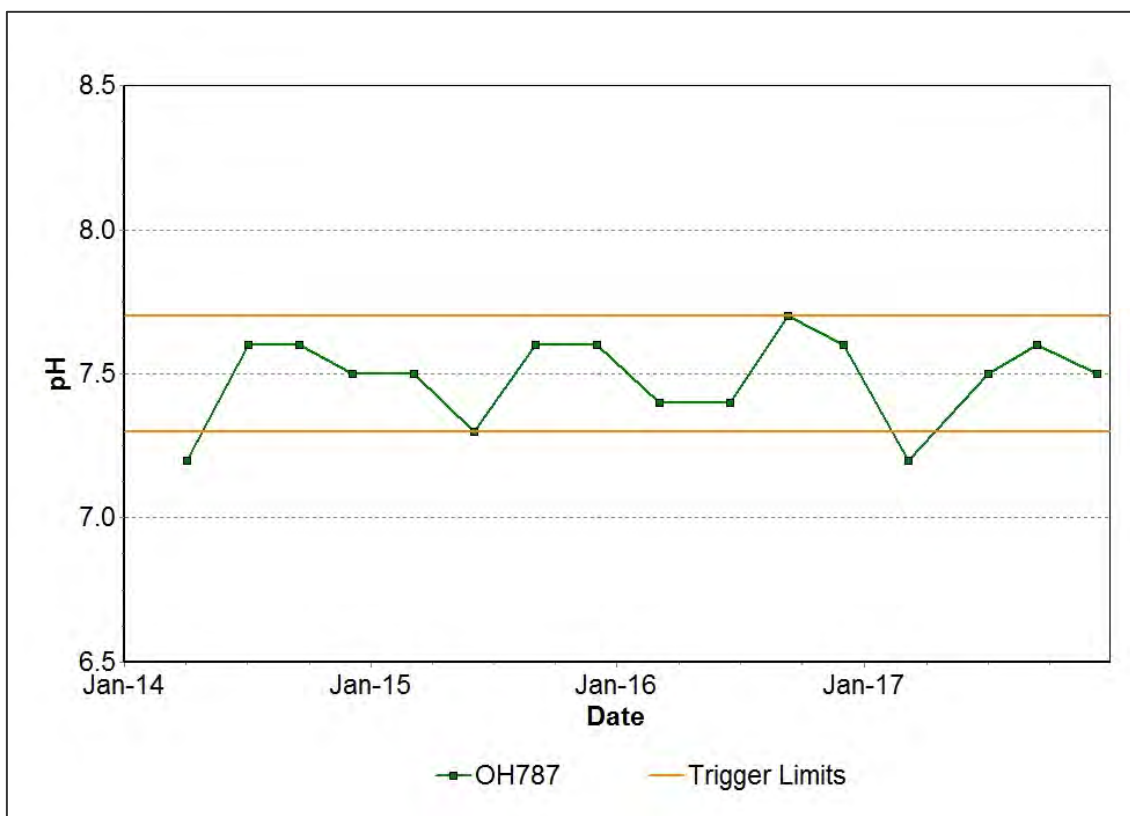


FIGURE 46: HUNTER RIVER ALLUVIUM BORE OH787 PH TREND 2014 TO 2017

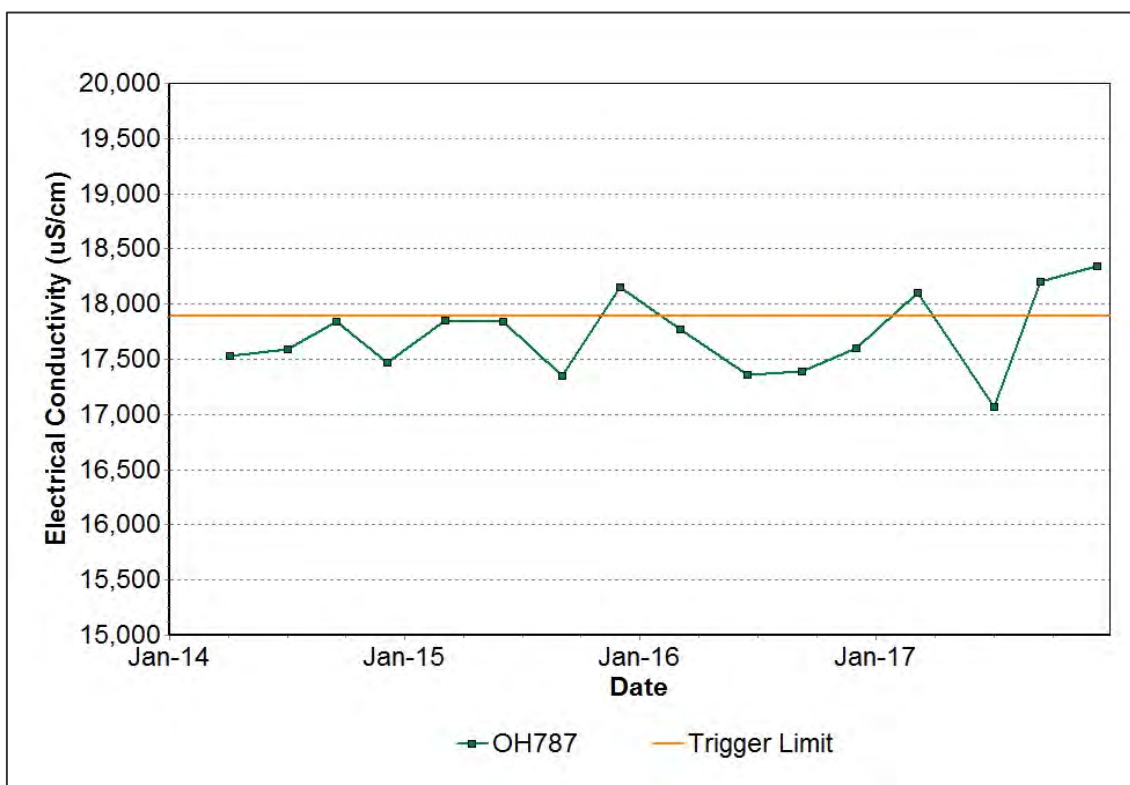


FIGURE 47: HUNTER RIVER ALLUVIUM BORE OH787 EC TREND 2014 TO 2017

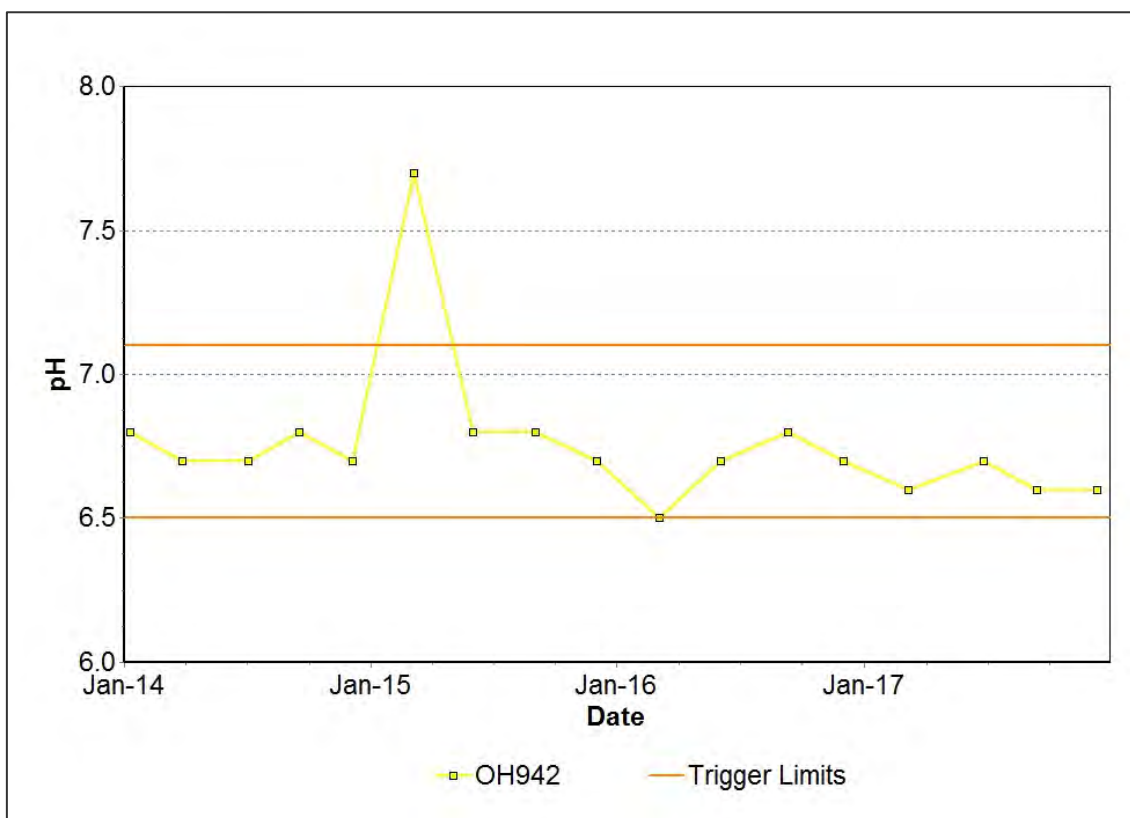


FIGURE 48: HUNTER RIVER ALLUVIUM BORE OH942 PH TREND 2014 TO 2017

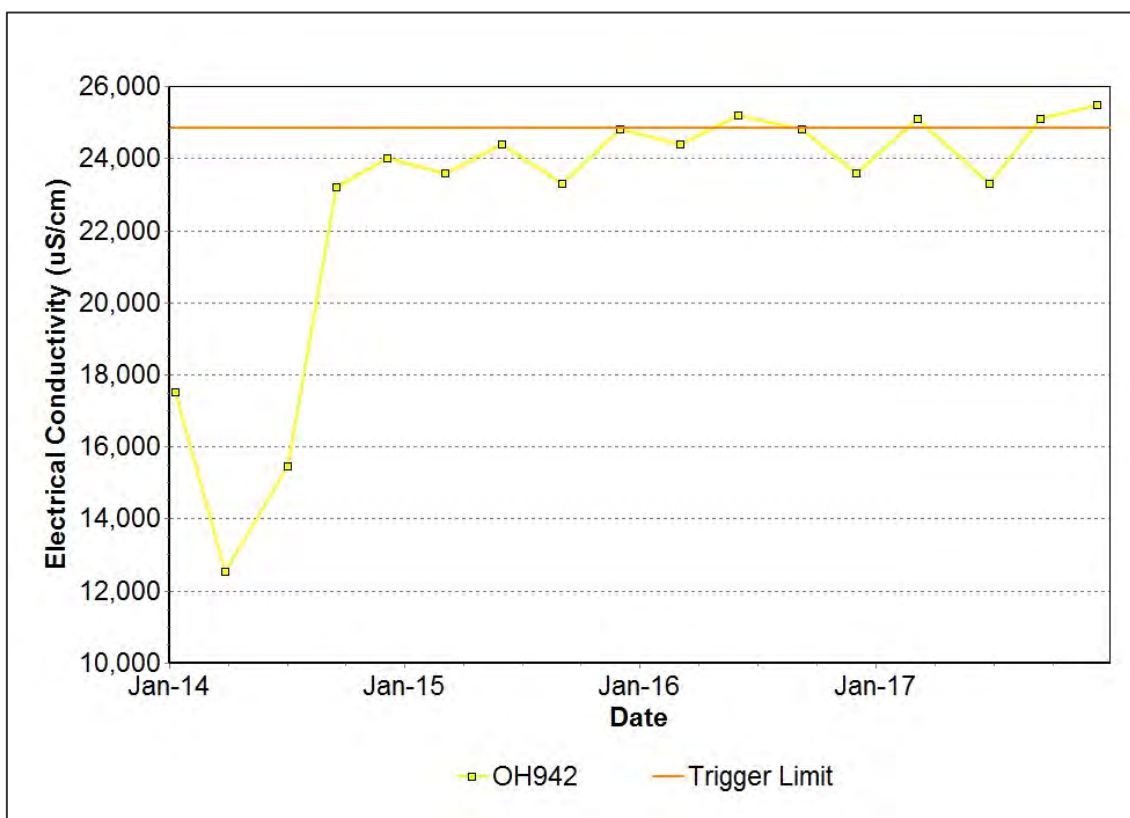


FIGURE 49: HUNTER RIVER ALLUVIUM BORE OH942 EC TREND 2014 TO 2017

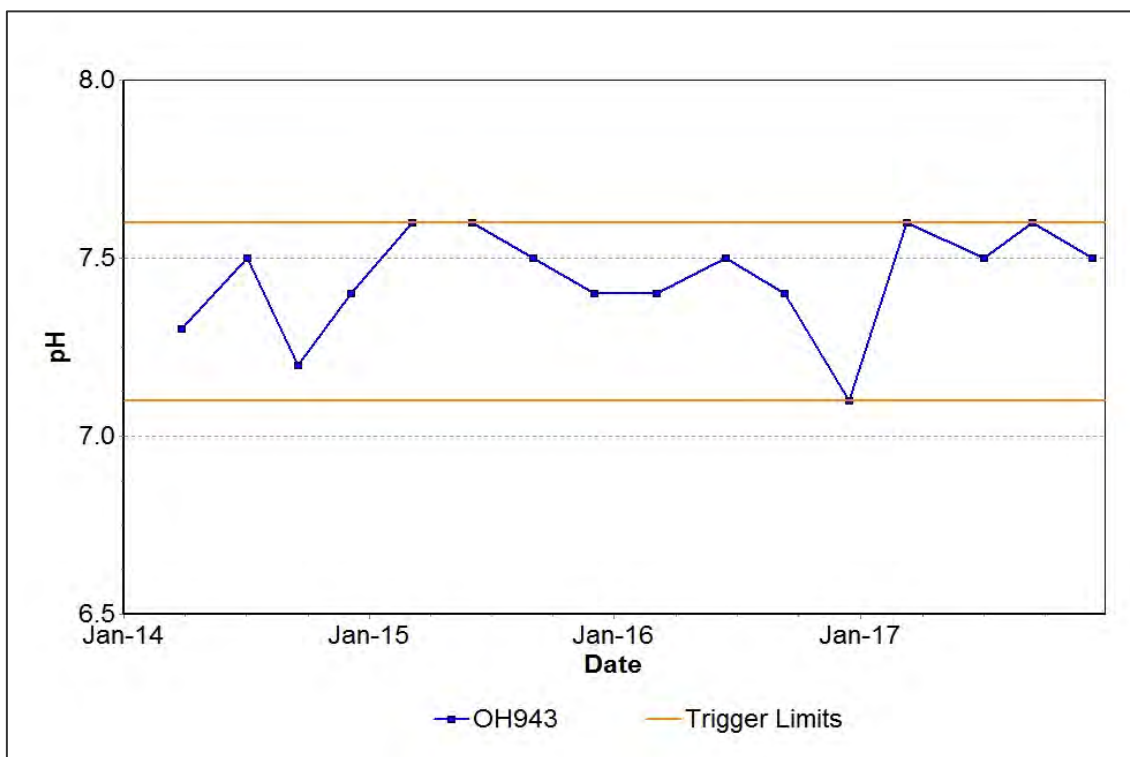


FIGURE 50: HUNTER RIVER ALLUVIUM BORE OH943 PH TREND 2014 TO 2017

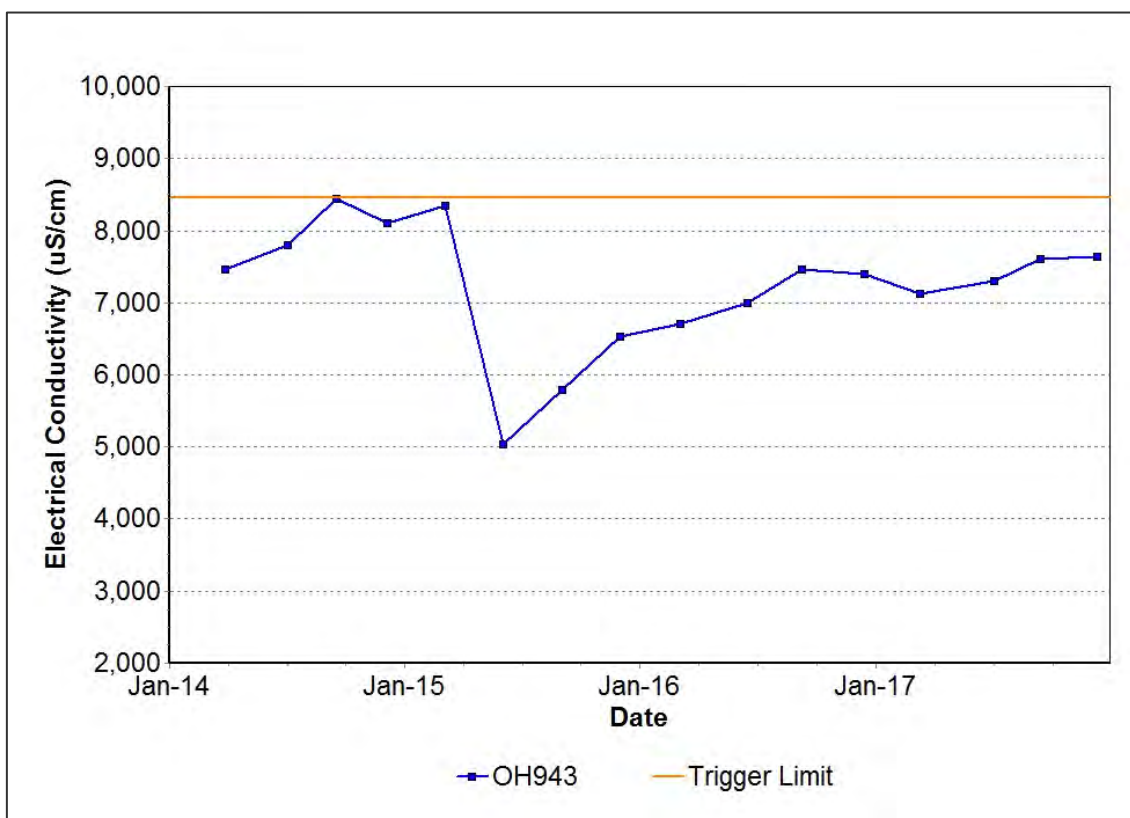


FIGURE 51: HUNTER RIVER ALLUVIUM BORE OH943 EC TREND 2014 TO 2017

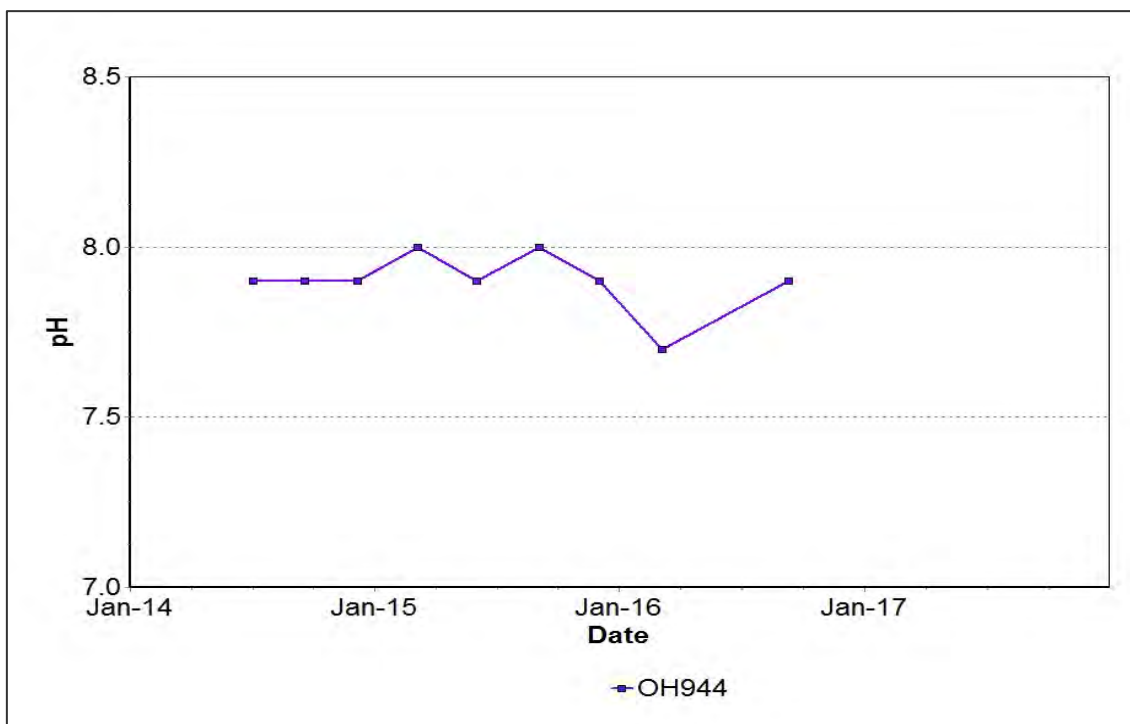


FIGURE 52: HUNTER RIVER ALLUVIUM BORE OH944 PH TREND 2014 TO 2017

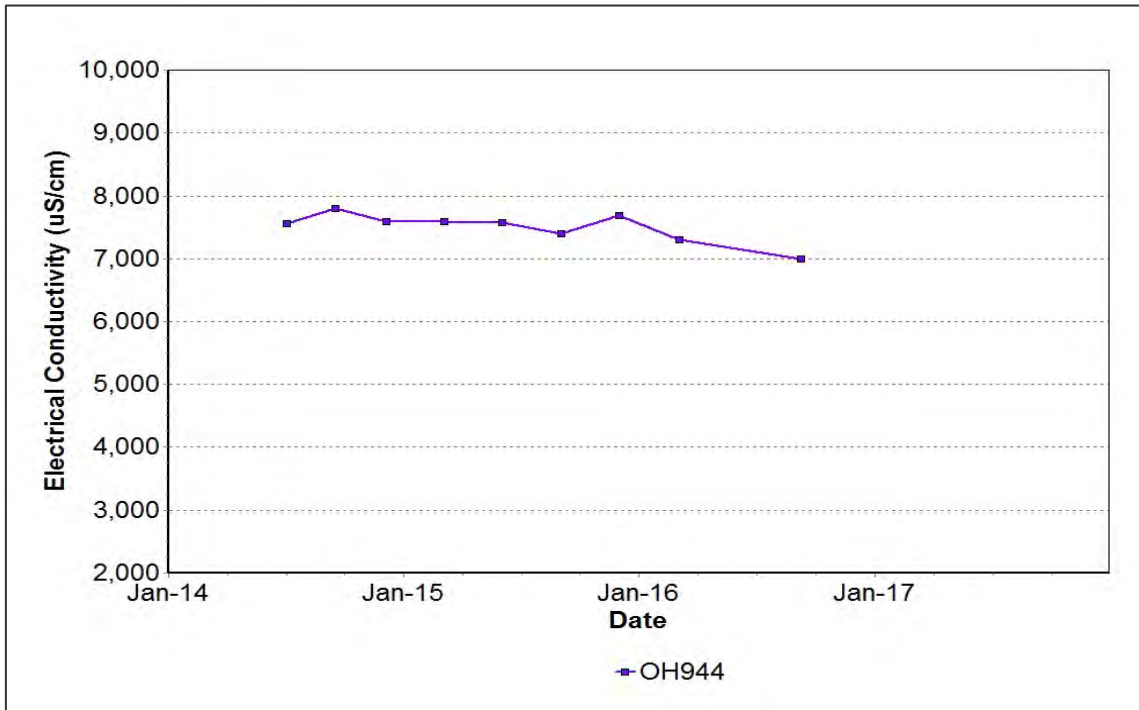


FIGURE 53: HUNTER RIVER ALLUVIUM BORE OH944 EC TREND 2014 TO 2017

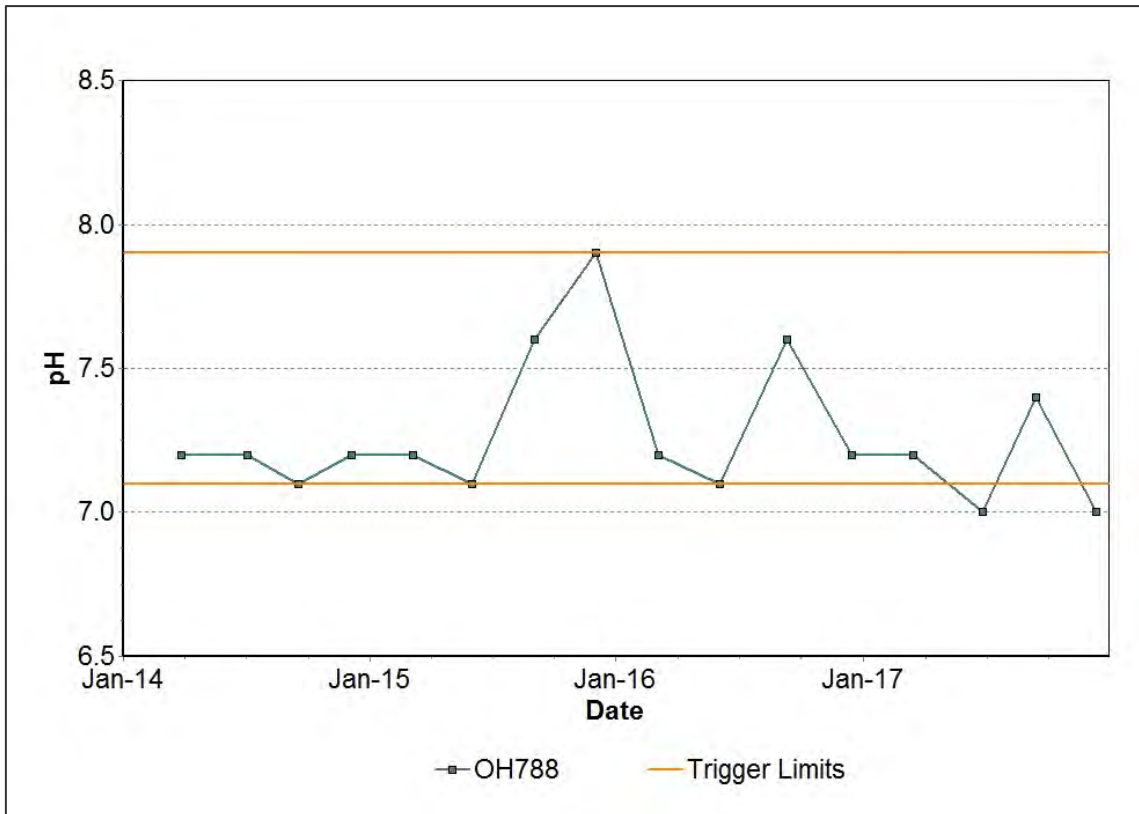


FIGURE 54: HUNTER RIVER ALLUVIUM BORE OH788 PH TREND 2014 TO 2017

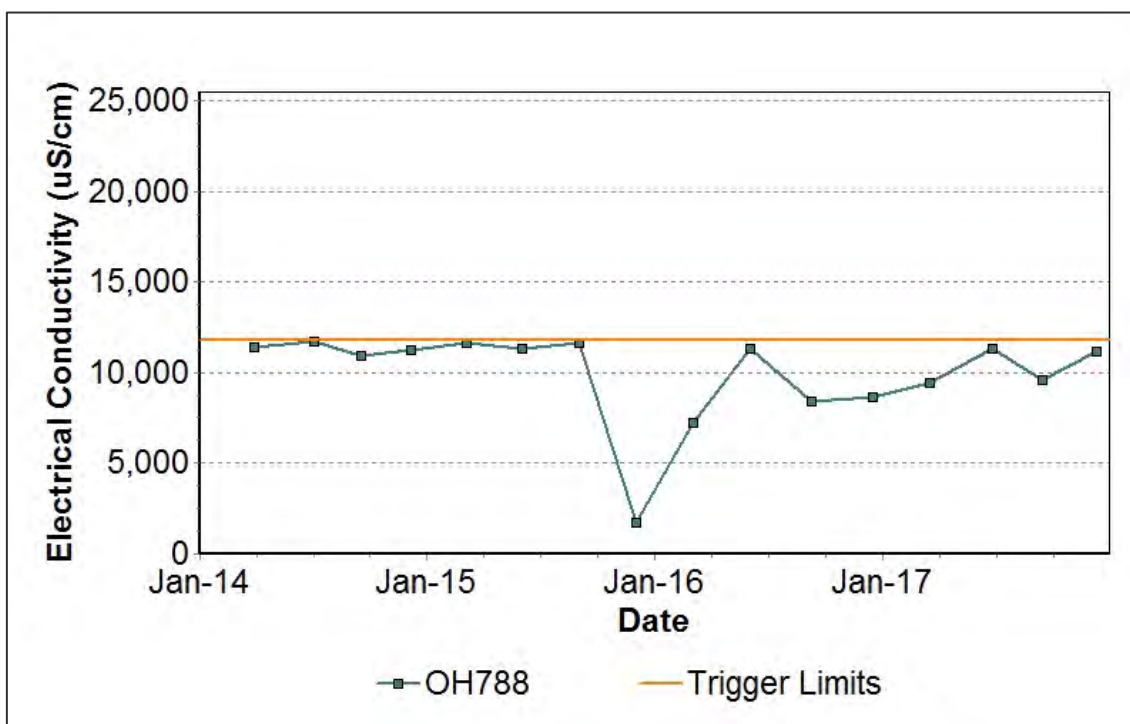


FIGURE 55: HUNTER RIVER ALLUVIUM BORE OH788 EC TREND 2014 TO 2017

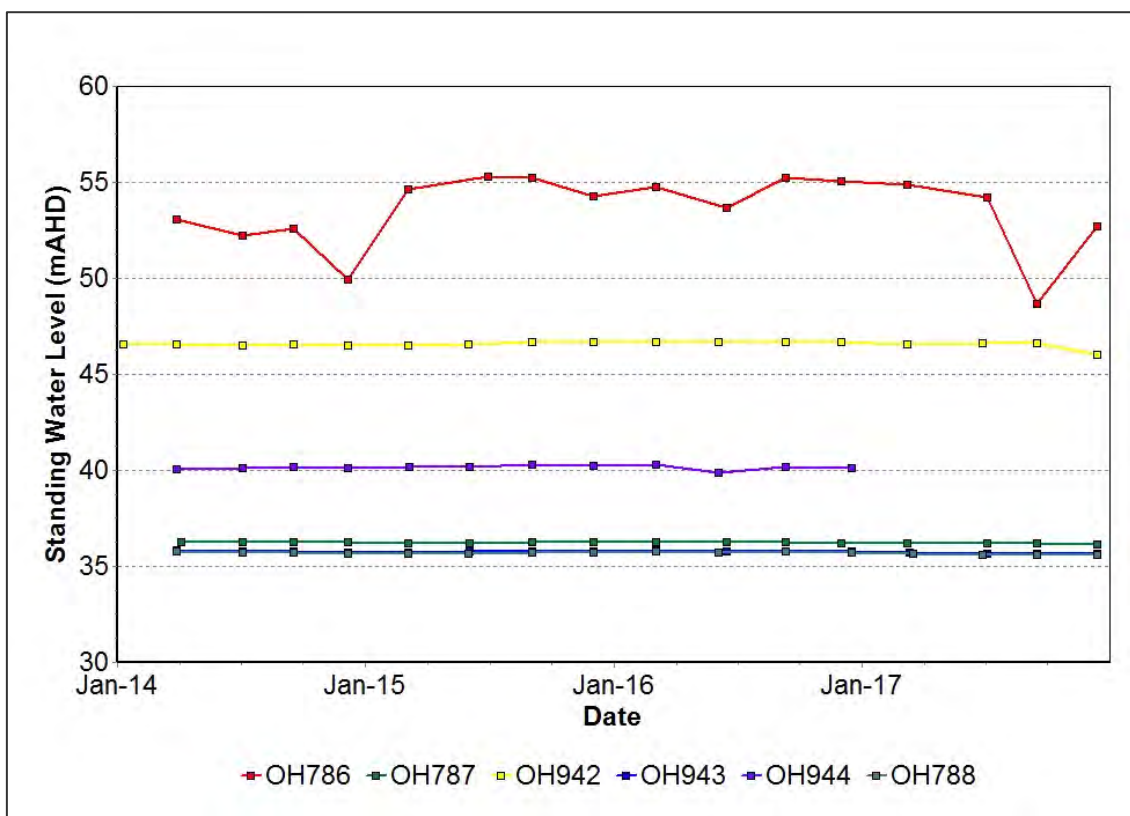


FIGURE 56: HUNTER RIVER ALLUVIUM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.5 Redbank Bores

