Centennial Coal

CENTENNIAL COAL
NEWSTAN COLLIERY
ANNUAL REVIEW

May 2019 Revision 1

Centennial Coal
Environment Matters

Name of Operation	Newstan Colliery
Name of Operator	Centennial Newstan Pty Ltd
Development Consent/ Project Approval #	DA 73_11_98 and SSD-5145
Mining Lease #	Consolidated Coal Leases 727, 746, 763 and 764. Mining Leases 1380, 1452, 1480, 1586, and 1587. Mining Purposes Leases 304, 305, 327, 328. Private Lands Lease 497.
Name of Holder of Mining Lease	Centennial Newstan Pty Ltd
Water License #	WAL18735
Name of Holder of Water License	Centennial Newstan Pty Ltd
MOP/RMP Start Date	March 2018
MOP/RMP End Date	July 2020
Annual Review Start Date	January 2018
Annual Review End Date	December 2018

I, , certify that this audit report is a true and accurate record of the compliance status of Newstan Colliery for the period January 2018 to December 2018 and that I am authorized to make this statement on behalf of Centennial Newstan Pty Ltd.

Note:

a) *The Annual Review is an 'environmental audit' for the purposes of s122B(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.*

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).*

Name of Authorised Reporting Officer	Andrew Myors
Title of Authorised Reporting Officer	Executive General Manager
Signature of Authorised Reporting Officer	
Date	

DOCUMENT CONTROL

DOCUMENT DETAILS

Name:	Newstan Colliery
	Annual Review Revision 1
Author:	Nerida Manley
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APPROVAL DETAILS

Revision No.	Date Sent	Details of Approval	Approved By	Approval Date
0	29/03/2019	Final for Consultation	Grant Watson	
1	30/05/2019	Revision 1 for DPE review	Andrew Myors	

CIRCULATION DETAILS

Name	Department	Circulation Date
Annual Review 2018	DRG	29/03/2019
Annual Review 2018	DP&E	29/03/2019
Annual Review 2018 Rev 1	DP&E	30/05/2019

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1 STATEMENT OF COMPLIANCE

Table 1: Statement of Compliance

Were all condition`s of the relevant approval(s) complied with?	
DA 73-11-98	No
SSD-5145	Yes
EPL 395	Yes
Mining Lease 1380	Yes
Mining Lease 1452	Yes
Mining Lease 1480	Yes
Mining Lease 1586	Yes
Mining Lease 1587	Yes

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition summary	Compliance Status	Comment	Section addressed in Annual Review
DA73-11-98	Schedule 3 Condition 2	The applicant must ensure that the operational noise generated by the development (including maintenance activities) does not exceed the criteria in Table 3 at any residence on privately owned land.	Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q2 monitoring at all monitoring locations, with the exception of NC1, NC3 and NC6 during the evening period and NC1, NC3, NC4 and NC6 during the night period.	Addressed in Section 6.1	Section 6.1

Note: Compliance Status Key for Table 2

Risk Level	Colour Code	Description
High		Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium		Non-compliance with: • Potential for serious environmental consequences, but is unlikely to occur; or • Potential for moderate environmental consequences, but is likely to occur
Low		Non-compliance with: • Potential for moderate environmental consequences, but is unlikely to occur; or • Potential for low environmental consequences, but is likely to occur
Administrative		Only to be applied where the non-compliance does not result in any risk of environmental harm (eg submitting a report to government later than required under approval conditions)

2 INTRODUCTION

The Northern Coal Logistics Project (NCL), owned and operated by Centennial Northern Coal Services Pty Limited (Northern Coal Services) and Centennial Newstan Pty Limited (Centennial Newstan) is located on the western side of Lake Macquarie approximately 140 kilometers north of Sydney in New South Wales. NCL comprises of the existing approved surface coal handling and processing facilities at the Newstan Colliery Surface Site and Mandalong Mine – Cooranbong Entry Site, along with existing private haul road and rail loading infrastructure (**Figure 1**).

For the purposes of this report Newstan will only be incorporated within this Annual Review. Cooranbong Site Services and Cooranbong Haul Road have been incorporated in the Mandalong Colliery Annual Review.

Figure 1: Regional Context

2.1 OVERVIEW

Newstan Colliery comprises the underground workings and surface infrastructure of:

- The Newstan Colliery underground workings;
- The Newstan Colliery surface infrastructure; and
- The Northern Coal Services Coal Handling and Preparation Plant (CHPP) and associated infrastructure and rail loop.

Underground coal mining operations commenced in the area now known as Newstan Colliery in 1887 and continued under existing use rights until 1999. On 14 May 1999 the then Minister for Urban Affairs and Planning granted Development Consent DA 73-11-98 under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the Newstan Colliery Life Extension Project following the submission of the Newstan Colliery Life Extension Project EIS. This development consent enabled existing mining and mining related activities to continue, along with the expansion of mining into the "Life Extension Area" and upgrade of surface facilities at the Newstan Colliery Surface Site and Awaba Colliery Surface Site. Development Consent DA 73-11-98 has been modified on the following occasions, with the last modification approved in December 2015.