Groundwater monitoring in the Redbank seam was undertaken from four sites during 2017. A total of 16 samples were collected during the reporting period. The pH, EC and SWL trends for 2013 to 2017 for Redbank seam groundwater bores are shown in Figure 57, Figure 58 and Figure 59 respectively. Trigger tracking results are detailed in Table 33. A steady declining trend in water levels at all monitoring sites continued during the reporting period which is likely to be a result of coal seam depressurisation due to mining.

TABLE 33 : MTW REDBANK SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
WOH2153A	10/03/2017	pH – 95 th percentile	Watching brief *

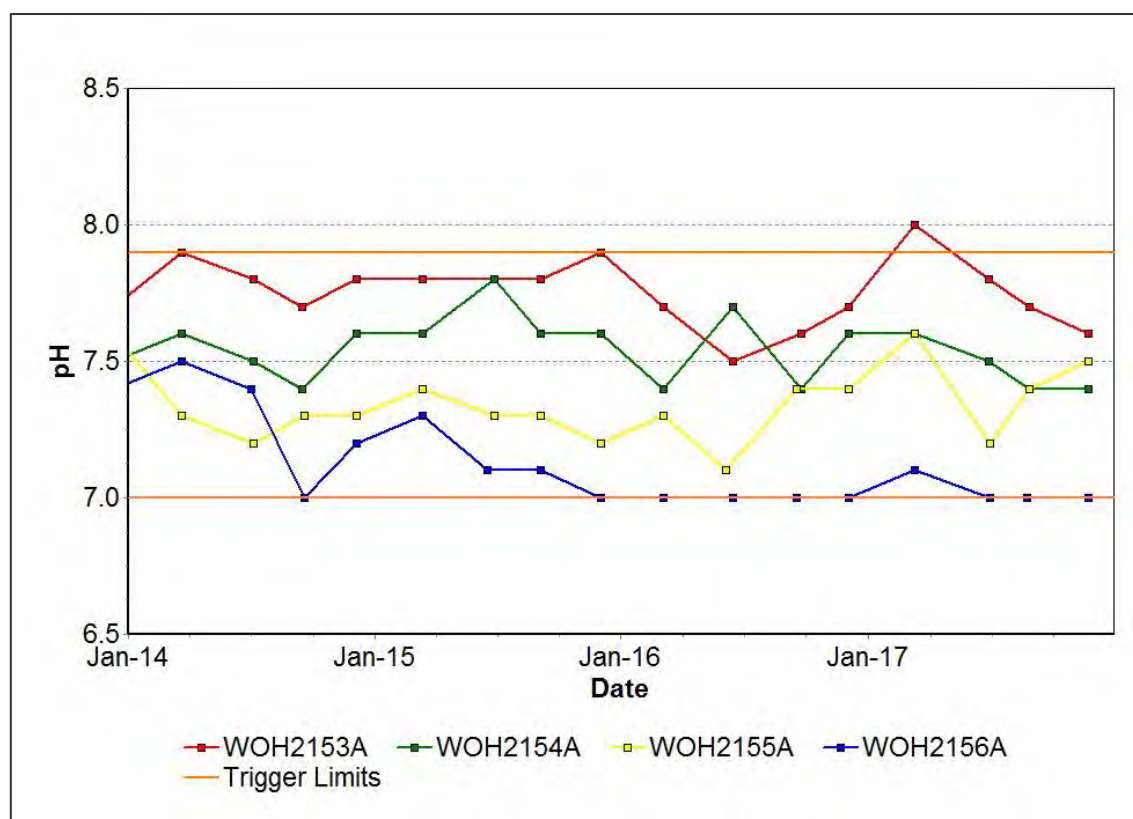


FIGURE 57: REDBANK SEAM GROUNDWATER PH TRENDS 2014 TO 2017

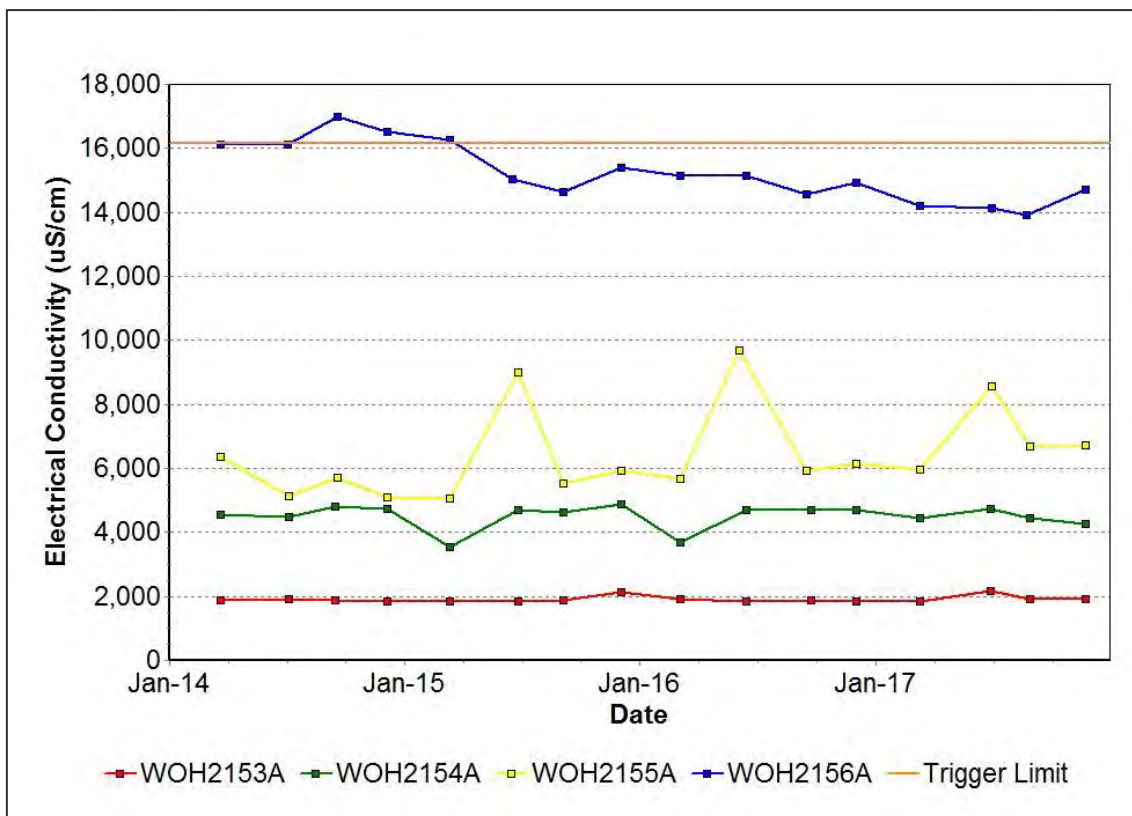


FIGURE 58: REDBANK SEAM GROUNDWATER EC TRENDS 2014 TO 2017

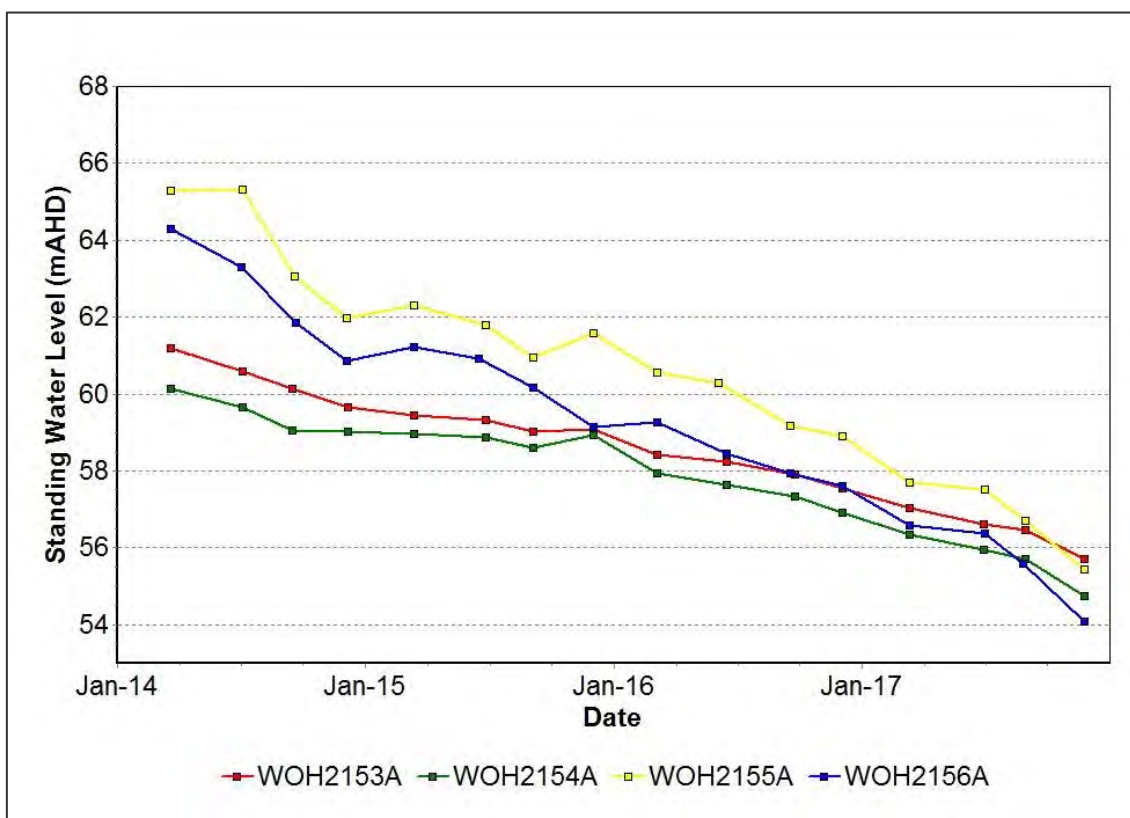


FIGURE 59: REDBANK SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.6 Shallow Overburden Bores

Groundwater monitoring in the Shallow Overburden was undertaken from three sites during 2017. A total of 12 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 for Shallow Overburden groundwater bores are shown in Figure 60, Figure 61 and Figure 62 respectively. Water levels and water quality were steady in all bores during the reporting period.