- 23 September 2007 to allow the mining of LW24 and the construction of a ventilation shaft at Awaba (**Mod 1**),
- 1 December 2009 to allow for the Washing of Mandalong Coal (**Mod 2**),
- 26 November 2010 to allow for the Washing of Awaba Coal **(Mod 3**),
- 16 March 2012 to allow for the recommencement of first workings, bord and pillar mining in an area referred to as Main West (**Mod 4**),
- 19 November 2012 to allow for washing up to 4 Mtpa of Mandalong coal, and to transport excavated material produced from the shafts at Awaba to Newstan Colliery (**Mod 5**),
- 7 January 2014 to adjust the approved Consolidated Consent Boundary in the Main West Mining Area to include the four excluded areas. The areas are proposed to be consolidated for administrative reasons to ensure all workings around the Main West Mining Area are regulated under Development Consent DA 73-11-98 (**Mod 6**), and
- 1 December 2015 to adjust the approval to prevent overlap of conditions with Development Consent SSD-5145. (**Mod 7**).

2.2 SCOPE

This Annual Review details the progress of environmental management covering Newstan Colliery for the period 1 January 2018 to 31 December 2018. The Annual Review has been prepared in accordance with the Newstan Colliery conditions of consent as detailed in SSD-5145 and DA 73-11-98.

The other operations covered by SSD-5145 are described in the Mandalong Annual Review required by SSD-5145.

2.3 SUMMARY OF WORKS

2.3.1 Newstan Colliery

The Newstan Colliery surface facilities area includes: offices, a workshop and bathhouse as well as equipment and materials storage areas. The Newstan Colliery has approval to produce up to 4.5 Mtpa of coal from the Newstan Colliery.

Newstan Colliery underground operations were put on care and maintenance in August 2014. There was no production in 2018 and none planned for 2019.

The underground operations were maintained during the January to December 2018 reporting period. No other construction activities were undertaken during the reporting period.

2.3.2 Northern Coal Services Coal Handling and Preparation Plant (CHPP)

The Newstan Colliery surface facilities area includes: offices, a workshop and bathhouse as well as coal handling infrastructure consisting of a coal preparation plant, truck loading bins and a rail loading facility.

The NCS has approval to produce handle and process up to 4.5 Mtpa of coal from the Newstan Colliery, up to 0.88 Mtpa of coal from the Awaba Colliery and up to 6 Mtpa from the Mandalong Mine. The CHPP also has approval to receive waste rock material from Mandalong Mine, Mandalong Southern Extension Project and Newstan Extension of Mining Project.

2.3.3 Mineral Processing

The coal handling and preparation plant (CHPP) processes Newstan ROM coal for domestic and export markets as well as coal from various other Centennial operations for the export market. Newstan has approval to process up to 8 million tonnes per annum of ROM coal through the Newstan CHPP. Newstan CHPP operations for the reporting period are summarised in Table 5.

Table 3: Centennial Newstan Environmental Contact Details

Name	Position	Email	Phone
Grant Watson	Mine Manager	Grant.Watson@centennialcoal.com.au	02 49560205
Nerida Manley	Environment & Community Coordinator	Nerida.Manley@centennialcoal.com.au	02 49560206

3 APPROVALS

Table 4: Environmental approvals held by Centennial Newstan.

Name	Description	Issued By	Expiry Date	Renewal Procedure
CCL727	Pit top, SREA, NREA & surrounds	Dept. Primary Industry (Mineral Resources)	11/08/2027	Manager Title and Property-North
MPL304	Part NREA	Dept. Primary Industry (Mineral Resources)	25/03/2035	Manager Title and Property-North

Name	Description	Issued By	Expiry Date	Renewal Procedure
MPL305	Water Tanks	Dept. Primary Industry (Mineral Resources)	25/03/2035	Manager Title and Property-North
ML1380	Mining Lease	Dept. Primary Industry (Mineral Resources)	18/09/2037	Manager Title and Property-North
ML1452	Mining Lease	Dept. Primary Industry (Mineral Resources)	06/07/2020	Manager Title and Property-North
ML1480	Part NREA	Dept. Primary Industry (Mineral Resources)	20/07/2023	Manager Title and Property-North
CCL764	Area between the rail loops and the haul roads	Dept. Primary Industry (Mineral Resources)	18/05/2021	Manager Title and Property-North
CCL763	Parcel land south of the pit top, including Stony Creek Pipeline,	Dept. Primary Industry (Mineral Resources)	09/06/2022	Manager Title and Property-North
PLL497	NA	Dept. Primary Industry (Mineral Resources)	24/08/2038	Manager Title and Property-North
CCL746	Area above underground workings, within Crown Land.	Dept. Primary Industry (Mineral Resources)	31/12/2028	Manager Title and Property-North
MPL327 *	Awaba Nitrogen Plant	Dept. Primary Industry (Mineral Resources)	05/08/2036	Manager Title and Property-North