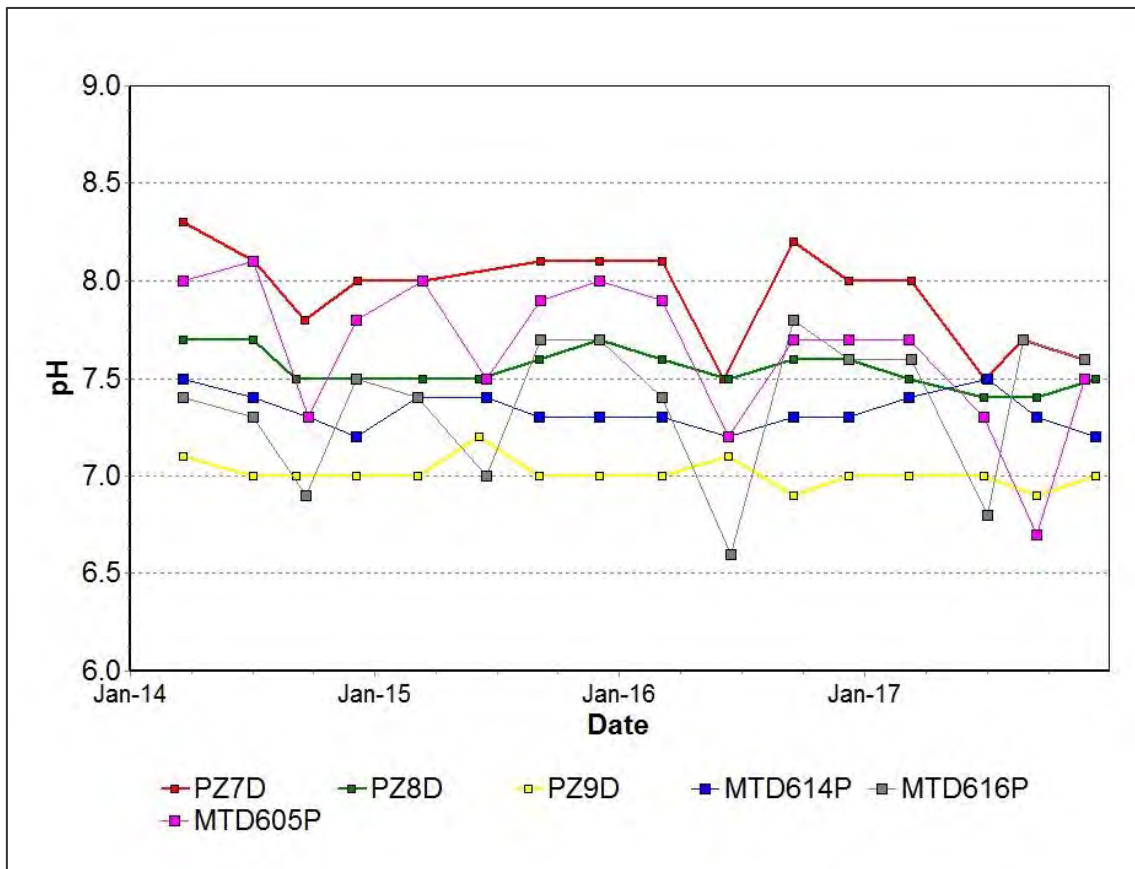


FIGURE 60 : SHALLOW OVERBURDEN SEAM GROUNDWATER PH TRENDS 2014 TO 2017

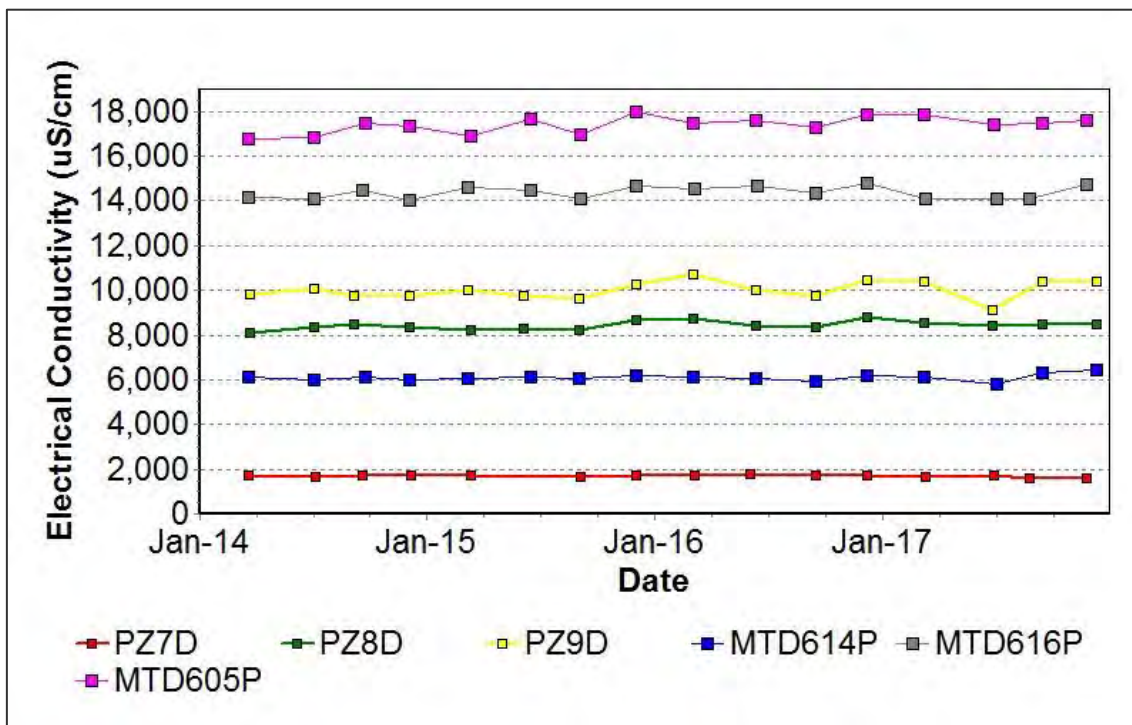


FIGURE 61: SHALLOW OVERBURDEN SEAM GROUNDWATER EC TRENDS 2014 TO 2017

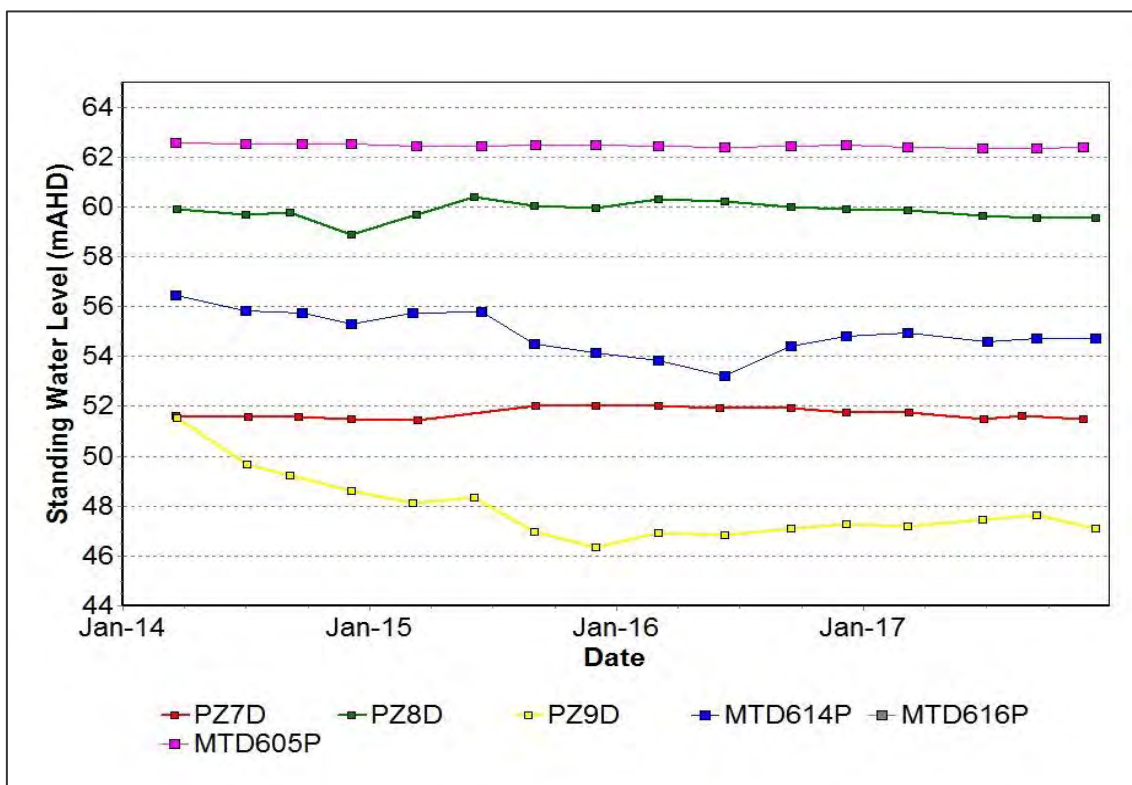


FIGURE 62: SHALLOW OVERBURDEN SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.7 Vaux Seam Bores

Groundwater monitoring in the Vaux seam was undertaken from three sites during 2017; a total of 12 samples were collected. The pH, EC and SWL trends for 2014 to 2017 for Vaux groundwater bores are shown in Figure 63, Figure 64 and Figure 65 respectively; results are consistent with historical trends.

TABLE 34: SHALLOW OVERBURDEN GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
OH1137	14/09/2017	EC – 95th percentile	Watching brief *
	11/12/2017		Watching brief *

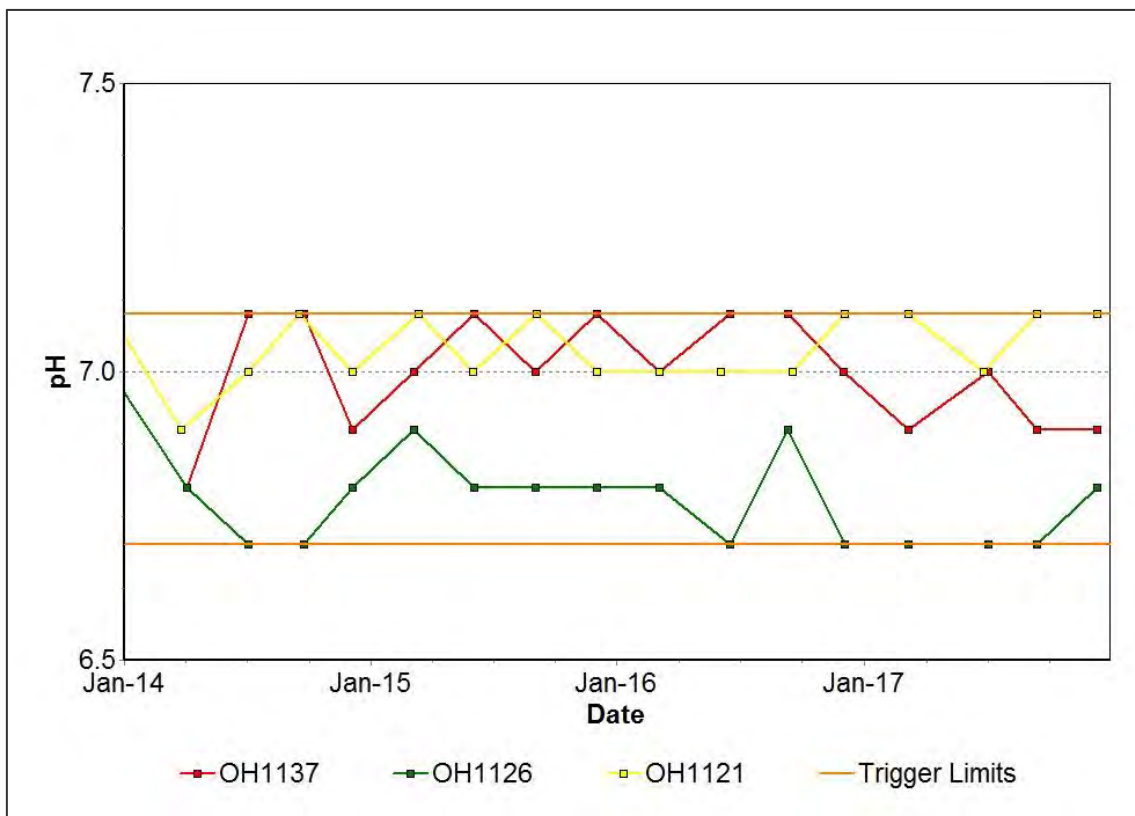


FIGURE 63: VAUX SEAM GROUNDWATER PH TRENDS 2014 TO 2017

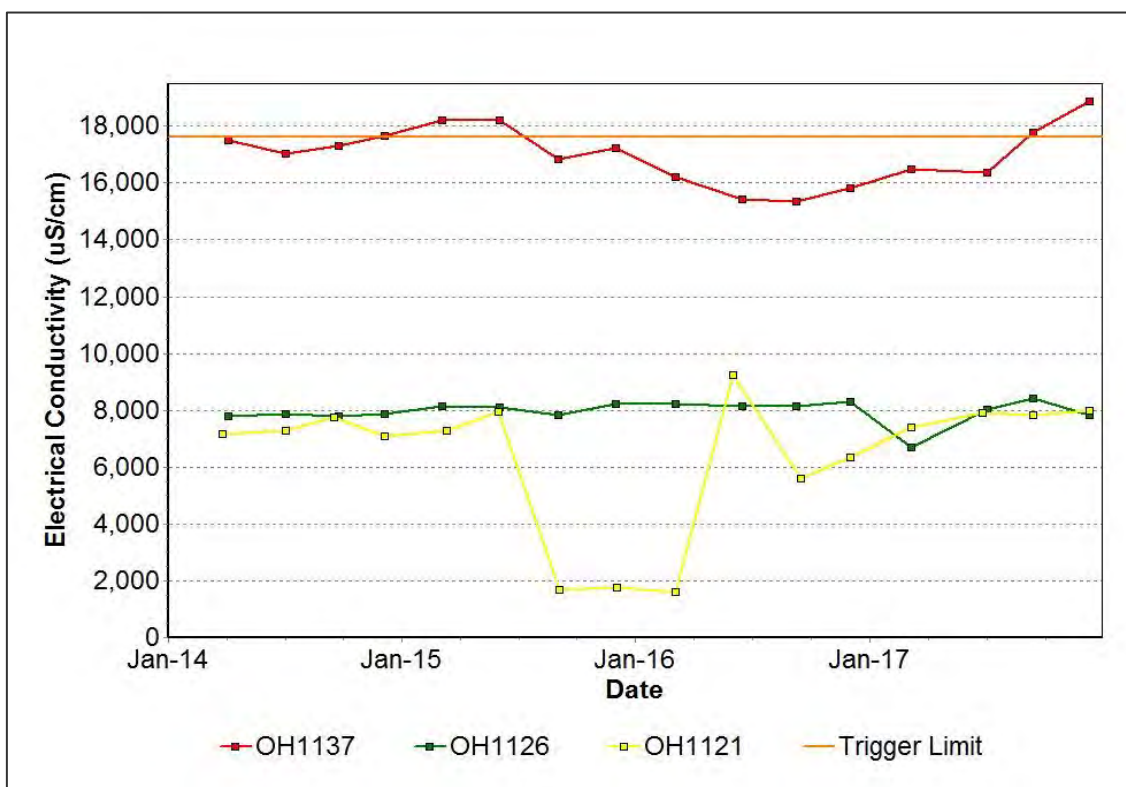


FIGURE 64: VAUX SEAM GROUNDWATER EC TRENDS 2014 TO 2017

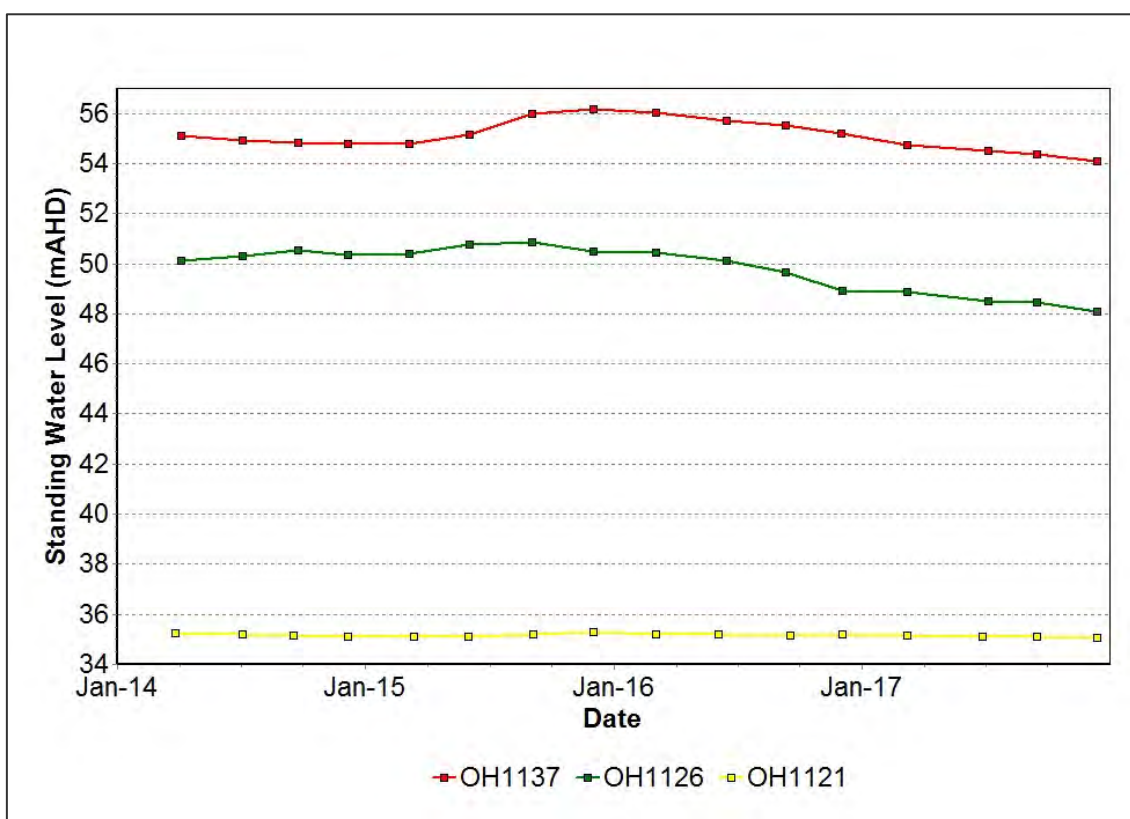


FIGURE 65: VAUX SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.8 Wambo Seam Bores

Groundwater monitoring in the Wambo seam bores were undertaken from five sites during 2017. A total of 19 samples were collected during the reporting period. The pH, EC and SWL trends for 2014 to 2017 for Wambo groundwater bores are shown in Figure 66, Figure 67 and Figure 68 respectively. Trigger tracking results are detailed in Table 35. Bore G3 collapsed during and was removed from the monitoring programme. Trends in all remaining bores were stable and consistent with historical data.