Name	Description	Issued By	Expiry Date	Renewal Procedure
MPL328	Part Awaba Stockpile	Dept. Primary Industry (Mineral Resources)	05/08/2036	Manager Title and Property-North
ML1586	Mining Lease	Dept. Primary Industry (Mineral Resources)	13/10/2022	Manager Title and Property-North
ML1587	Surface area incl SREA.	Dept. Primary Industry (Mineral Resources)	23/10/2027	Manager Title and Property-North
Mine Operations Plan (MOP)	Summary of Mining and Processing Activities – Newstan and Awaba	NSW Trade & Investment – Division of Resources & Energy	2020	MOP approved for the period March 2018 – July 2020
Newstan Colliery Development Consent DA 73-11-98	Permits development and works to occur as described in the EIS	NSW Department of Planning & Environment	July 2020	Permits development and works to occur as described in the EIS
Centennial Northern Coal Services Development Consent SSD-5145	Receipt, handling, processing and transport of run-of-mine coal from Centennial Coal's underground operations at Mandalong Mine, Newstan Colliery and Awaba Colliery.	NSW Department of Planning & Environment	31/12/2045	Requires new development consent after expiry date.
Environmental Protection Licence 395	Permits scheduled activity "coal mining" and discharge of water from licensed discharge points.	Environment Protection Authority	Perpetual	Requires payment and Annual Return February each year

** A renewal application has been lodged with the Department of Industry - Division of Resources & Energy and as such the mining lease remains in full force at the time of drafting this report.*

3.1 DEVELOPMENT CONSENTS

Development Consent DA 73-11-98 for Newstan Colliery

In 1998, Powercoal Pty Limited, the (then) owners of Newstan, submitted an Environmental Impact Statement (Umwelt, 1998) to the New South Wales Department of Planning (DoP), seeking approval for the expansion of Newstan, in an area referred to as the Life Extension Area (LEA). On 14 May 1999, the then Minister for Urban Affairs and Planning, granted development consent under Part 4 of the EP&A Act for the Newstan Colliery Life Extension Area pursuant to Development Application DA 73-11-98. This development consent has since been modified on the following occasions:

- 23 September 2007 to allow the mining of LW24 and the construction of a ventilation shaft at Awaba (Mod 1),
- 1 December 2009 to allow for the Washing of Mandalong Coal (Mod 2),
- 26 November 2010 to allow for the Washing of Awaba Coal (Mod 3),
- 16 March 2012 to allow for the recommencement of first workings, bord and pillar mining in an area referred to as Main West (Mod 4),
- 19 November 2012 to allow for washing up to 4 Mtpa of Mandalong coal, and to transport excavated material produced from the shafts at Awaba to Newstan Colliery (Mod 5),
- 7 January 2014 to adjust the approved Consolidated Consent Boundary in the Main West Mining Area to include the four excluded areas. The areas are proposed to be consolidated for administrative reasons to ensure all workings around the Main West Mining Area are regulated under Development Consent DA 73-11-98 (Mod 6), and
- 1 December 2015 to adjust the approval to prevent overlap of conditions with Development Consent SSD-5145. (Mod 7).

This development consent applies to the Pit Top Area, Coal Handling and Preparation Plant (CHPP), stockpile areas, the rail loop, haulage roads, Northern Reject Emplacement Area (NREA) including the tailings dam and water management dams, Southern Reject Emplacement Area (SREA) and underground operations, including the ventilation site at Awaba.

An application was made under Section 100 of the *Coal Mine Health and Safety Act 2002* on 27 November 2006 to construct stages two through to five of the Southern Reject Emplacement Area (SREA) tailings storage facility. Approval was granted by the chief inspector of coal mines on 10 January 2007.

Development Consent SSD-5145 for Northern Coal Services Project

Development Consent SSD-5145 for the Northern Coal Services Project was approved by the Department of Planning & Environment (DPE) on 29 September 2015. The approval consolidates the receipt, handling, processing and transport of run-of-mine coal from Centennial Coal's underground operations at Mandalong Mine, Newstan Colliery and Awaba Colliery.

The surface infrastructure and operations at the Cooranbong Entry Site are part of the Northern Coal Services Project SSD-5145, however continue to be managed by Centennial Mandalong.

3.2 MINING AUTHORITIES

Newstan Colliery holding comprises a number of leases as shown in **Table 4.**

3.3 ENVIRONMENT PROTECTION LICENCE

Centennial Newstan holds Environment Protection Licence (EPL) 395 under the Protection of the Environment Operations Act 1997.

3.4 AUTHORISATIONS & EXPLORATION LICENCES

The Newstan Colliery holding comprises a number of leases as shown in **Table 4**.

The Newstan Awaba MOP Complex was approved by DRE in March 2018 and is approved until July 2020.