TABLE 35: MTW WAMBO SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
G3	15/12/2016	pH – 5th percentile	Bore partially collapsed in early 2016 so data may not be representative of aquifer. Removal from monitoring programme has been recommended following review of data from nearby bores.
	07/03/2017		Watching brief *
WOH2156B	10/03/2017	EC – 95th percentile	Elevated EC is likely the result of coal seam depressurisation, as evidenced by falling water level. This trend is consistent with effects of nearby mining. No further action required.
	30/06/2017		
	24/08/2017		
	23/11/2017		
WD622P	30/06/2017	EC – 95th percentile	Watching brief *

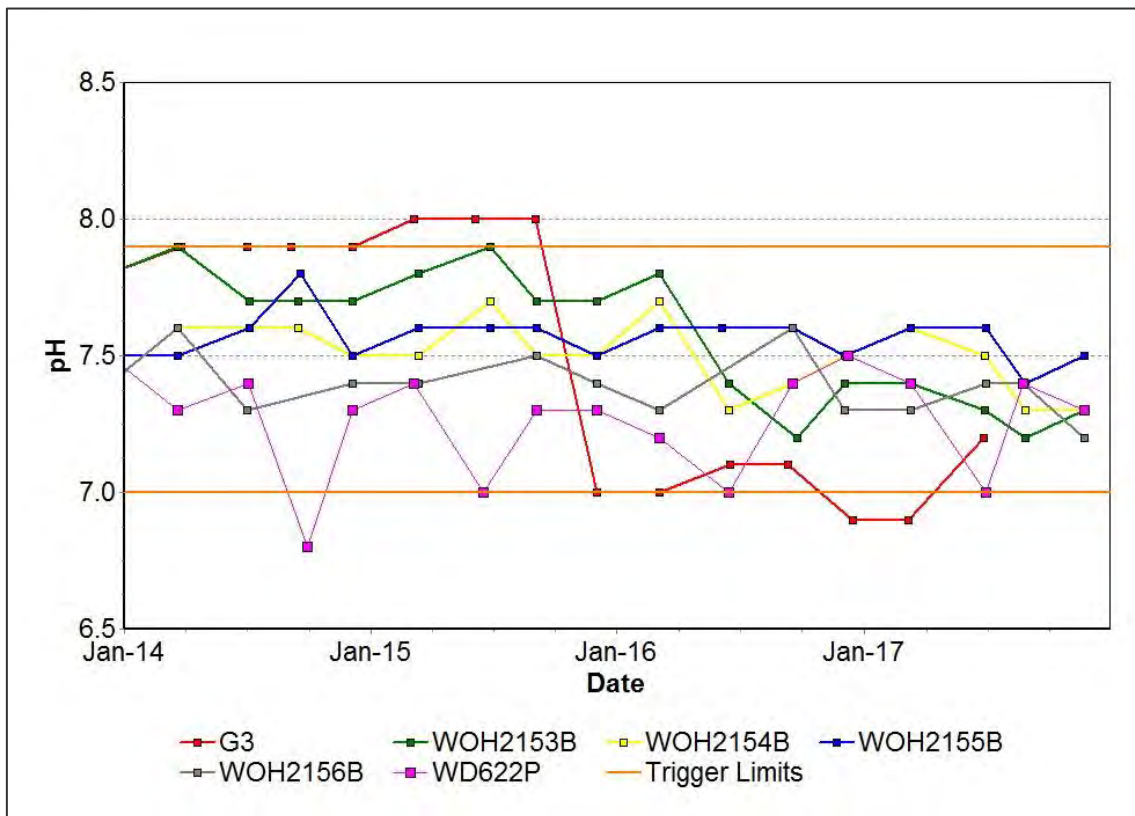


FIGURE 66: WAMBO SEAM GROUNDWATER PH TRENDS 2014 TO 2017

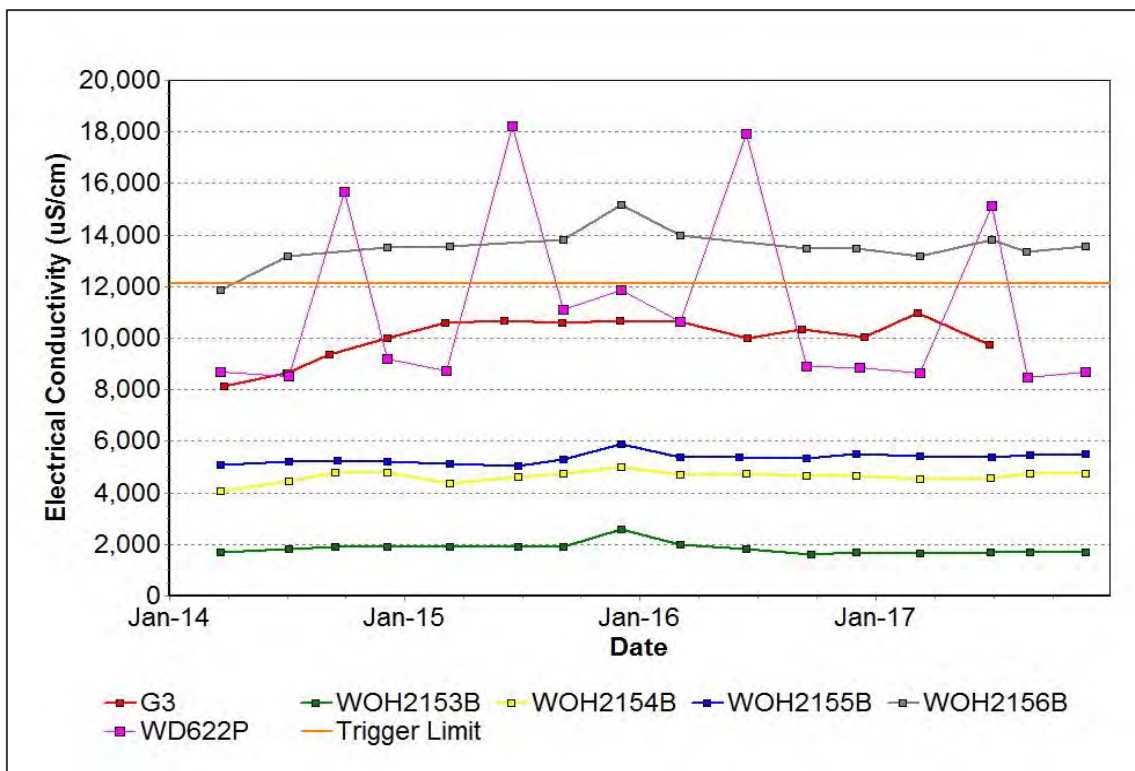


FIGURE 67: WAMBO SEAM GROUNDWATER EC TRENDS 2014 TO 2017

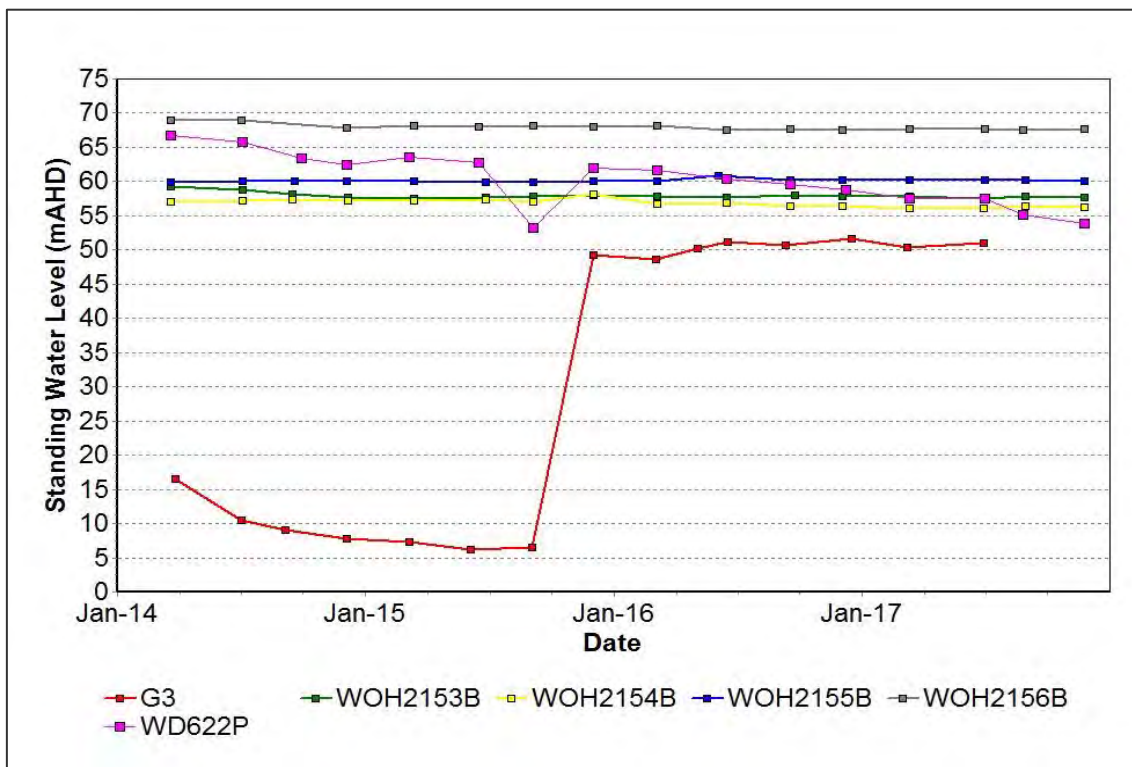


FIGURE 68: WAMBO SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.9 Warkworth Seam Bores

Groundwater monitoring in the Warkworth seam area was undertaken from two sites during 2017; eight samples were collected. The pH, EC and SWL trends for 2014 to 2017 for Warkworth seam bores are shown in Figure 69, Figure 70 and Figure 71 respectively.

TABLE 36: WARKWORTH SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
OH1138(1)	04/07/2017	pH – 5 th percentile	Watching brief *
	14/09/2017		Watching brief *
	11/12/2017		Under investigation.
OH1138(1)	14/09/2017	EC – 95 th percentile	Watching brief *
	11/12/2017		Watching brief *

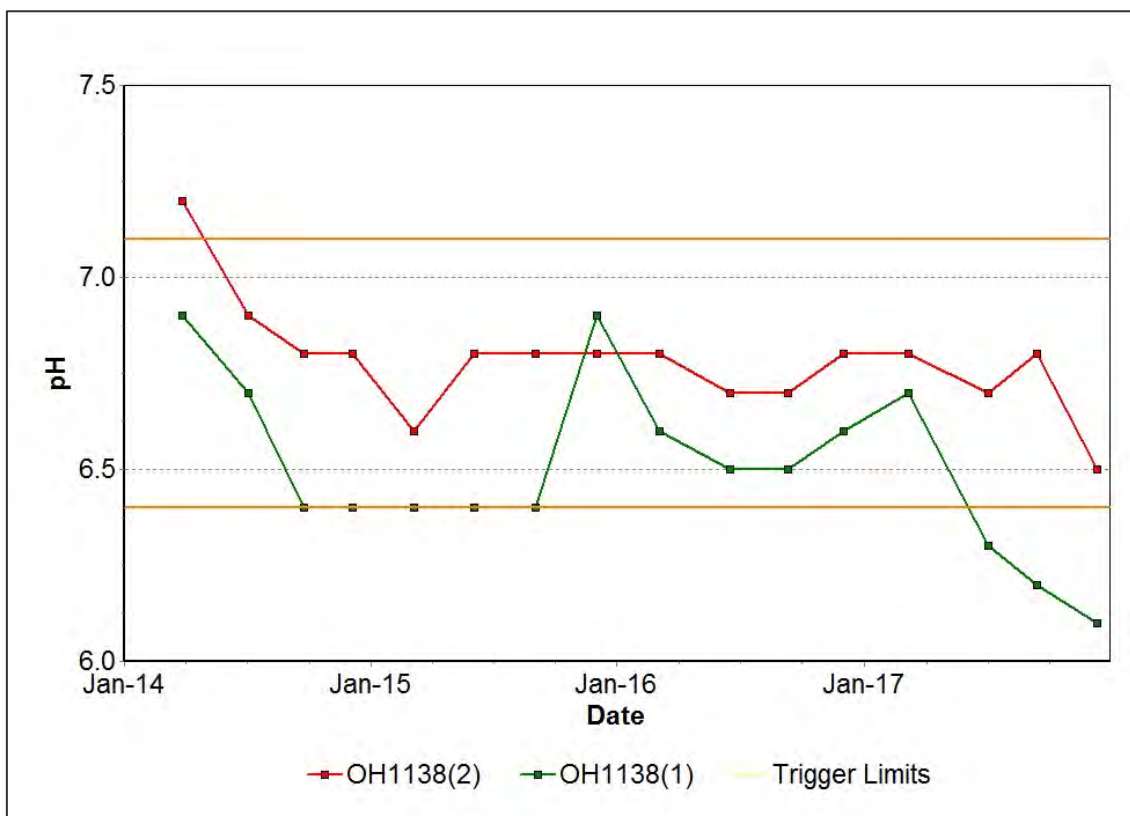


FIGURE 69: WARKWORTH SEAM GROUNDWATER PH TRENDS 2014 TO 2017

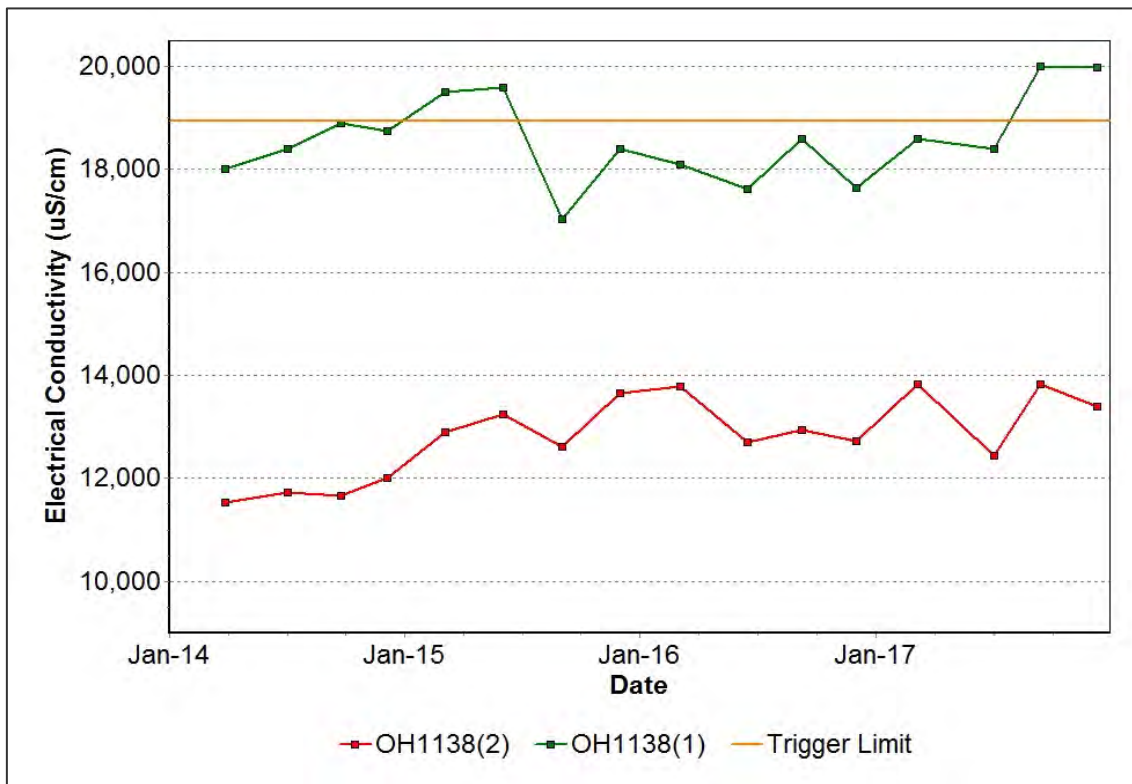


FIGURE 70: WARKWORTH SEAM GROUNDWATER EC TRENDS 2014 TO 2017

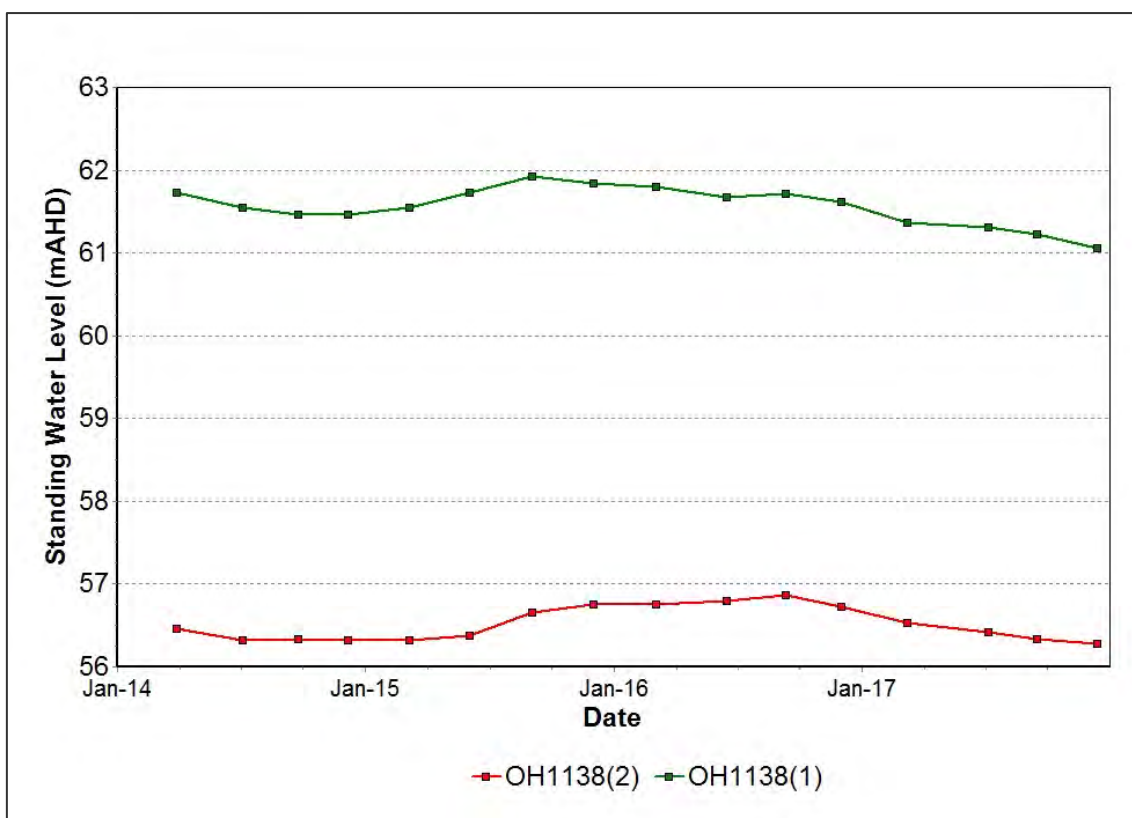


FIGURE 71: WARKWORTH SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.10 Wollombi Brook Alluvium Seam Bores

Groundwater monitoring in the Wollombi Brook Alluvium was undertaken from two sites during 2017; eight samples were collected. The pH, EC and SWL trends for 2014 to 2017 are shown in Figure 72, Figure 73 and Figure 74 respectively.

TABLE 37: WOLLOMBI BROOK ALLUVIUM SEAM GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
PZ9S	07/03/2017	EC – 95 th percentile	Watching brief *