3.5 CONSENT CONDITIONS – ANNUAL REVIEW REQUIREMENTS

Schedule 5 Condition 11 of SSD-5145 and Schedule 2 Condition 9.1 of DA 73-11-98 (MOD 7) include the requirement for an Annual Review.

The 2018 Annual Review was provided to DPE, DRE, LMCC, NOW, EPA, NPWS and the Newstan Colliery CCC consistent with DA 73-11-98 condition 9.1.

4 OPERATIONS SUMMARY

Table 5: Production Summary

Material	Approved Limit (and source)	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
ROM Coal	4.5 Mtpa	1.732	1.354	2.40
Saleable product	4.5 Mtpa	1.617	1.328	2.33
Transport (rail)	8 Mtpa	1.675	1.286	2.33
Hours of operation	24/7	24/7	24/7	24/7

Production figures in Table 5 consist only of coal from Mandalong which may also be included in the Mandalong Annual Review. No coal was extracted from Newstan during the reporting period and therefore no product coal was trucked to Eraring during the reporting period. No coal was extracted from Newstan Colliery during the reporting period.

4.1 EXPLORATION

During 2018 there were three exploration boreholes completed and one borehole partially completed for Newstan Mine. Additional exploration related activities completed included assessment of the results, database updating, and revision of geological model, mine planning and review of additional exploration requirements. The key findings to date are the re-positioning of a known split line indicating the point wherein the consolidated West Borehole profile separates into the Yard and Borehole seams. At the time of submission coal quality results had not yet been received.

A modification to the Newstan Stage 1 Exploration Area for an additional eighteen exploration drill sites was granted by Industry and Investment NSW (I&I) on 9 April 2009. Approval for the Newstan Lochiel Stage 2 exploration area was granted by I&I on 13 July 2009, approving fourteen exploration drill sites. A modification to both the Stage 1 and Stage 2 Newstan Lochiel exploration areas was granted by I&I on 4 November 2009, approving the development of four large diameter drill holes across the two exploration areas.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The DPE in a letter dated 14 December 2018 considered the 2017 Annual Review to be generally in accordance with the conditions of approval. The DPE identified a number of items to be addressed in the 2018 Annual Review as detailed in **Table 6**.

The DPE Resource Regulator in a letter dated 3 September 2018 considered the 2017 Annual Review to be to the satisfaction of the Minister and Secretary. The DRE identified a number of items to be documented in the Annual Review as detailed in **Table 6**.

Table 6: Actions from Previous Annual Review

Action Required	Requested By	Action Taken	Where addressed in Annual Review
Continuation of weed management	DRR	Ongoing	
Review completion criteria of native vegetation ground cover for NREA and implement remediation plan	DRR		2018 Annual Review
Include a description of the management measures for biodiversity that were undertaken on site during the reporting period	Department of Planning & Environment DPE		6.4
Include plans proposed post mine land-uses for all the domains associated	Department of Planning & Environment DPE		Plan NS3370

Action Required	Requested By	Action Taken	Where addressed in Annual Review
with the project			
Describe the key environment improvement activities that will be undertaken in the next reporting period and include timelines for implementation	Department of Planning & Environment DPE		Section 12

6 ENVIRONMENTAL PERFORMANCE

Schedule 2 Condition 9 of DA 73-11-98 and Schedule 5 Condition 11 of SSD-5145 require the presentation and discussion on all monitoring required under the Development Consents and other approvals. **Table 7** includes a summary of the monitoring required by the Development Consents, current status and report section in the Annual Review.

Table 7: Summary of Monitoring Requirements

Monitoring Type	Status	Report Section
Noise Monitoring	Quarterly	**Section 6.1**
Air Quality Monitoring	Ongoing	**Section 6.2**
Meteorological Monitoring	Ongoing	**Section 6.7**
Surface Water Monitoring Groundwater Monitoring	Ongoing Ongoing	**Section 7.1** **Section 7.2**
Rehabilitation Monitoring	Annual survey	**Section 8**

6.1 NOISE

The Northern Region Noise Management Plan has been developed to ensure that operational and construction noise impacts on the local community are minimised and appropriate management measures are identified and response protocols detailed should noise criteria be exceeded and to comply with statutory approval conditions. The plan was submitted to the DPE for approval in July 2016.

Quarterly attended noise monitoring was conducted to assess operational noise levels compared to the noise limits specified by Schedule 3 Condition 2 of.SSD-5145.

Operator attended noise surveys were conducted during March, June, August and December 2018 at each of the seven (7) locations during day, evening and night periods to determine the character and relative contribution of ambient noise sources and mine contributions.

The Newstan EIS predictions for noise found that the noise emission levels at NC1 and NC2 were below or marginally (1 dBA) above the then daytime (39 dBA) and night-time (38 dBA) assessment criteria during calm and adverse weather conditions.

Noise emissions levels at NC4 and NC5 are below or only marginally (2dBA) above the then daytime (37 dBA) and night time (35 dBA) assessment criteria during calm conditions. During adverse weather conditions noise emissions may be up to 4 dBA (daytime) and 6 dBA (night time) above the assessment criteria when using the front end loader.

The Main West EA found that the potential noise impacts are predicted to meet the project specific noise criteria at all resident locations, with the exception of NC3. The NC3 site was predicted to have a 2 dBA exceedance of project specific noise criteria (35 dBA night time) under a temperature inversion.

The Northern Coal Services EIS found that the potential noise impacts are predicted to meet the project specific noise criteria at all resident locations, with the exception of NC3. The NC3 site is predicted to exceed the project specific noise criteria by up to 1dBA during night time calm conditions and by up to 4dBA during night time temperature inversions for the current existing and approved operations.

In order to minimise noise generated by train operations at Newstan Colliery, the following operating procedures have been implemented, except in emergency situations.

1. The procurement of a fleet of new locomotives has allowed for the elimination of bank engines and the use of BRM new generation locomotives. They are considerably quieter and environmentally friendly.
2. No bank engines are now being used.
3. The use of the Locomotive horn at level crossings at Newstan Colliery is restricted to EMERGENCY use only. The headlight and ditch lights shall be used to provide adequate warning.
4. The use of the Locomotive horn prior to moving the train at Newstan Colliery is restricted to EMERGENCY use only.
5. All shunting shall be carried out with radio communication. The use of the locomotive horn is prohibited.
6. Train ‘run-ins’ and ‘run-outs’ shall be managed professionally by the train crew, ensuring correct use of the automatic (train) brake and independent brake. Four new locomotives are now required where previously six or seven were needed. The new locomotives were delivered throughout 2012/2013.
7. A 6 metre high bund wall was constructed at the south-eastern end of the Rail Loop stockpile in 2012.

6.1.1 Summary of Noise Monitoring Results

Global Acoustics Pty Ltd, were engaged by Centennial Newstan to conduct quarterly noise compliance assessments for the Newstan Colliery in accordance with the Development Consent criteria.

Table 8: Summary of Noise Monitoring

Monitoring Quarter	Compliance status
Quarter 1 March	Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q1 monitoring at all monitoring locations.
Quarter 2 June	Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q2 monitoring at all monitoring locations, with the exception of NC1, NC3 and NC6 during the evening period and NC1, NC3, NC4 and NC6 during the night period (details in the July report)
Quarter 3 August	Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q3 monitoring at all monitoring locations.
Quarter 4 December	Activities from Newstan Colliery complied with the relevant development consent noise limits during Quarter 4 2018 monitoring at all monitoring locations.

Quarter 2 Noise exceedance

Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q2 monitoring at all monitoring locations, with the exception of NC1, NC3 and NC6 during the evening period and NC1, NC3, NC4 and NC6 during the night period.

Newstan Colliery is continuing to undertake work to implement a noise model to allow for a real time noise monitor on site to be used as a more precise management tool. A comparison of the model against the Q2 attended compliance monitoring undertaken by Global Accoustics, showed a substantial difference in the predicted noise recorded at NC1. All other locations showed similar results.

Newstan is investigating the precise sources of noise from the CHPP with the assistance of extensive vibration testing and motion amplification of the entire CHPP to identify areas where improvements can be made.

6.1.2 Newstan Shaft Site (Awaba) Noise Monitoring

The requirements for the Newstan Ventilation Shaft Site at Awaba impact assessment criteria are included in the Table 9 in accordance with Newstan's Development Consent condition 6.4 D and the Newstan Colliery Modification of Development Consent Statement of Environmental Effects (2007).

Table 9: Newstan shaft site noise monitoring criteria

	Noise Criteria $L_{Aeq(15\ minute)}$ Noise Goals (dBA)		
Location	**Day**	**Evening**	**Night**
All privately owned residences	38 dBA	40 dBA	36 dBA

No noise monitoring was conducted during the reporting period due to no operational activities occurring at the Newstan ventilation shaft site at Awaba.

6.2 AIR QUALITY

The Northern Region Air Quality and Greenhouse Gas Management Plan has been developed to ensure that operational and construction air quality impacts on the local community are minimised, appropriate management measures identified and response protocols detailed should air quality criteria be exceeded and to comply with statutory approval conditions. The plan was submitted to the DPE for approval in July 2016.

6.2.1 Dust Deposition Gauges

Originally there was a total of 9 depositional dust gauges located around the Newstan Colliery pit top facilities and Fassifern. Dust gauge 8 was decommissioned in 2005 due to the tree growth in the private garden that the gauge was located in (no longer compliant with the relevant standard) and continual vandalism by school children. Dust Gauge 7 was removed and decommissioned by a private land owner to allow fill to be placed in the owner's horse paddock. Dust Gauge 7 was re-instated in August 2009 to the south-east of Newstan Colliery at the Fassifern Archery Complex.

Newstan currently has eight depositional dust gauges located around the Colliery pit top facilities, NREA, SREA and Fassifern. The following graph, Figure 2, displays Newstan's Monthly Rolling Annual Average Dust Deposition in 2018 (Insoluble Solids).