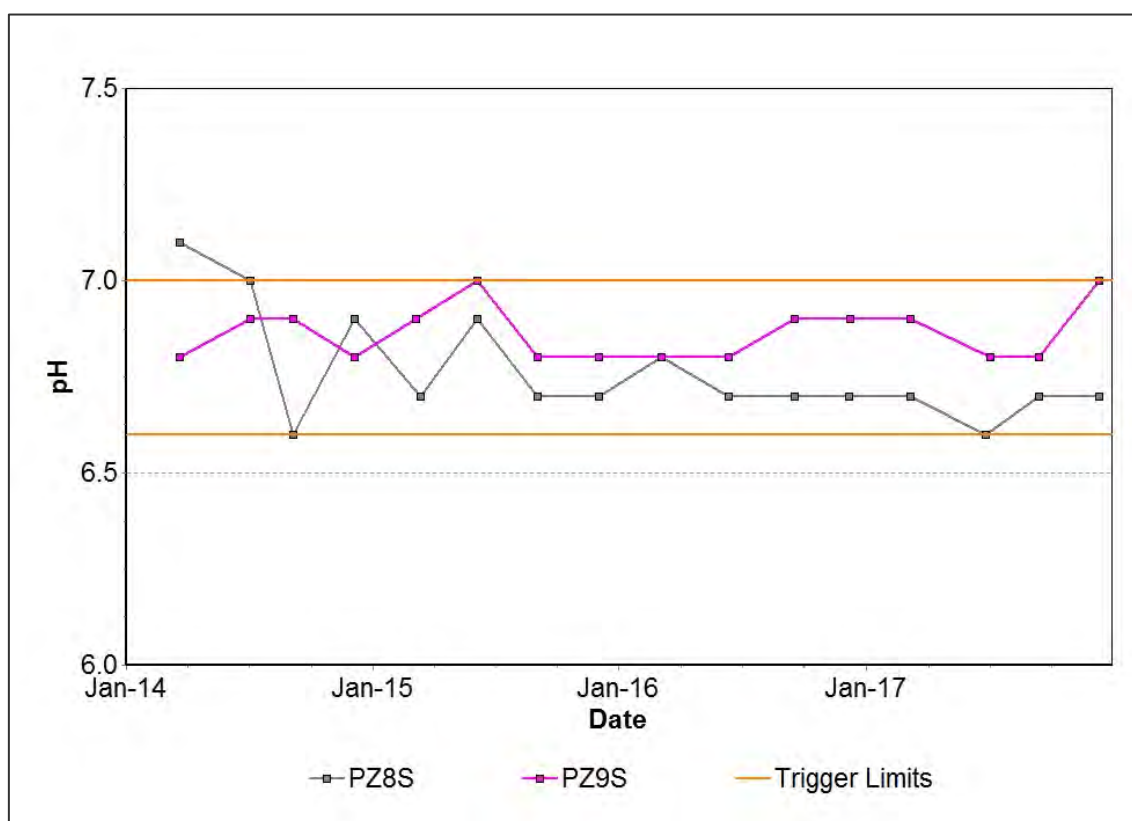


FIGURE 72: WOLLOMBI BROOK ALLUVIUM SEAM GROUNDWATER PH TRENDS 2014 TO 2017

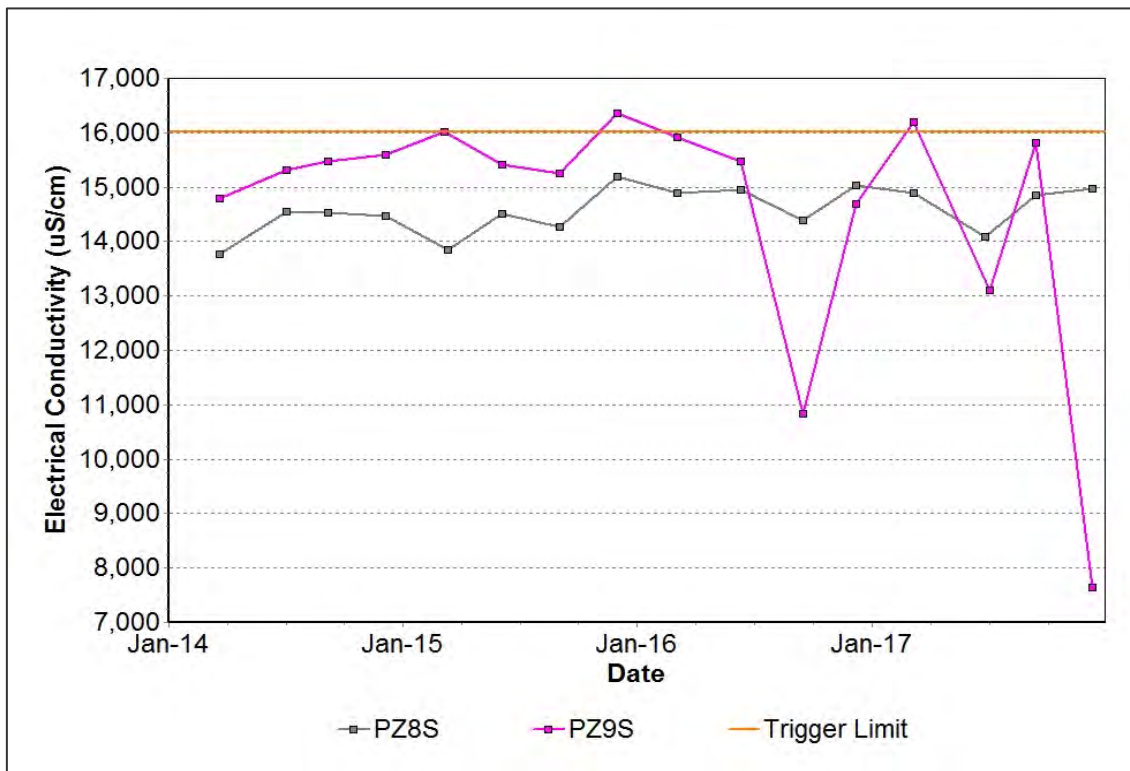


FIGURE 73: WOLLOMBI BROOK ALLUVIUM SEAM GROUNDWATER EC TRENDS 2014 TO 2017

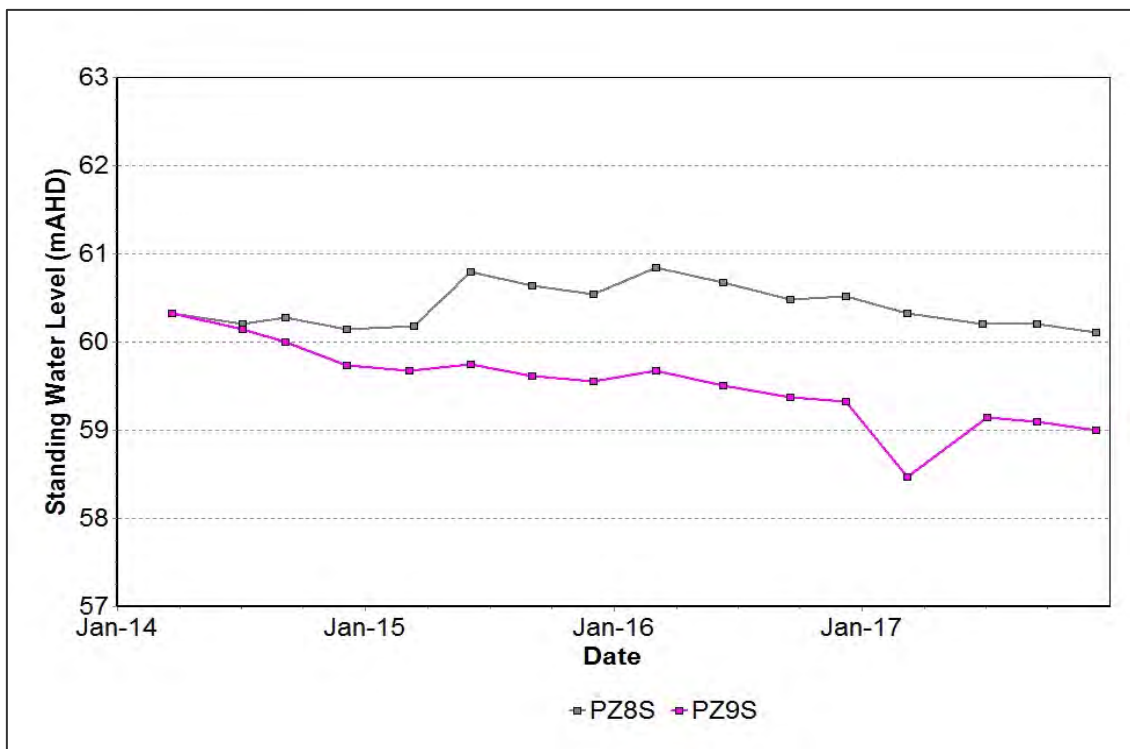


FIGURE 74: WOLLOMBI BROOK ALLUVIUM SEAM GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.11 Aeolian Warkworth Sands

Groundwater monitoring in the Aeolian Warkworth Sands was undertaken from one site during 2017; a total of four samples were collected. The pH, EC and SWL trends for 2014 to 2017 are shown in Figure 75, Figure 76 and Figure 77 respectively. Monitoring results were consistent with historical data.

TABLE 38: AEOLIAN WARKWORTH SANDS GROUNDWATER 2017 INTERNAL TRIGGER TRACKING

Location	Date	Trigger limit	Action taken in response
PZ7S	23/11/2017	EC – 95 th percentile	Watching brief *

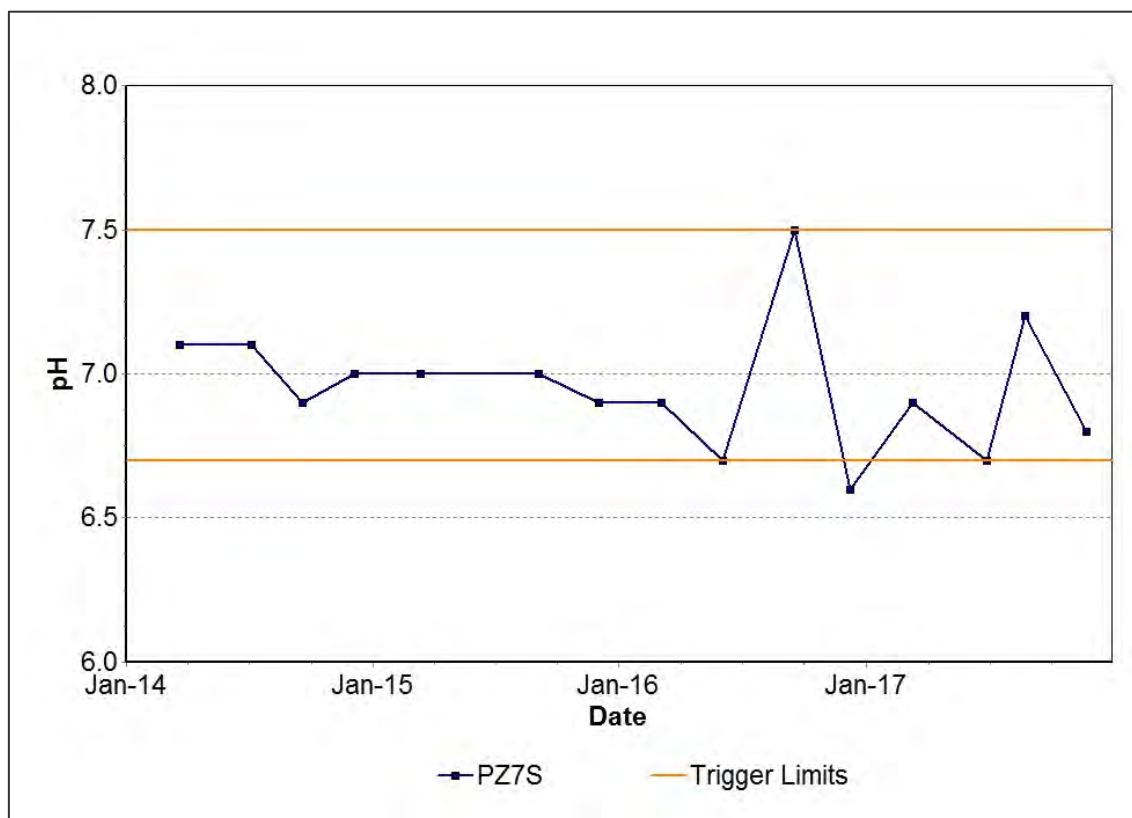


FIGURE 75 : AEOLIAN WARKWORTH SANDS GROUNDWATER PH TRENDS 2014 TO 2017

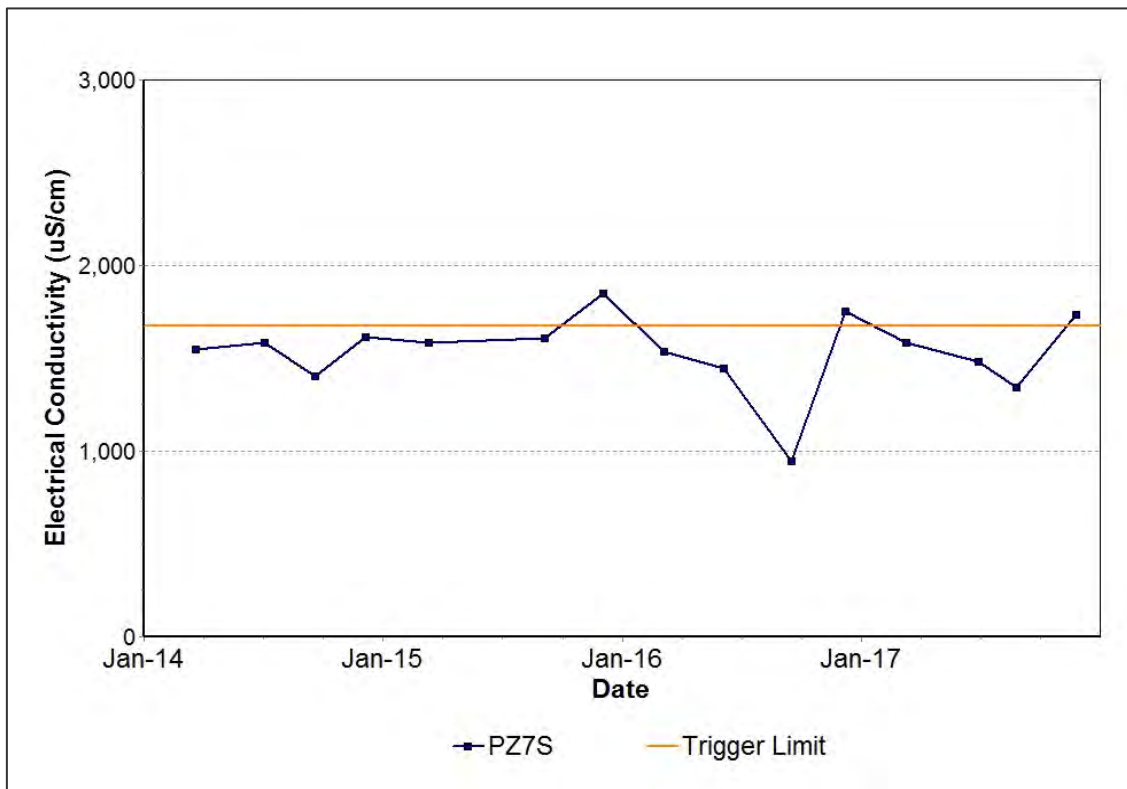


FIGURE 76: AEOLIAN WARKWORTH SANDS GROUNDWATER EC TRENDS 2014 TO 2017

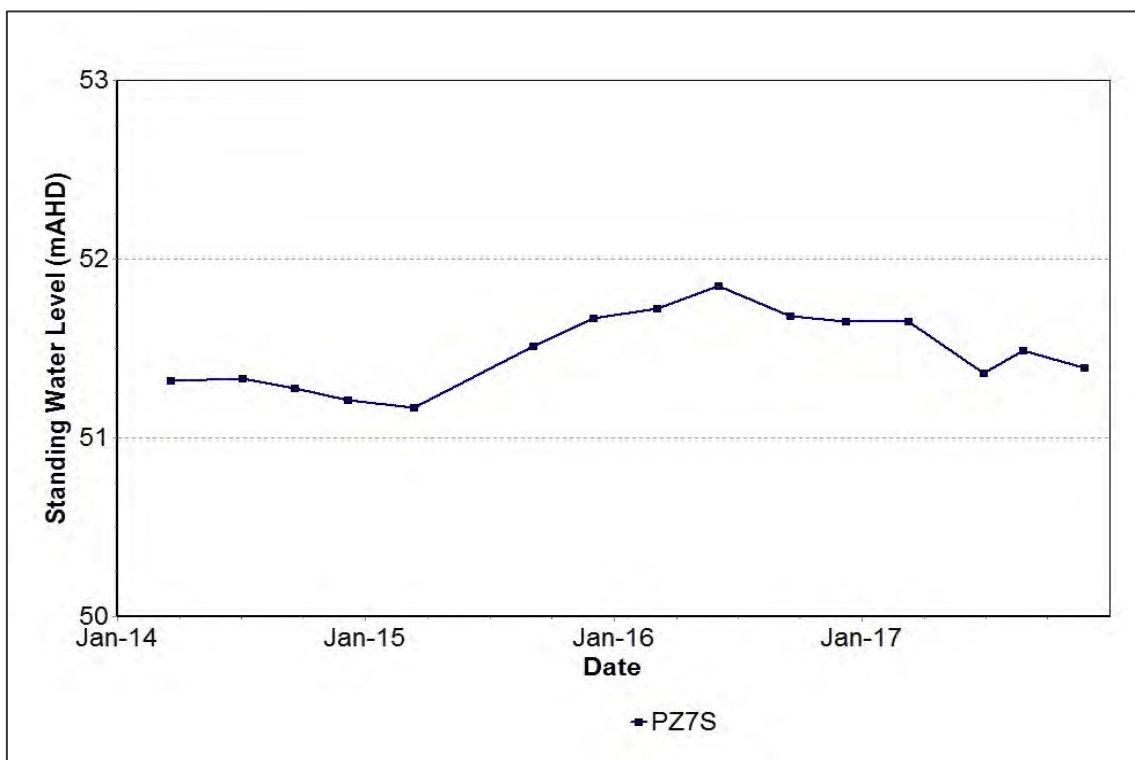


FIGURE 77: AEOLIAN WARKWORTH SANDS GROUNDWATER SWL TRENDS 2014 TO 2017

7.4.3.12 Audits and Reviews

An independent environmental audit of the Mount Thorley Operations and Warkworth Mining Operations was undertaken in May 2017. There were two findings related to water flow devices. **A summary detailing the findings of this audit can be found on Yancoal's public website (<https://insite.yancoal.com.au/document-library/audits-mtw>).**

8. REHABILITATION

Rehabilitation progress has been compared to the MOP that was current at the end of the reporting period (MTW MOP 2015-2021 approved 5th February 2016).

8.1 SUMMARY OF REHABILITATION

A total of 124 ha rehabilitation was undertaken during 2017 against a MOP target of 107.1 ha. Total disturbance undertaken during 2017 was 74.9 ha, slightly higher than the MOP projection of 72.8 ha. The disturbance during 2017 was made up of 40.4 ha of new disturbance and 34.5 ha of disturbance of previously rehabilitated area.

TABLE 39: KEY REHABILITATION PERFORMANCE INDICATORS

Mine Area Type	Previous Reporting Period (Actual) Year 2016 (ha)	This Reporting Period (Actual) 2017 (ha)	Next Reporting Period (Forecast) Year 2018 (ha)
A. Total mine footprint²	3,608.7	3,659.7	3,749.6
B. Total Active Disturbance³	2,499.5	2,468	2,499.7
C. Land being prepared for rehabilitation⁴	41.9	35.7	21.9
D. Land under active rehabilitation⁵	1,067.3	1,156	1,228
E. Completed rehabilitation⁶	0	0	0

² **Total mine footprint** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.

³ **Total active disturbance** includes all areas ultimately requiring rehabilitation such as: on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpiles areas, access tracks and haul road, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).

⁴ **Land being prepared for rehabilitation** – includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines).

⁵ **Land under active rehabilitation** – includes areas under rehabilitation and being managed to achieve relinquishment – includes the following rehabilitation phases as described in the DRE MOP/RMP Guidelines – “ecosystem and land use sustainability” (revegetation assessed as showing signs of trending towards relinquishment OR infrastructure development).

⁶ **Completed rehabilitation** – requires formal sign off by DRE that the area has successfully met the rehabilitation land use objectives and completion criteria.

8.1.1 Management

Performance criteria for each rehabilitation phase have been detailed in the Mining Operations Plan (MOP) for MTW. These criteria have been developed so that the rehabilitation success can be quantitatively tracked as it progresses through the phases outlined below:

- Stage 1 – Decommissioning
- Stage 2 – Landform Establishment
- Stage 3 – Growing Media Development
- Stage 4 – Ecosystem and Land use Establishment
- Stage 5 – Ecosystem and Land use Sustainability
- Stage 6 – Rehabilitation Complete

The performance criteria are objective target levels or values that can be measured to quantitatively demonstrate the progress and ultimate success of a biophysical process. A monitoring methodology has been developed to measure the performance criteria outlined in the MOPs utilising a combination of tools that provide quantitative data to assess changes occurring over time.

The target levels or values have been based on monitoring results from reference sites and were detailed in a Mining Operations Plan (MOP) Amendment submitted to Division of Resources and Geoscience (DRG) in October 2017. The results of the rehabilitation monitoring programme for native vegetation areas (presented in Appendix 5) have been compared against the target levels to determine if rehabilitation has been successful or if additional intervention is needed.

Ecologists from Niche Environment and Heritage commenced monitoring of rehabilitated land returned to native vegetation in 2015. The results of monitoring conducted in early and mid 2017 are presented in Appendix 4. Monitoring was conducted across 12 reference sites within the two target vegetation communities Central Hunter Grey Box-Ironbark Woodland EEC, and Ironbark-Spotted Gum-Grey Box Forest EEC. The 2017 monitoring program revisited 16 of the 17 sites monitored in 2016 to check the consistency of the monitoring results from successive years. The 2017 monitoring program also established 8 new monitoring sites at MTW. Additional monitoring methods were incorporated into the 2017 program to measure the density, health and growth of canopy species. Sites were selected to include rehabilitation of varying ages and different rehabilitation methods.

8.2 DECOMMISSIONING

Capping of the Interim Tailings Storage Facility continued during 2017 using breaker rock from the South CHPP. A capping of inert spoil will be placed over the breaker rock before rehabilitating the area.

During 2017, capping of Tailings Dam 2 commenced using small contractor-owned equipment to place selected mine spoil in layers across the tailings dam surface. Capping work was suspended during 2017 due to settlement cracking occurring in an area where the tailings surface had low strength. Further geotechnical studies have been undertaken by Australian Tailings Consultants in order to design an alternative capping method that will allow capping work to safely recommence in 2018.

8.3 REHABILITATION PERFORMANCE

Table 40 summarises actual rehabilitation and disturbance completed compared with the rehabilitation commitments in the MTW MOP. Appendix 3 provides the Annual Rehabilitation Report Form, including rehabilitation progress for each domain through the rehabilitation phases.

The area of rehabilitation that was sown during the reporting period exceeded the combined MOP target for Mt Thorley and Warkworth by 16.9ha. The area of rehabilitation disturbance however exceeded the MOP target for MTW by 10.9ha, leading to a net rehabilitation result for 2017 that was 6ha in front of the MOP commitment. The net rehabilitation result over the MOP period (2015 to 2017) is 218.8ha versus a MOP commitment of 229.3ha, lagging by 10.5ha.

The amount of new disturbance undertaken in 2017 was approximately 20ha higher than the MOP projections. However, the cumulative new disturbance over the period of the current MOP is still approximately 40ha lower than the projected disturbance, mainly due to the clearing for the Rural Fire Service Road being delayed. This road will be used for emergency access by the RFS when Wallaby Scrub Road is closed. Clearing for the RFS road construction is scheduled to occur in 2018 after approval is gained to close Wallaby Scrub Road.

The 2017 rehabilitation areas for MTW are shown in Appendix 2.