The Newstan Life Extension EIS results for DG's 1 to 8 found the monthly averages and annual averages were below 2 g/m2/month, which is within the EPA goal of 4 g /m2/month annual average. The EIS states that increases between 1 and 2 g/m2/month due to the Newstan extension would therefore be acceptable given the existing deposition levels. Annual average dust deposition rates due to existing operations were predicted to be approximately 1 g/m2/month or less at Fassifern and surrounding districts.

Table 10: Summary of depositional dust results between January 2018 and December 2018 surrounding Newstan Colliery.

	Insoluble Solids (Combustible Matter + Ash) g/m^2/month							
	DG1	DG2	DG3	DG4	DG5	DG6	DG7	DG9
Long Term Average	1.2	3.1	1.4	2.1	3.8	1.9	3.6	2.3
Average 2018 (Reporting Period)	1.2	0.8	1.0	3.0	1.0	1.4	2.3	0.7
Air Quality Criteria	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0

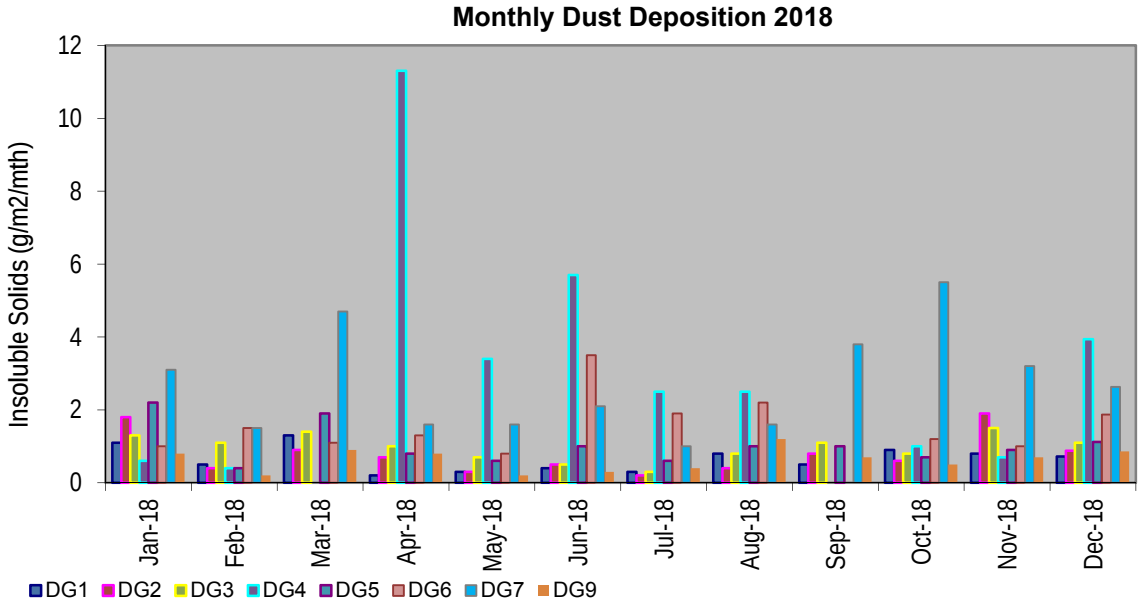

Figure 2: Newstan Monthly Dust Deposition 2018

All particulate dust gauges recorded an annual average particulate monitoring result below the development consent limit of 4g/m2/month for the annual averaging period.

Dust gauge 1 has remained relatively stable since 2001, while the results for dust gauges 2, 5, 6, 7 and 9 have decreased. Some high results at dust gauges 3 and 4 have resulted in an increasing trend due to spikes in 2012, 2015, 2017 and 2018. Visual inspections of the samples showed that approximately 90% of the samples were insect matter and or bird droppings.

Dust monitoring locations are provided in Plan NS3332.

6.2.2 High Volume Dust Sampling

The EIS states that the annual average TSP levels are predicted to be approximately 10 µg/m3 at Wakefield and Fassifern. This is less than measured background levels indicating that other local dust sources may also be contributing to TSP levels in the area. Predictions for the expansion up to 3 mtpa using the front end loader method showed an annual average TSP concentrations at the nearest residence to the northwest

of the existing emplacement area increase by 5 µg/m3 above those predictions made for the existing case. Emissions were not predicted to cause exceedances of the air quality goal of 90 µg/m3 (annual average for TSP). Assuming that approximately 50% of total TSP is PM10, the annual average goal of 50 µg/m3 is not predicted to exceed after the initial expansion for PM10.

The Main West Mining Project EA states that the results of dispersion modelling indicate no potential for exceedance of the annual average TSP and PM10 assessment criteria at the nearest non-project related receptors. The dispersion modelling predicted a likelihood of exceedances at the nearest sensitive receptor of regulatory guidelines for PM10 as a 24 hour average. Background concentrations of PM10 also contribute significantly to predicted likelihood of exceedances of 24 hour PM10.

High volume dust sampling was undertaken to monitor dust deposition rates and concentrations of Total Suspended Particulates (TSP) and Suspended Particles PM10 and PM2.5.

The Hill Top High Volume dust sampling point (HVS1) is located to the north of the NREA near Culgan's property. The Water Tank High Volume Dust Sampling point (HVS2) is located to the south of Newstan Colliery near the Fassifern Railway Station. It was not possible to locate the southern high volume dust sampler at the Fassifern Public School as required by the Development Consent DA 73-11-98, due to the need to undertake extensive tree clearing at the school. The site chosen is located closer to the mine site.

Table 11 displays the annual average PM10 (ug/m3) at HVS1 and HVS2 since monitoring commenced in 2007, while Table 12 shows the Annual Average TSP. Table 11 demonstrates a significant reduction in the annual average PM10 levels at the Newstan Colliery since 2007, especially at HVS2.

Table 11: Annual Average PM10 (ug/m3) at HVS1 and HSV2

Annual Average PM10 (ug/m3)		
Year	**Hill Top (HVS1)**	**Water Tank (HVS2)**
2008	16.0	25.8
2009	16.6	19.4
2010	11.6	16.2
2011	14.3	17.7
2012	12.5	17.0
2013	13.3	16.1
2014	11.9	14.7
2015	11.5	12.8
2016	11.0	12.4
2017	11.5	14.6
2018	13.9	15.5

Table 12: Annual Average TSP (ug/m3) at HVS1 and HSV2

Annual Average TSP (ug/m3)		
Year	Hill Top (HVS1)	Water Tank (HVS2)
2008	33.0	53.2
2009	31.5	38.5
2010	22.5	30.3
2011	24.2	33.7
2012	21.2	34.3
2013	22.3	29.3
2014	21.4	27.9
2015	17.9	24.0
2016	18.0	20.3
2017	20.1	29.9
2018	23.1	31.1

Newstan's Development Consent specifies the following criteria for TSP or PM10.

Table 13: Development Consent Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter <10 µm (PM_{10})	Annual	30 µg/m^3

Table 14: Development Consent Short Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter <10 µm (PM_{10})	24 hour	50 µg/m^3

Figure 3 displays the rolling annual average and 24 hour results for high volume dust sampling results for PM10. Figure 4 displays the Rolling Annual average and the 24 hour results for TSP at the Hill Top Location (HVS1) and Water Tank Location (HVS2).

The rolling annual average results for both locations were below the criteria for TSP of 90 µg/m3 (annual average), and PM10 of 30 µg/m3 (annual average) during the reporting period.

The Newstan EPL 395 requires a sampling frequency for high volume air samplers to be every 6 days for TSP and PM10 at the two monitoring locations.