TABLE 40: REHABILITATION AND DISTURBANCE COMPLETED IN 2017

MOP	Pit Area	2017 Totals (ha)		Cumulative Totals During MOP Period* (ha)	
		Actual	MOP Commitment	Actual	MOP Commitment
Rehabilitation					
MTW	Mt Thorley	55.1	44.9	91.6	63.2

	Warkworth	68.9	62.2	193	202.2
	MTW Total	124.0	107.1	284.6	265.4

Rehabilitation Disturbance					
MTW	Mt Thorley	14.0	19.4	19.0	23.9
	Warkworth	20.5	4.2	46.8	12.2
	MTW Total	34.5	23.6	65.8	36.1

New Disturbance					
MTW	Mt Thorley	5.0	0	6.6	0.4
	Warkworth	35.3	20.1	155.5	202.2
	MTW Total	40.3	20.1	162.1	202.6

Net Rehabilitation (Rehabilitation minus Rehabilitation Disturbance)					
MTW	Mt Thorley	41.1	25.5	72.6	39.3
	Warkworth	48.4	58	146.2	190
	MTW Total	89.5	83.5	218.8	229.3

Note: Rehabilitation areas relate to areas at or past the phase of Ecosystem and Landuse Establishment.

*** MOP Period is 2015 - 2021**

Progressive rehabilitation commitments are outlined in the Warkworth Continuation 2014 and Mt Thorley Operations 2014 Environmental Impact Statements. These documents modelled a total of 767 ha of rehabilitation would be complete by 2014, and a further 336 ha would be completed in the period 2015 to 2017, making a modelled total at the end of 2017 of 1,103ha. At the end of the reporting period there had been 1,156 hectares of rehabilitation completed across MTW, 53ha ahead of the EIS forecasts.

The South Pit South Accelerated Rehabilitation Plan was prepared in 2014 to address lagging rehabilitation in the South pit area of Warkworth. The Plan details how rehabilitation in this area will progress between 2014 and 2018. For the period 2014 to 2017 the Plan committed to 124.7 ha of rehabilitation being completed. The actual rehabilitation amounts to 158.8 ha, which is 34.1 ha ahead of the planned progress.

8.3.1 Rehabilitation Programme Variations

There were no variations to the rehabilitation programme during the reporting period.

8.4 REHABILITATION TRIALS

A trial was undertaken in the South Pit South area of MTW to investigate methods that could potentially improve the germination and establishment of native plants, particularly in areas that have been previously stabilised with exotic cover crops. The trial investigated various combinations of the following methods:

Compost application: secondary application of composted green waste;

Soil amelioration and seed bed preparation: ripping, aerating and application of Cal-S;

Inoculant and growth promotant application: bacteria and fungi dominated inoculants, germination and growth promotants.

The dry end to 2017 has meant that little germination has occurred on this trial area to date, however monitoring of this trial site will be conducted following rain in 2018.

8.4.1 Rehabilitation Maintenance

Management of rehabilitated areas is undertaken when required or when issues are identified through monitoring, auditing or inspections. Rehabilitation maintenance activities are described further in the sections below.

A licence agreement is in place for grazing 90 ha of Warkworth North Pit North rehabilitation area.

Post rehabilitation broadacre weed control

Broadacre weed treatment within rehabilitation areas is undertaken using agricultural methods comprising boom sprays and wick wipers. In existing rehabilitation areas boom spraying is primarily used to manage cover crop and fallow areas prior to sowing to final native seed mixes. Pre-emergent application of herbicide is occasionally necessary to control emerging weeds in the period between sowing and germination of the desired plants. Wick wiping targets rapidly growing exotic grasses and other erect growing weeds in the period following native germination but while desirable species remain below the wiper target zone. During 2017 areas totalling 312.3ha of existing rehabilitation received boom and/or wick wiper treatment (Figure 78).

Hand spraying and manual removal of weeds is also undertaken in rehabilitation areas with establishing native vegetation. These activities are described in Section 8.7 Weed Control.

Stem Thinning

Thinning of tree stems is undertaken in developing stands of native vegetation to reduce stem densities, manage species compositions and control over-shading. Where monitoring indicates that the density of overstory species is excessive, thinning is used as an intervention to maintain rehabilitation areas on the desired trajectory. The following herbicide application methods are utilised at MTW for stem thinning: cut and paint (using

brushcutters and chainsaws), basal bark and splatter gun. During 2017, areas totalling 10.3ha of existing rehabilitation received stem thinning maintenance (Figure 78).

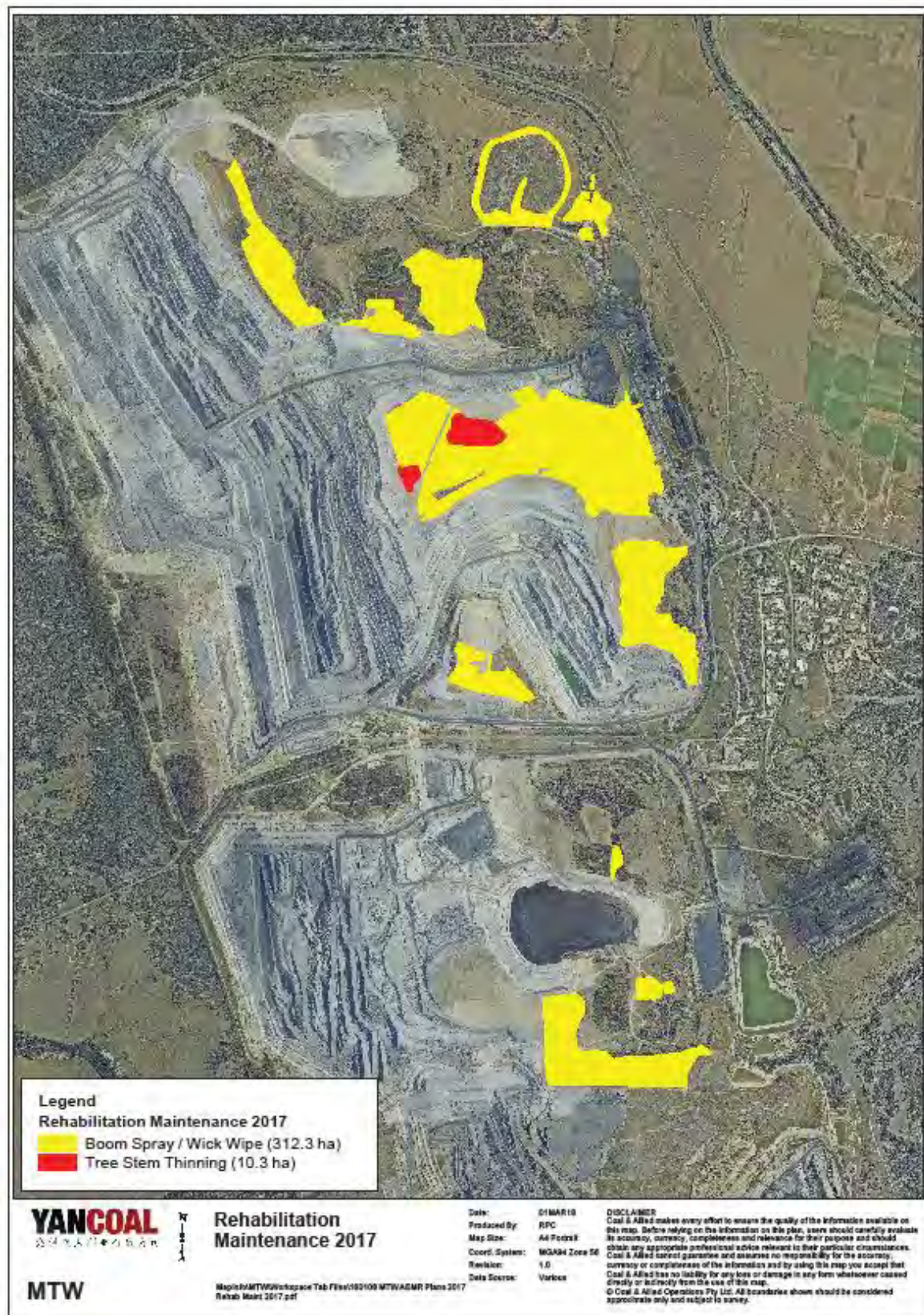


FIGURE 78: 2017 REHABILITATION MAINTENANCE LOCATIONS

8.5 TOPSOIL MANAGEMENT

Topsoil is managed according to Coal & Allied Ground Disturbance Permit and land management procedures outline the topsoil used and stockpiled during 2017. There were 110.6 ha of rehabilitation top soiled during 2017, using stockpiled and pre-stripped soil resources.

TABLE 41: SOIL MANAGEMENT

Soil Used This Period (m ³)	Soil Prestripped This Period (m ³)	Stockpile Inventory to Date (m ³)	Stockpile Inventory Last Report (m ³)
110,600	74,900	639,824	675,524

8.6 TAILINGS MANAGEMENT

Detail of capping activities on tailings storage facilities at MTW is covered in Appendix 1. Minimising the amount of standing water on tailings storage facilities, by managing the decant water, is important during and post tailings deposition to assist with closure of these facilities. Effective removal of decant water enables better consolidation of the tailings material, which in turn facilitates earlier capping and rehabilitation of the storage facility. Table 42 below outlines the current state of decant water pumping infrastructure across the active and inactive TSF's at MTW.

TABLE 42: TAILINGS MANAGEMENT

Facility	Status	Decant System
Centre Ramp TSF	Active	Decant pumps in place, regular pumping
Abbey Green South	Active	Decant pumps installed as required due to infrequent filling regime.
TD2	Inactive	Diesel Pump in place
Interim TSF	Inactive	Floating solar pump installed
Ministrip TSF	Inactive	Diesel Pump in place, pumping as required

8.7 WEED CONTROL

8.7.1 Weed Treatment

The weeds identified at MTW occur primarily in areas that have been disturbed such as post mining rehabilitation areas, previous civil works areas, soil stockpiles, water management structure surrounds, and general areas of minor ground disturbance. A total of 78 days of weed management work was undertaken on site at MTW during 2017, with 430 ha of land treated, including maintenance of access tracks and environmental monitoring points. The weeds targeted during the 2017 weed management programme were based on the results of the 2016 weed survey. Figure 79 illustrates the target species and weed treatment areas across MTW.

Weed treatment areas are assessed following the completion of periods of work to determine the effectiveness of control works.

The species focussed on during treatment included:

- African Boxthorn (*Lycium ferocissimum*)
- Galenia (*Galenia pubescens*)
- Lantana (*Lantana Camara*)
- Mother of Millions (*Bryophyllum delagoense*)
- Opuntia (*Pear*) species (*Tiger, Prickly and Creeping Pear*)
- **St John's Wort** (*Hypericum perforatum*)

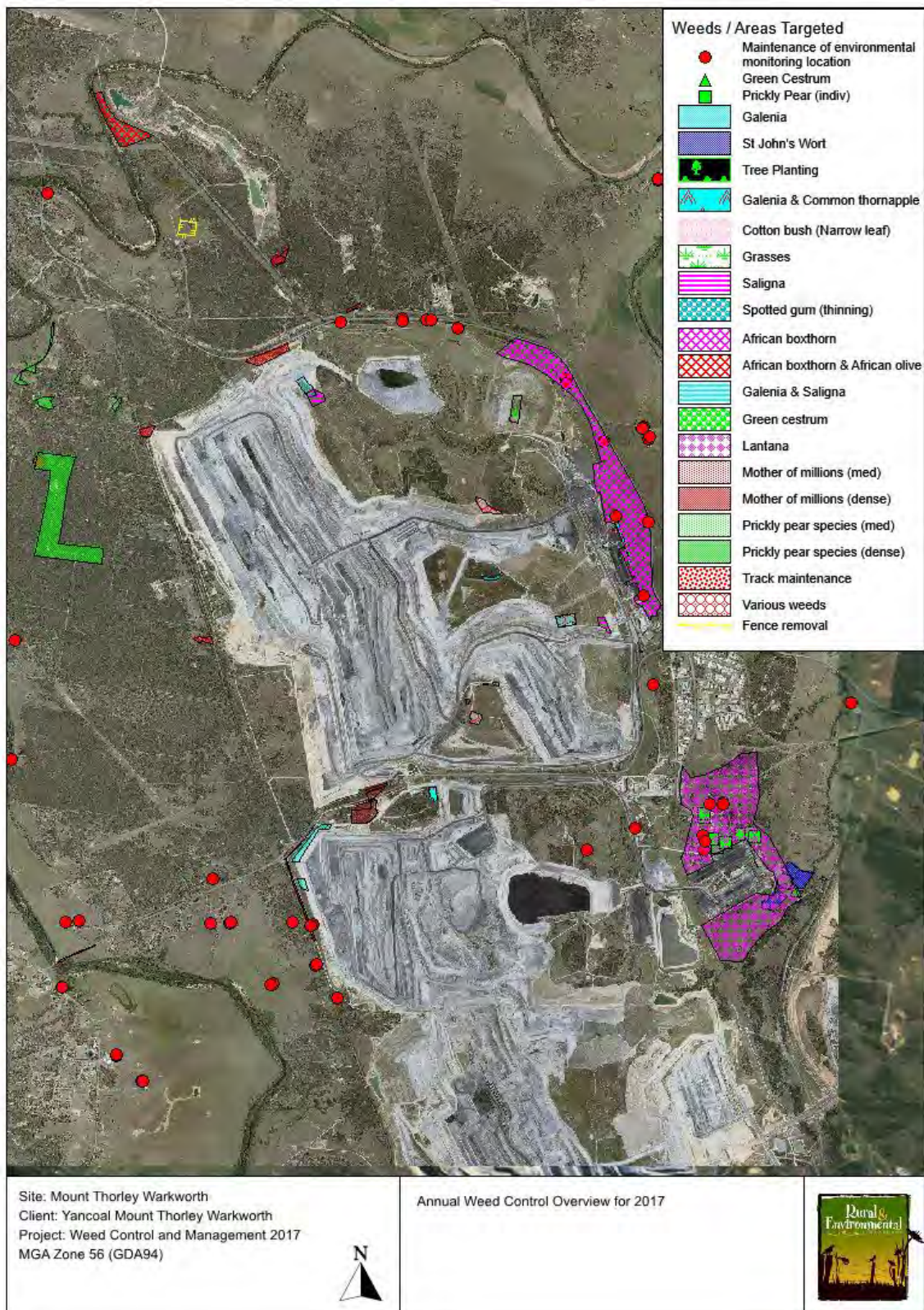


FIGURE 79: ANNUAL WEED CONTROL OVERVIEW FOR 2017

8.7.2 Annual Weed Survey

The management and control of weeds at MTW is governed by the Annual Weed Survey (AWS). The AWS lists Weeds of National Significance (WONS), noxious, environmental and other non-declared weed species identified across MTW, and provides a framework to allow for structured weed management and control across operational and non-operational areas of MTW.

The following summarises the results of the weed survey undertaken during December 2017, from 2018 all reports and surveys will be based upon the NSW Biosecurity Act 2015 which came into force from 1 July 2017 and repealed 14 Acts including the Noxious Weeds Act 1993. The new legislation has resulted in the development of the Hunter Regional Strategic Weed Management Plan 2017-2022 which covers the area occupied by MTW.

Seven WONS were identified during the survey, they included:

- African Boxthorn (*Lycium ferocissimum*)
- Bitou bush (*Chrysanthemoides monilifera subsp. rotundata*)
- Fireweed (*Scenecio madagascariensis*) – very sparse
- Lantana (*Lantana camara*)
- Pear Species,
 - Creeping Pear (*Opuntia humifusa*)
 - Prickly Pear (*Opuntia stricta*)
 - Tiger Pear (*Opuntia aurantiaca*)

Four other noxious weeds were identified at MTW during the survey, including:

- Mother of Millions (*Bryophyllum delagoense*)
- St Johns Wort (*Hypericum perforatum*)
- Xanthium species including
 - Bathurst burr (*Xanthium spinosum*)
 - Noogoora burr (*Xanthium occidentale*)

Seven environmental weed species were identified at MTW during the survey, they included:

- African Olive (*Olea europaea subsp. cuspidata*)
- African lovegrass (*Eragrostis curvula*)
- Blue heliotrope (*Heliotropium amplexicaule*)
- Castor Oil Plant (*Ricinus communis*)
- Common thornapple (*Datura stramonium*)
- Galenia (*Galenia pubescens*)
- Scotch Thistle (*Onopordum acanthium*),

Fourteen weeds that are not officially declared or listed were also recorded at MTW including:

- Aloe Vera (*Aloe vera*)
- Blackberry nightshade (*Solanum nigrum*)
- Century plant (*Agave americana*)
- Farmers friends (*Bidens pilosa*)
- Golden wreath wattle or Saligna (*Acacia saligna*)
- Inkweed (*Phytolacca octandra*)
- Mustard weed (*Sisymbrium sp*)
- Narrow Leaved cotton bush (*Gomphocarpus fruticosus*)
- Spiny Rush (*Juncus acutus*)
- Tree Tobacco (*Nicotiana glauca*), and
- Wild Rose (*Rosa species*)
- Redroot pigweed (*Amaranthus retroflexus*)
- Rhodes grass (*Chloris gayana Kunth*)
- Stinking Roger (*Tagetes minuta*)

Species identified during the 2017 survey will form the basis of ongoing weed management works during 2018.

8.8 VERTEBRATE PEST MANAGEMENT

As part of MTW's Vertebrate Pest Action Plan a baiting programme is carried out on a seasonal basis. Three 1080 ground baiting programmes consisting of 60 bait sites utilising meat baits and ejector baits were undertaken during summer, winter and spring, to target wild dogs and foxes. Baits were checked over a three week period and replaced each week when taken.

Table 43 summarises the results from the programmes carried out at MTW during 2017 with baiting locations and results for the programmes are illustrated in Figure 80.

TABLE 43: VERTEBRATE PEST CONTROL SUMMARY

Season	1080 Baiting			Trapping	Shooting			
	Total Lethal Baits Laid	Takes by Wild Dog	Takes by Fox	Wild Dog	Feral Pigs	Hares	Foxes	Rabbits
Summer	120	61	5	-	-	-	-	-
Autumn - Winter	120	63	3	1	2	25	-	5

Spring	120	64	5	-	3	15	6	6
Total	360	188	13	1	5	40	6	11

Additional pest management programmes included:

- Soft Jaw trapping across MTW: one wild dog trapped and euthanized.
- Opportunistic shooting of vertebrate pests: five pigs, 40 hares, six foxes and 11 rabbits were euthanized.

MTW will continue to carry out quarterly vertebrate pest control programmes during 2018 to limit feral pest impacts on landholdings and surrounding neighbours.

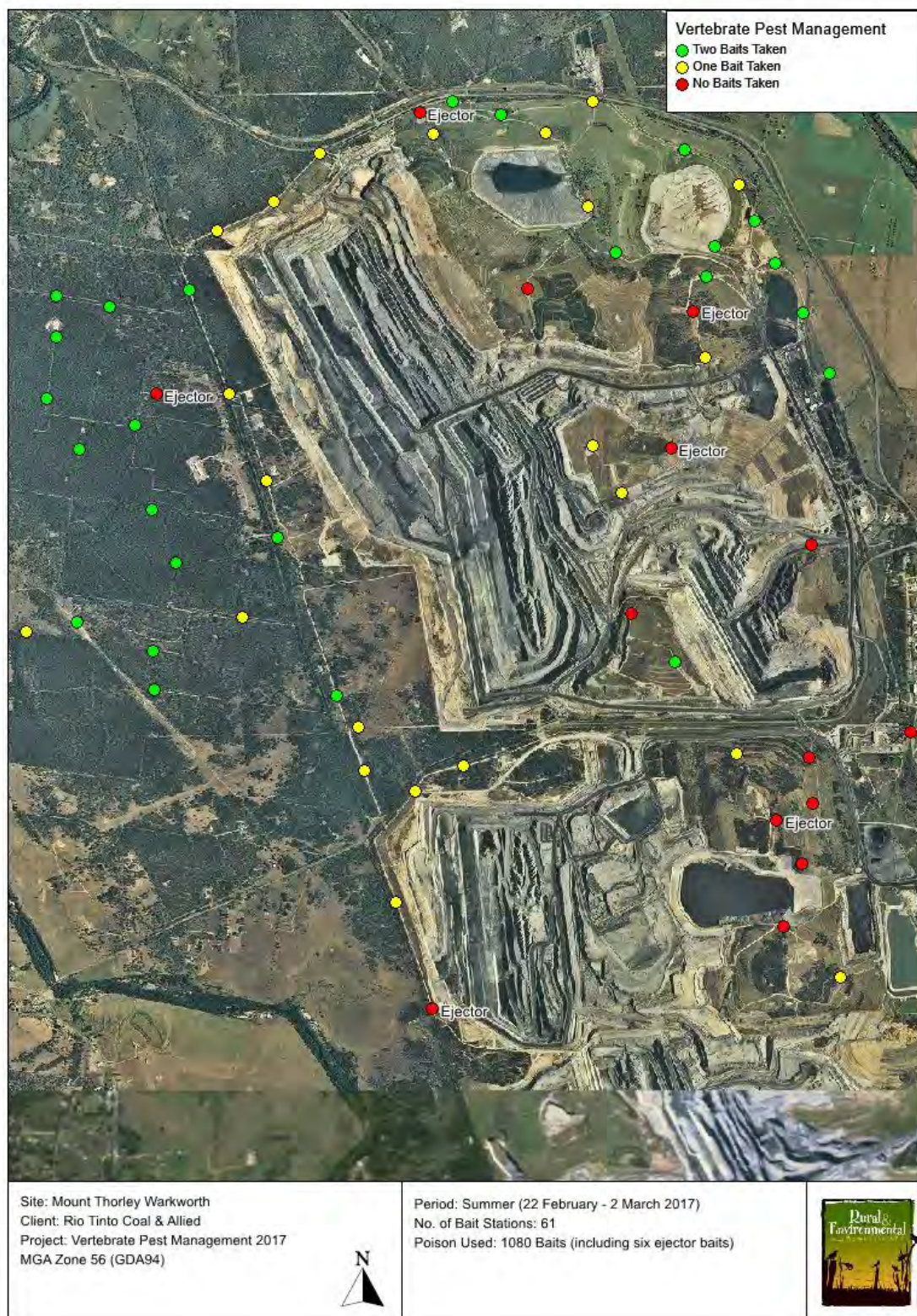


FIGURE 80: BAITING STATION LOCATIONS AND RESULTS AT MTW DURING THE SUMMER 2017 VERTEBRATE PEST MANAGEMENT PROGRAMME

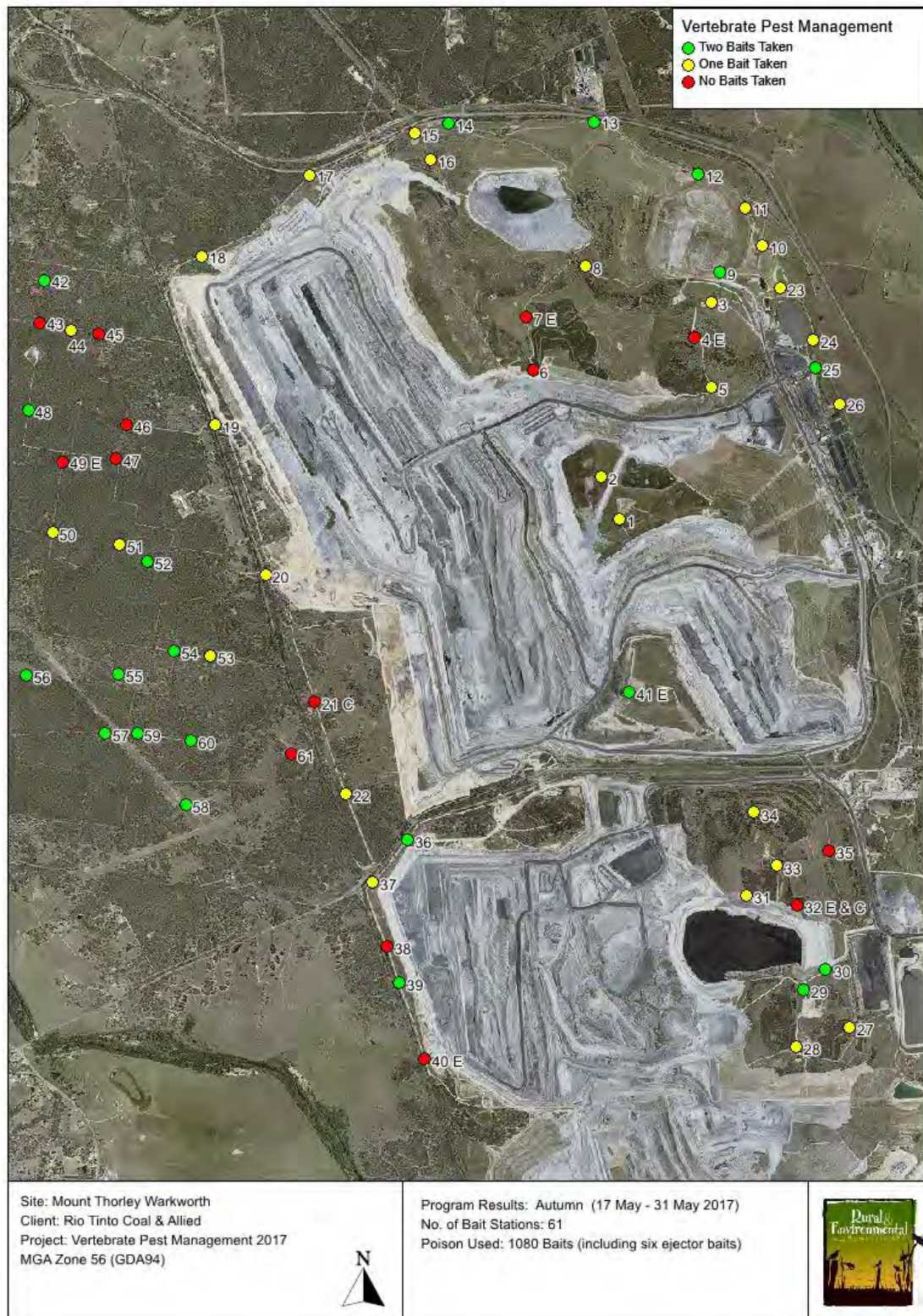


FIGURE 81: BAITING STATION LOCATIONS AND RESULTS AT MTW DURING THE AUTUMN 2017 VERTEBRATE PEST MANAGEMENT PROGRAMME

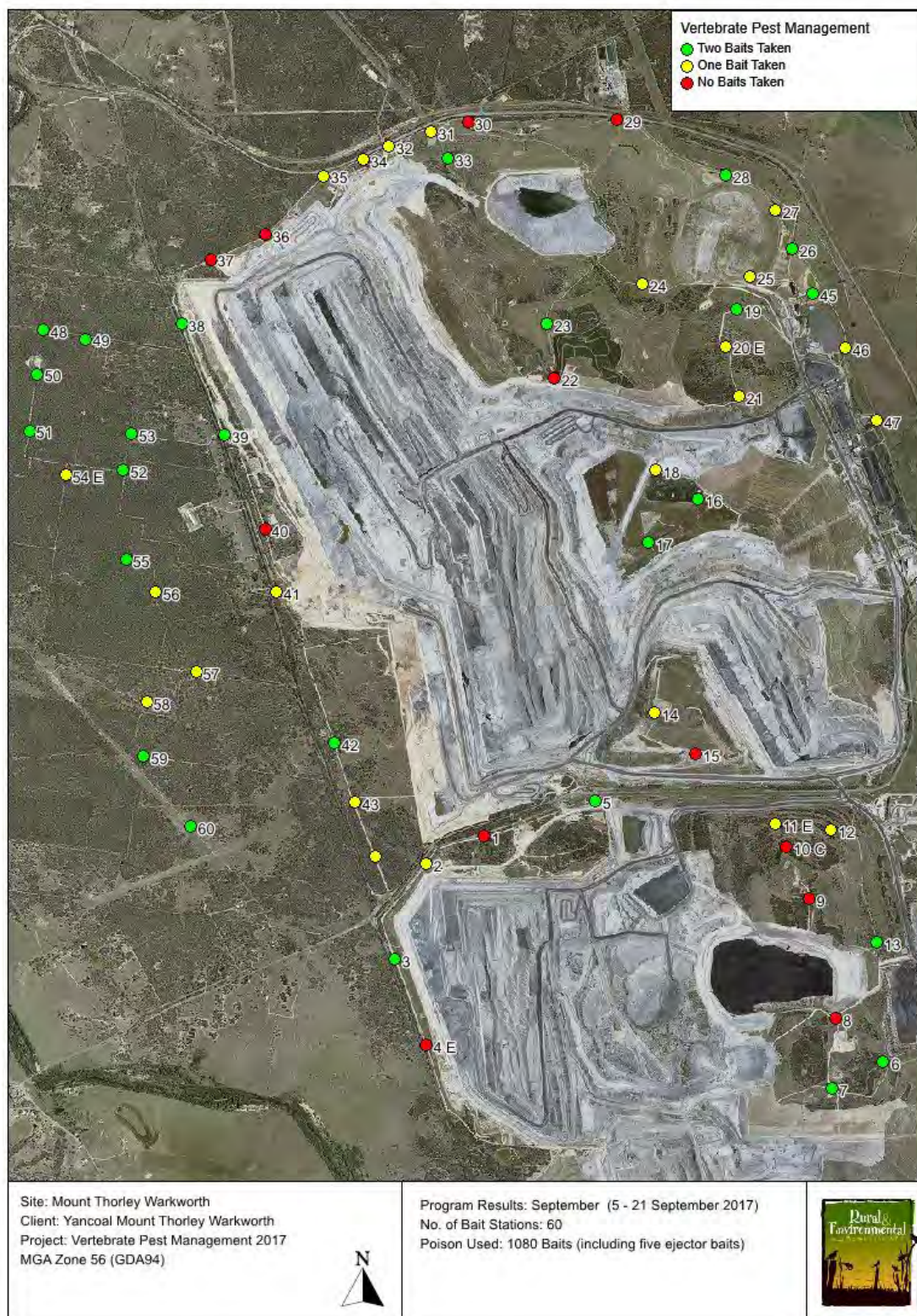


FIGURE 82: BAITING STATION LOCATIONS AND RESULTS AT MTW DURING THE SPRING 2017 VERTEBRATE PEST MANAGEMENT PROGRAMME

8.9 BIODIVERSITY OFFSETS

8.9.1 Management

The Warkworth Mine's impacts on biodiversity values are offset through the protection and management of Biodiversity Areas (BAs). The BA's that are related to MTW illustrated in Figure 83 and also listed in Table 46 below:

TABLE 44: MTW BIODIVERSITY AREAS

Biodiversity Area	Offset Area (ha)	Environmental Approvals				Offset Feature/s
		State Govt.		Federal Govt.		
		NSW 2013	NSW 2014	EPBC 2002/629	EPBC 2009/5081	
Southern	986	211	775		94	Warkworth Sands Woodland; Central Hunter Grey Box – Ironbark Woodland; Habitat for Swift Parrot, Regent Honeyeater, Southern Myotis and Large-eared Pied Bat.
Northern	341	39	302		341	Warkworth Sands Woodland; Central Hunter Grey Box – Ironbark Woodland; Habitat for Swift Parrot, Regent Honeyeater, Southern Myotis and Large-eared Pied Bat.
North Rothbury	41		41		41	North Rothbury Persoonia
Goulburn River (MTW Portion)	1,066		1,066	1,066		Central Hunter Valley Eucalypt Forest (CHVEF); Ironbark/Strinybark Communities; Box shrubby/grassy Woodlands; Habitat for Swift Parrot and Regent Honeyeater
Bowditch	602		602	520	82	CHVEF; Ironbark/Strinybark Communities; Habitat for Swift Parrot and Regent Honeyeater

Putty	383				383	CHVEF; Habitat for Swift Parrot and Regent Honeyeater
Seven oaks	519				519	CHVEF; Habitat for Swift Parrot and Regent Honeyeater
Condon View (MTW Portion)	345				345	CHVEF; Habitat for Swift Parrot and Regent Honeyeater

The MTW BA's are managed in accordance with the Local, Putty Road, and Regional Offset Management Plans (OMPs). These Offset Management Plans were superseded with new site specific plans in 2017.

The OMPs provides the management framework for the entire BAs and their Offset Areas, as in some cases the entire BA is not an Offset Area, to enhance the biodiversity values through the implementation of conservation management strategies. All of the OMPs are available on the Yancoal Portal.

Figure 1

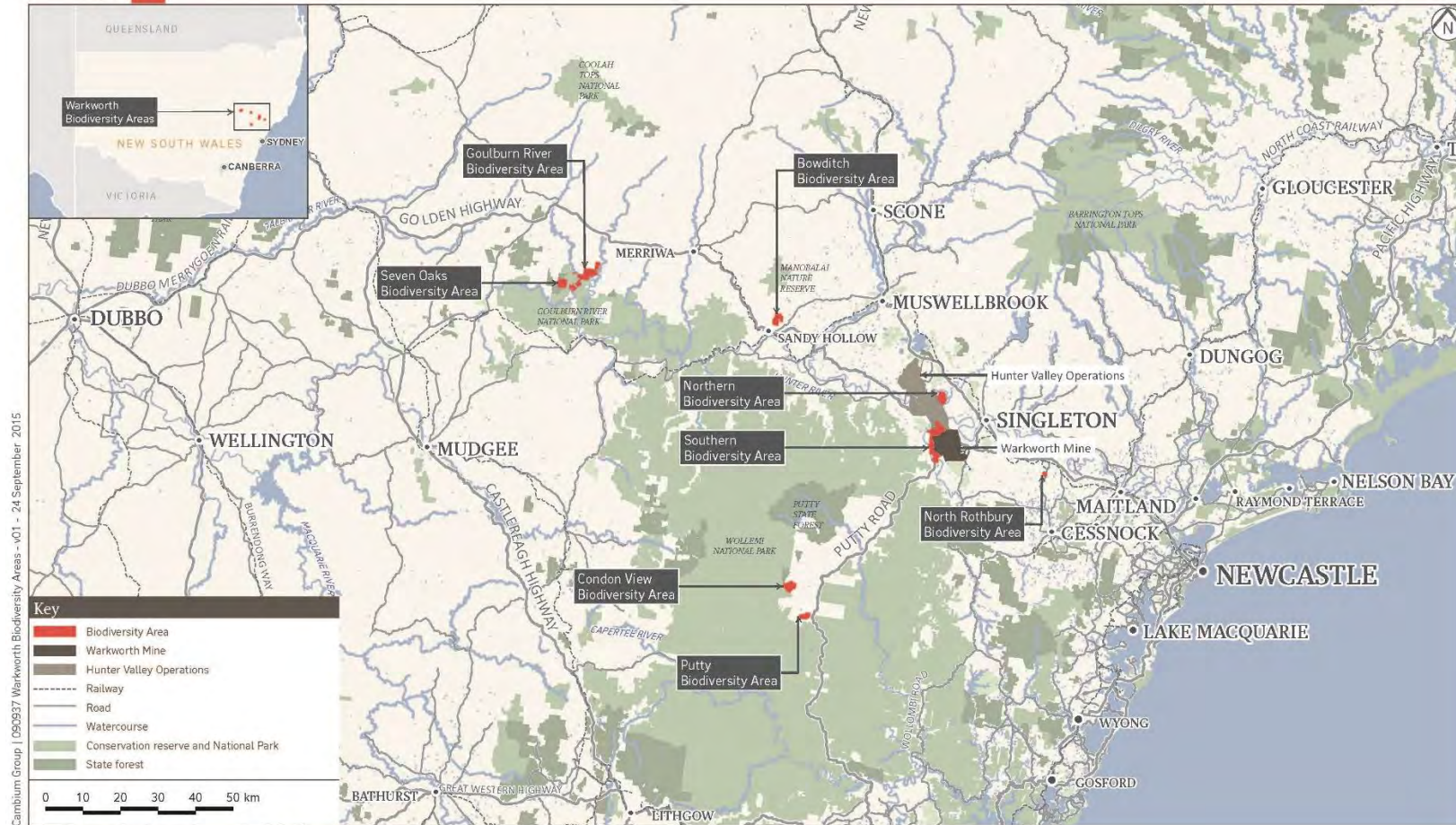


FIGURE 83: MTW BIODIVERSITY OFFSET LOCALITY MAP

8.9.2 Biodiversity Area Management Activities

The OMPs describe the Conservation Management Strategies. The following are the key actions completed throughout 2017 across all the BAs:

Weed Control

Weed control at the Local BAs targeted Turkey Rhubarb (*Acetosa sagittata*), Tree of Heaven (*Ailanthus altissima*), Balloon Vine (*Cardiospermum grandiflora*), Mother of Millions (*Bryophyllum delagonesse*), Green Cestrum (*Cestrum parqui*), Lantana (*Lantana camara*), and African Boxthorn (*Lycium ferocissimum*).

Weed control at the Regional BAs targeted African Boxthorn (*Lycium ferocissimum*), Prickly Pear (*Opuntia species*), Narrow leaf cotton bush (*Gomphocarpus fruticosus*), Blackberry (*Rubus fruticosus*), Scotch thistle (*Onopordum acanthium*), Stinging nettles (*Urtica dioica*), Blackberry (*Rubus fruticosus*), Blackberry (*Rubus fruticosus*), Green cestrum (*cestrum parqui*), **St John's wort** (*Hypericum perforatum*), Tree of heaven (*Ailanthus altissima*), Caltrop or cat heads (*Tribulus terrestris*), Mallow (*Malva parviflora*), African Olive (*Olea europaea subspecies cuspidate*), Lantana (*Lantana camara*), Sweet briar (*Rosa rubiginosa*), and Nagoora Burr (*Xanthium strumarium*).

Infrastructure Management and Improvement

Fence repairs and new sections of boundary fence were constructed at the Southern BA, Goulburn River BA and North Rothbury BA. Internal fences and waste were removed from the Southern BA areas to be planted in 2018. A farm dump site was cleaned up and asbestos and building waste from a derelict house and sheds were removed from the Goulburn River BA. New Biodiversity Area signs were installed and monthly property inspections were undertaken on all MTW BAs.

Incidents

Trespassing and illegal tree clearing and timber getting within the Southern Biodiversity Area resulted in felling approximately 40 full sized trees and 100 small trees. This unauthorised activity was reported to both Department of Environment and Energy and Department of Planning and Environment in October 2017.

Fire Management

The Regional Offset Bushfire Management Plan and the Warkworth Bushfire Management Plan were reviewed and updated. Slashing of fire breaks was undertaken on the Southern BA and Goulburn River BA.

Strategic Grazing

No strategic grazing was undertaken in the BAs in 2017.

Vertebrate Pest Management

Three 1080 ground baiting programmes were undertaken across the Biodiversity Areas targeting wild dogs and foxes. Baiting was checked over a three week period and replaced each week when taken. Baiting in the Local BAs was undertaken in conjunction with baiting on site and occurred seasonally. Additional baiting programmes included Condon View and Putty BA in autumn and all Regional BAs in spring. Table 46 summarises the results from the programmes carried out on the BA's during 2017.

TABLE 45: SUMMARY OF VERTEBRATE PEST MANAGEMENT 2017

Season	1080 Baiting			Trapping		Shooting					
	Total Lethal Baits Laid	Takes by Wild Dog	Takes by Fox	Wild Dog	Fox	Feral Pig	Feral Cat	Fox	Deer	Hares	Rabbit
Summer	108	44	2	-	-	-	1	2	-	6	7
Autumn - Winter	162	59	2	6	2	8	-	1	-	-	-
Spring	260	101	24	-	-	1	-	-	4	4	-
Total	530	204	28	6	2	9	1	3	4	10	7

ADDITIONAL PEST MANAGEMENT PROGRAMMES INCLUDED:

- Soft Jaw trapping across Wandewoi and Goulburn River BA: six wild dogs and two foxes trapped and euthanised.
- Sixty Five feral cattle were mustered and removed from the Goulburn River BA.
- Noisy Miner ground shoot at the Goulburn River BA to assist the survivability of the Regent Honeyeater: 350 Noisy Miners controlled under NPWS Section 120/121.
- Opportunistic shooting of other vertebrate pests.
- Rabbit poisoning, 5850g out of 8000g of 1080 poison carrot was consumed at the Southern and Northern BA

Vertebrate pest management programmes will continue to be carried out during 2018 to limit feral pest impacts on landholdings and surrounding neighbours.

Seed Collection

Seed collection was undertaken by contractors in the Northern and Southern BAs during 2017, focussing on the WSW and Ironbark vegetation community. Tube stock for future plantings is currently being propagated from the seed collected. Seed collection was also undertaken on the Goulburn River BA for Yellow Box – Grey Box – Red Gum grassy woodland and River Oak riparian woodland with planting scheduled for 2019.

Revegetation

MTW has committed to restoring the Endangered Ecological Communities of Warkworth Sands Woodland and Central Hunter Grey Box – Ironbark Woodland in the Southern and Northern Biodiversity Areas. Work commenced in 2014 to restore over 80 hectares of Warkworth Sands Woodland, this involved the planting of seedlings and the relocation of sand salvaged ahead of mining activities.

In 2017, planting works continued in the Northern Biodiversity Area, with over 10,800 seedlings planted. Topsoil from ahead of mining operations at MTW was salvaged and hauled to the Biodiversity Area prior to planting commencing. In total there were 44 patches established, ten received 50mm of topsoil over the patch, two received 50mm of topsoil over half the patch, 12 received 25mm of topsoil over the patch and ten received no topsoil.

The team dug holes for each seedling, either by hand or auger, into 50x50m patches. All plants were watered, fertilised and protected with a tree guard. Within these patches the seedlings were **planted at a close spacing to create “stepping stones” between existing remnant** vegetation. When these patches grow they will create shelter to support natural regeneration in surrounding areas and over time all of these areas will connect together and create a better habitat for native plants and animals.

Restoration activities also included planting Central Hunter Grey Box – Ironbark Woodland in a small area of the Northern BA and 89 ha of the Southern BA with over 13,000 seedlings planted into rip lines. The site preparation for these sites included ripping by dozer and weed control. The team planted the seedlings into rip lines. To mimic nature the tree species were planted at a spacing of 5 -10m and shrubs species planted in clumps as commonly found with understory species within this vegetation type. All plants were watered, fertilised and protected with a tree guard.

The next round of planting is planned for Autumn 2018. Overall there is more than 500 hectares of grassland area to be planted and managed over 15 years to restore these Endangered Ecological Communities.



FIGURE 84: TUBE STOCK PLANTED INTO ONE OF THE PLOTS IN THE NORTHERN BIODIVERSITY AREA



FIGURE 85: TUBE STOCK PLANTED INTO RIP LINES AT THE SOUTHERN BIODIVERSITY AREA

8.9.3 Audits and Reviews

An Independent Environmental Audit was conducted during 2017 to fulfil the requirements of the Mt Thorley and Warkworth Development Consents (SSD-6464 and SSD-6465). The **audit focused on the site's compliance with licences, approvals and management plans** (including those associated with biodiversity offsets). The audit team from Jacobs were approved by DP&E and OEHL prior to conducting the audit. A total of 1,512 conditions and commitments were assessed as part of this audit which identified 7 issues resulting in 14 non-compliances (3 of the non-compliances were administrative).

The next MTW Independent audit is due in 2020.

9. COMMUNITY

9.1 COMPLAINTS

A total of 382 complaints were recorded during the reporting period, down 17.5% compared to 2016. The 382 complaints were registered by 51 people, 53% were received from 6 individuals. Most complaints were received from Bulga residents, making up 88% of the complaints record, 22 Complainants remained anonymous and therefore no location could be assigned. A breakdown of complaints by type is shown in Noise remains of key concern for near neighbours. There has been a trending decrease (overall 39%) in noise complaints from 2015. The decrease experienced in 2017 is primarily attributed to full noise attenuation of the truck fleet. MTW continues to comprehensive noise monitoring programme and, noise Trigger Action Response Plan.

TABLE 46.

Noise remains of key concern for near neighbours. There has been a trending decrease (overall 39%) in noise complaints from 2015. The decrease experienced in 2017 is primarily attributed to full noise attenuation of the truck fleet. MTW continues to comprehensive noise monitoring programme and, noise Trigger Action Response Plan.

In summary:

- 42% reduction in noise complaints;
- Lighting and Dust related complaints have doubled in 2017 compared to 2016. 53% of lighting complaints from 2 individual complainants;
- **Complaints in the “Other” category decreased from 2016 by 47%, however were still significantly higher than the 2015 statistics.** Complaints in this category were primarily in regard to road closures for blasting.

The level of complaints received from Bulga residents remains elevated (despite improvements in noise management and a demonstrated high level of compliance in this area). Noise remains of key concern for near neighbours. There has been a trending decrease (overall 39%) in noise complaints from 2015. The decrease experienced in 2017 is primarily attributed to full noise attenuation of the truck fleet. MTW continues to comprehensive noise monitoring programme and, noise Trigger Action Response Plan.

TABLE 46: SUMMARY OF COMPLAINTS BY TYPE FOR 2015 TO 2017

Complaint type	2017	2016	2015
Noise	191	325	492
Blasting	68	65	54
Dust	80	38	62

Lighting	33	16	44
Water	0	0	0
Other	10	19	3
Total	382	463	655

9.2 REVIEW OF COMMUNITY ENGAGEMENT

9.2.1 Communication

Quarterly letters are sent to MTW's near neighbours to provide an overview of mining operations and other relevant activities, as well as inform residents about how impacts are being managed. In addition, Coal & Allied issues correspondence to specific near neighbours who may be affected by certain changes, to inform of upcoming consultation activities and as a feedback mechanism. In 2017, this included communication relating to:

- Social Impact Management Plan community consultation and feedback
- Third Crossing of Putty Road project
- MTW rehabilitation tour
- Company ownership changes

During September, MTW hosted a number of residents on a tour of Warkworth Rehabilitation and Warkworth Sands Woodlands restoration project areas. In July MTW held a community consultation session for members of the Bulga, Milbrodale and surrounding communities to consider the draft MTW Social Impact Management Plan.

A range of consultation and engagement activities were also completed, including:

- Engagement and consultation with near neighbours to provide project updates at key project milestones and activities, and in response to concerns/queries raised by individual near neighbours
- Local Council briefings
- Participation in the Upper Hunter Mining Dialogue – a programme co-ordinated by the NSW Minerals Council to engage the community across the Hunter Valley

Yancoal also maintained a community shopfront in Singleton and were involved in various community events through sponsorship and participation.

9.2.2 Community Consultation Committee

The MTW CCC met on a quarterly basis to provide updates on operations and environmental performance. The Committee is comprised of MTW representatives, community members and other key external stakeholders, including Council. The MTW CCC minutes are made available on the Yancoal website (www.insite.yancoal.com.au).

Following CCC meetings a letter is mailed to near neighbours to update them about what was **discussed at the meeting and to provide any additional information about MTW's operations**. In 2017 CCC members were:

- Dr Col Gellatly
- Cr Hollee Jenkins
- Mr Adrian Gallagher
- Mrs Christina Metlikovec
- **Mr Graeme O'Brien**
- Mr Ian Hedley
- Mr Stewart Mitchell
- MTW General Manager – Mr Jason McCallum (from 1st September)
- Manager Environment & Community – Mr Andrew Speechly

9.3 COMMUNITY DEVELOPMENT

In 2017, Coal & Allied continued its focus on ensuring the long term sustainability of the communities in which it operates, through the facilitation of community development programmes such as:

- Coal & Allied Community Development Fund (CDF)
- Mount Thorley Warkworth Site Donations Committee
- Community partnership with Westpac Rescue Helicopter Service

9.3.1 Community Development Fund

The year 2017 marked 19 years of operation of the CDF, which has invested over \$15 million to support over 120 community projects in the Hunter Valley since its establishment in 1999, across the areas of health, education, environment and economic development.

In 2014, Coal & Allied announced that a further \$3 million⁷ would be made available to the CDF over a three year period (2015 – 2017) for projects in the Singleton, Muswellbrook and Upper Hunter LGAs. Strategic priority areas were refined for the 2015-2017 funding cycle to enable a more targeted approach to addressing identified community need and to leverage other resources Coal and Allied may be able to offer to strengthen community partnerships.

Priority areas for the 2015-2017 funding cycle include (See figure 82 for allocations):

- Economic Development: encouraging the diversity and competitiveness of the Upper Hunter economy
- Community Health: Supporting projects which target health, safety and social wellbeing of the community
- Education: Promoting the value of education and building skills within our community

⁷ With the sale of Bengalla Mine and the Mount Pleasant project the total available funding was revised to reflect the reduced footprint. The revised allocation was \$2,166,000

- Environment and Land Management: Supporting projects that can make a difference on a greater scale. i.e. beyond C&A mining operations

In 2017, the CDF contributed more than \$800,000 to 14 programmes (**Table 47**) aimed at delivering long term benefits for communities in the CDF catchment, which include the Singleton, Muswellbrook and Upper Hunter LGAs. Across the 2015 – 2017 funding cycle the CDF contributed more than \$2.1 million to community development programmes.

TABLE 47: COAL & ALLIED COMMUNITY DEVELOPMENT FUND PROJECTS SUPPORTED IN 2017

Partner	Programme	Value
Sirolli Institute	Enterprise Facilitation	\$45,000
Upper Hunter Where There's A Will Foundation	Positive Education Programme	\$80,000
University of Newcastle	Science and Engineering Challenge, and SMART Programme (2015-2019)	\$138,493
Upper Hunter Education Fund	HSC Study Camps and Upper Hunter Education Fund Scholarships (2015-2017)	\$84,000
Singleton Business Chamber	Business Development Officer	\$72,000
University of Newcastle	University of Newcastle Scholarships	\$80,000
Outward Bound Australia	Youth Leadership Programme (2015-2017)	\$245,332
Singleton Council	Singleton Economic Development and Funding Coordinator (2015-2017)	\$100,000
Ungooroo Aboriginal Corporation	Health Services Programme (2017-2018)	\$110,000
Bulga Rural Fire Service	Electronic Datasign	\$24,500
Australian Christian College Singleton	STEM Lego Robotics Programme	\$10,420
Jerrys Plains Public School	Ready 4 School Programme (2017-2018)	\$58,000

Total College	Total Steers Challenge (2015-2017)	\$25,725
Milbrodale Public School	Early Learning Programme (2017-2018)	\$64,000

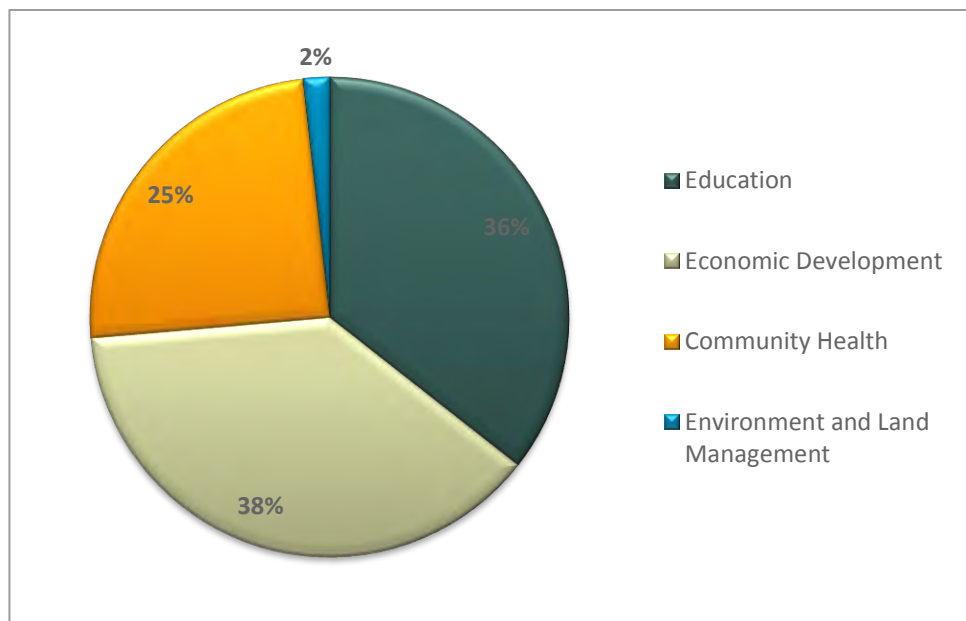


FIGURE 86: DISTRIBUTION OF COMMUNITY DEVELOPMENT FUND BY CATEGORY (2015 – 2017)

9.3.2 Site Donations

Coal & Allied considers applications for local donations and sponsorships that have a clear community benefit. In 2017, MTW provided \$54,000 to 30 local projects and initiatives, including:

- Rotary Club of Singleton on Hunter - Singleton Art Prize
- Australian Families of the Military – Mental Health Retreat
- Wildlife Aid Inc.
- Singleton Business Chamber – **International Women’s Day event**
- NSW Cancer Council – Singleton Relay for Life
- Singleton Junior Rugby League – Sporting equipment
- Singleton Junior Rugby League – 2017 season sponsorship
- Northern Agricultural Association Inc – 2017 Singleton Show
- Glendonbrook Hall Inc – **Safety fencing for children’s play area**
- Singleton Pony Club – Repairs/upgrades to clubrooms
- Singleton Theatrical Society – 2017 production of ‘**Oliver Twist**’
- Broke Fordwich Wine and Tourism Association – Little Bit of Italy festival
- Singleton Historical Society and Museum – Copier and printing consumables
- Singleton Hospital Community Trust – Holes 4 Hospital Charity Golf Day 2017

- Singleton Council – Christmas on John Street Fireworks
- Greta Branxton Wildcats Football Club – Jerseys for junior football teams
- Milbrodale Public School P&C Association – Family Fun Day 2017
- Singleton Golf Club Lady Members – Annual Open Day 2017
- NSW Cancer Council – Transport for Treatment program
- Salvation Army Singleton – **Children’s Christmas Party**
- Singleton Fire Brigade Social Club – **Santa’s Lolly Run**
- Singleton Australian Football Club – Strapping Ta

10. INDEPENDENT AUDIT

An Independent Environmental Audit (IEA) of MTW was conducted in 2017 to satisfy Schedule 5, Condition 9 of both the Warkworth (SSD-6464) and Mount Thorley (SSD-6465) Operations, which require an IEA to be undertaken *“within 1 year of the commencement of development under this consent, and every 3 years thereafter”*, and submitted *“within 6 weeks of the completion of this audit.”* In January 2016 MTW conducted an Independent Environmental Audit to satisfy the **relevant conditions of MTW’s previous Planning Approvals. In addition to the Planning Approvals and Statement of Commitments**, the audit included an assessment of performance against the **conditions of MTW’s Mining Leases, Water Licences and EPL’s, and a review of the adequacy of the Groundwater model**. Due to this, the focus of the IEA for 2017 was on the new planning approvals. The Independent Environmental Audit reviewed all relevant approvals and environmental management documents with a total of 1,512 conditions and commitments being assessed as part of this audit; 7 issues resulted in 11 non-compliances, 3 of the non-compliances were administrative. No High-risk findings were identified in the audit.

The 7 issues identified in the IEA are generally in the fields of

- Water discharges
- Compliance to water license conditions
- Mining Method- Overburden Management
- Cultural Heritage management inductions
- Blast management controls
- Noise management- mitigation measures

A more detailed summary can be found in Appendix 4 of this report.

The initial audit report was submitted to DP&E in July 2017. Following review the DP&E requested additional information be provided. The amended audit report was submitted in March 2018 and is currently pending approval.

Once approved, **reports for the environmental audit and MTW’s response to recommendations** will be available on the company website (<https://insite.yancoal.com.au>).

11. INCIDENTS AND NON-COMPLIANCE

11.1 WATER

4 December 2017

Following a rainfall event over the weekend of 2nd and 3rd December 2017, stormwater had pooled across a light vehicle gravel road (known as the Geo Road) which is aligned parallel to Wallaby Scrub Road approximately 300-400 metres east of the road corridor.

A Dozer operator undertook maintenance the road and opened a hole in the windrow to relieve water from the working surface, intending for the water to report to a sediment dam via a contour drain.

On inspection, it was observed that the contour drain intending to capture the released water had been overtopped as a result of the concentrated flow entering the contour at a singular point. The water then preceded downslope towards the mine boundary.

The water passed through a culvert under Wallaby Scrub Road and was contained in a farm dam and gully on mine-owned land within the boundary of EPL 1376 and Development Consent SSD-6464.

All of the water (approximately 23 kL) was recovered from the farm dam. MTW reported the incident to the NSW EPA, DP&E and DRG. The EPA inspected the site and are undertaking an investigation into the incident.

25 August 2017 (2016 Incident)

Warkworth Mining Ltd was convicted and fined \$50,000 by the Land and Environment Court of New South Wales of an offence against s 64 of the Protection of the Environment Operations Act 1997. Warkworth was prosecuted by the NSW EPA for breaching a condition of its EPL which required Warkworth to carry out its licensed activities in a competent manner. The conviction related to an incident which occurred at the Warkworth Mine on January 6 2016 when a stormwater retention dam was breached after the dam's embankment wall partially failed. Up to 4 ML of sediment laden water escaped from the dam to land owned by MTW and to a lesser extent the nearby Wallaby Scrub Road reserve.

12. **ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD**

12.1 **NOISE**

Noise management improvements identified for implementation in 2017 include:

- Maintain and continue sound power level testing of attenuated fleet;
- Continuation of daily public reporting, including information on noise management for the previous night shift (reporting undertaken on business days only); and
- Progressively upgrade BarnOwl noise monitors with latest hardware/software packages; and
- Review MTW Noise Management Plan

12.2 **BLASTING**

Blasting management improvements identified for implementation in 2017 include:

- Review and if necessary the revision of the MTW Blast Management Plan; and
- Hardware upgrades to ground units to allow for longer storage of blast data.
- Providing SMS notifications to advice of planned road closure times and changes to road closures (February 2018).

12.3 **Air Quality**

Air Quality management improvements identified for implementation in 2018 includes:

- Review the MTW Air Quality Management Plan; and
- Upgrade Dusttrak PM10 monitors with heated inlets for improved monitoring results.

12.4 **CULTURAL HERITAGE**

Aboriginal Cultural Heritage

Ongoing Aboriginal archaeological and cultural heritage management activities will occur in 2018 at MTW in accordance with current AHMPs, to inform ongoing land management and development planning. This will include the removal of the Site M grinding grooves & the salvage of those Aboriginal artefact sites located within the ACHMP Area in areas required for 2018 mined development. Condition monitoring of those sites peripheral to authorised disturbance areas will be conducted at regular intervals to ensure operational compliance with the ACHMPs.

The Hunter Valley Sands Bodies research study will also commence, as will proactive management within the Wollombi Brook Aboriginal Cultural Heritage Conservation Area in accordance with the Plan of Management for that area. This will commence with the establishment of the Plan of Management Implementation Group.

Historic Heritage

Conservation Management Plans (CMPs) have been prepared for a number of historic sites at MTW. Protective maintenance and stabilisation of these sites, in line with the recommendations within the CMPs & the Project Approvals, will continue to be conducted throughout 2018. An MTW complex-wide Historic HMP has been developed in accordance with the conditions of the Warkworth & Mount Thorley Project Approvals, which will guide the management of historic heritage. Archaeological investigations into the Great North Road alignment will commence when Wallaby Scrub Road is closed to public access.

12.5 WATER

Improvements to water management in 2018 will focus on the following main activities:

- Construction of dams and drains for containment of sediment laden runoff ahead of mining.
- Separation and diversion of clean water runoff from mature rehabilitation areas at Warkworth.
- Introduction of secondary flocculation process to tailings deposition to improve water recovery

12.6 REHABILITATION

Performance Criteria and Rehabilitation Monitoring

The rehabilitation monitoring programme will continue in 2018 for both grazing and native vegetation rehabilitation areas.

Rehabilitation and Rehabilitation Maintenance

During 2018, maintenance activities are planned to result in approximately 99ha of rehabilitation, currently in the initial stage of cover cropping, being seeded with the full native seed mixes. Weed spraying (boom and spot spraying) and weed wiping will be conducted in establishing rehabilitation areas as required to control both noxious and environmental weeds that are likely to impact on successful rehabilitation being achieved.

It is planned that 100ha of new rehabilitation will be undertaken at MTW during 2018.

Habitat Augmentation

Habitat augmentation measures, such as the construction of habitat ponds and the placement of salvaged logs in rehabilitation areas, will be undertaken during 2018.

Tailings Storage Facility Capping

Capping of Tailings Dam 2 will be progressed during 2018 in accordance with the revised capping methodology developed by Australian Tailings Consultants. The capping method being utilised on TD2 was reviewed and updated following settlement cracking of the capping layer in an area of TD2 in 2017.

Capping of the Interim TSF will continue during 2018 using breaker rock from the South CHPP as the initial capping layer.

12.7 BIODIVERSITY MANAGEMENT

In 2018, planting works to restore Warkworth Sands Woodland will continue in the Southern BA, with 14ha to be planted. Restoration activities will also include planting 118ha of Central Hunter Grey Box – Ironbark Woodland and 11ha of River Oak Forest in the Southern BA. Conservation management actions will be undertaken across the BAs in 2018 in accordance with the Offset Management Plans, these will include weed management across all the BAs in autumn and spring. Vertebrate pest management including 1080 ground baiting programmes scheduled for autumn and spring to target wild dogs and foxes across all BAs and a noisy miner control in the regent honeyeater breeding area at the Goulburn River BA. Waste removal and bushfire management are scheduled for later in the year at the Seven Oaks, Goulburn River and Condon View BA. Monitoring scheduled for all BAs in 2018 include Habitat Restoration, Bird Assemblage, Rapid Condition Assessment and property inspections. Infrastructure improvement including fence repairs and track maintenance will be undertaken as required.

12.8 COMMUNITY ENGAGEMENT

In 2018 Mount Thorley Warkworth will continue the implementation of the MTW Social Impact Management Plan.

One of the initiatives identified in the Social Impact Assessment for the Warkworth Continuation project was contribution towards a Near Neighbour Amenity Resource, with particular reference made to assisting with the cost of routine maintenance of water quality in rainwater tanks. Following community consultation regarding this initiative MTW provided a tank cleaning service to all near neighbours throughout 2017.

For the 2018 reporting period the MTW Near Neighbour Amenity Resource will continue with all MTW near Neighbours being offered under-sink water filtration systems with **12 months' supply of filter cartridges. The decision to supply filtration systems was made in response to community consultation conducted throughout 2017.**

Amenity Resource project types/offers will be reviewed annually; therefore 2018 will also involve consultation on types of projects to be considered in 2018 and beyond.

12.9 COMMUNITY DEVELOPMENT

Priority areas for community development in 2017 included education, economic development, community health, environment and land management. MTW will continue to operate a site donations program in 2018 and the local community will also have access to a Yancoal corporate sponsorship program (to be launched mid-2018).

Appendix 1: Annual Rehabilitation Report Summary Table

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Appendix 2: Rehabilitation and Disturbance Summary

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Appendix 3: Rehabilitation Monitoring Report

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Appendix 4: 2017 Independent Audit Review – response to recommendations

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Appendix 5: Annual Ground Water Impacts Review

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