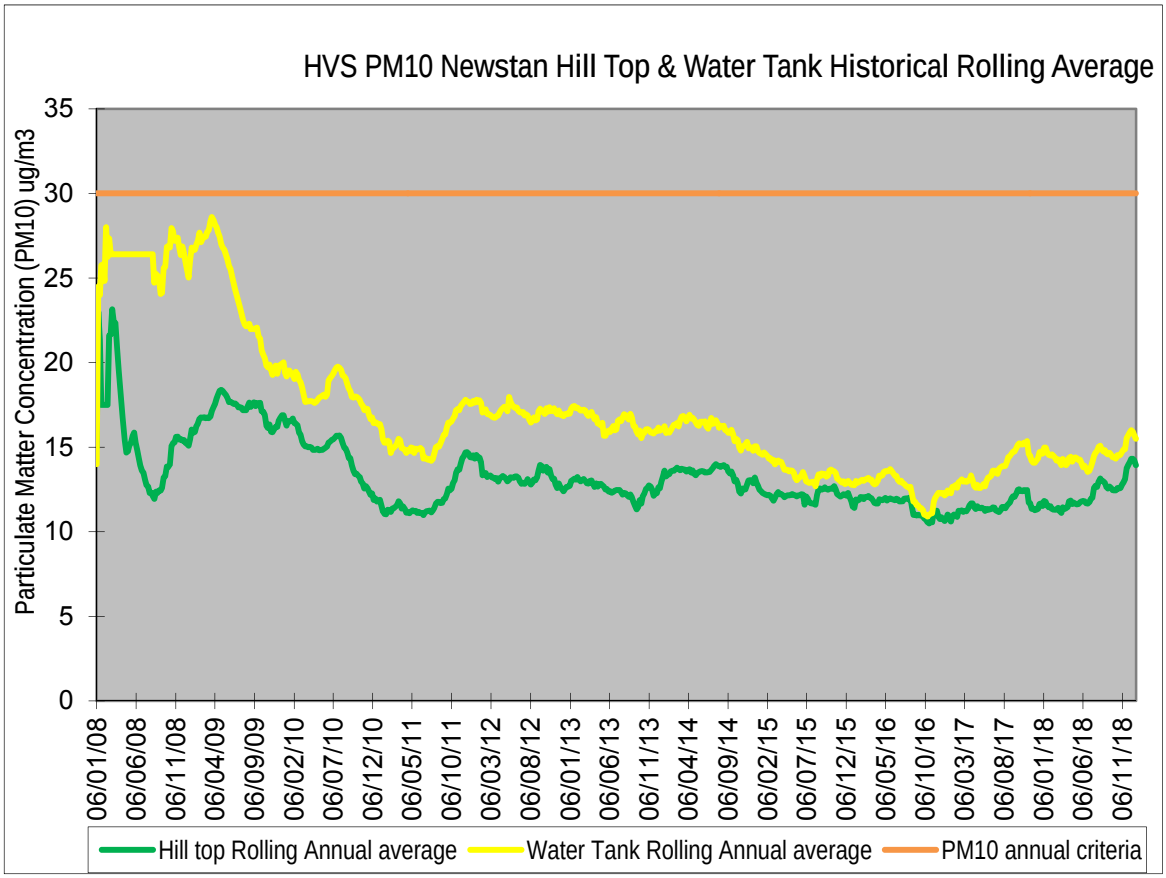

Figure 3: Newstan Rolling Annual Average for High Volume Dust Sampling for PM10

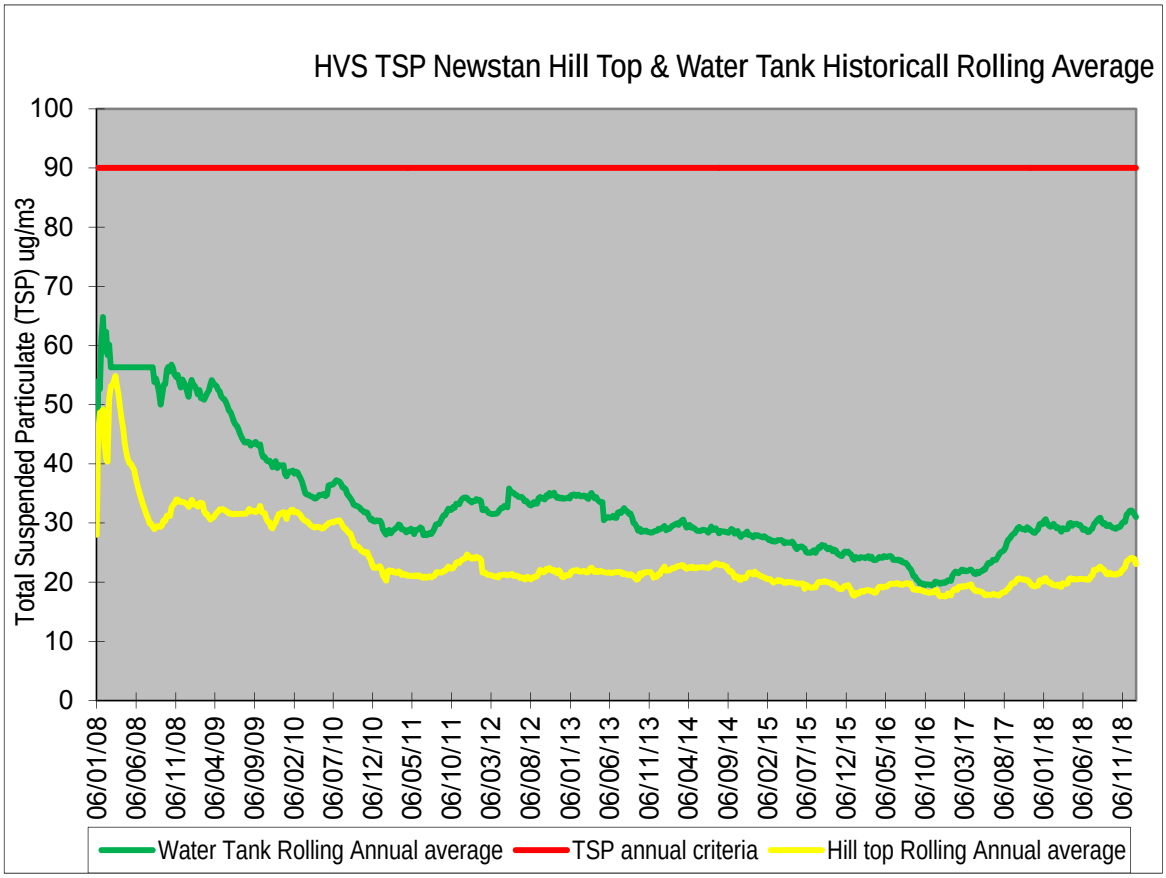

Figure 4: Newstan Rolling Annual Average for High Volume Dust Sampling for TSP

Figure 5 displays the 24 hour results for high volume dust sampling results for PM2.5 during the reporting period. The annual average high volume dust for PM2.5 was 7µg/m3 and 8µg/m3 for Hill Top and Water Tank respectively.

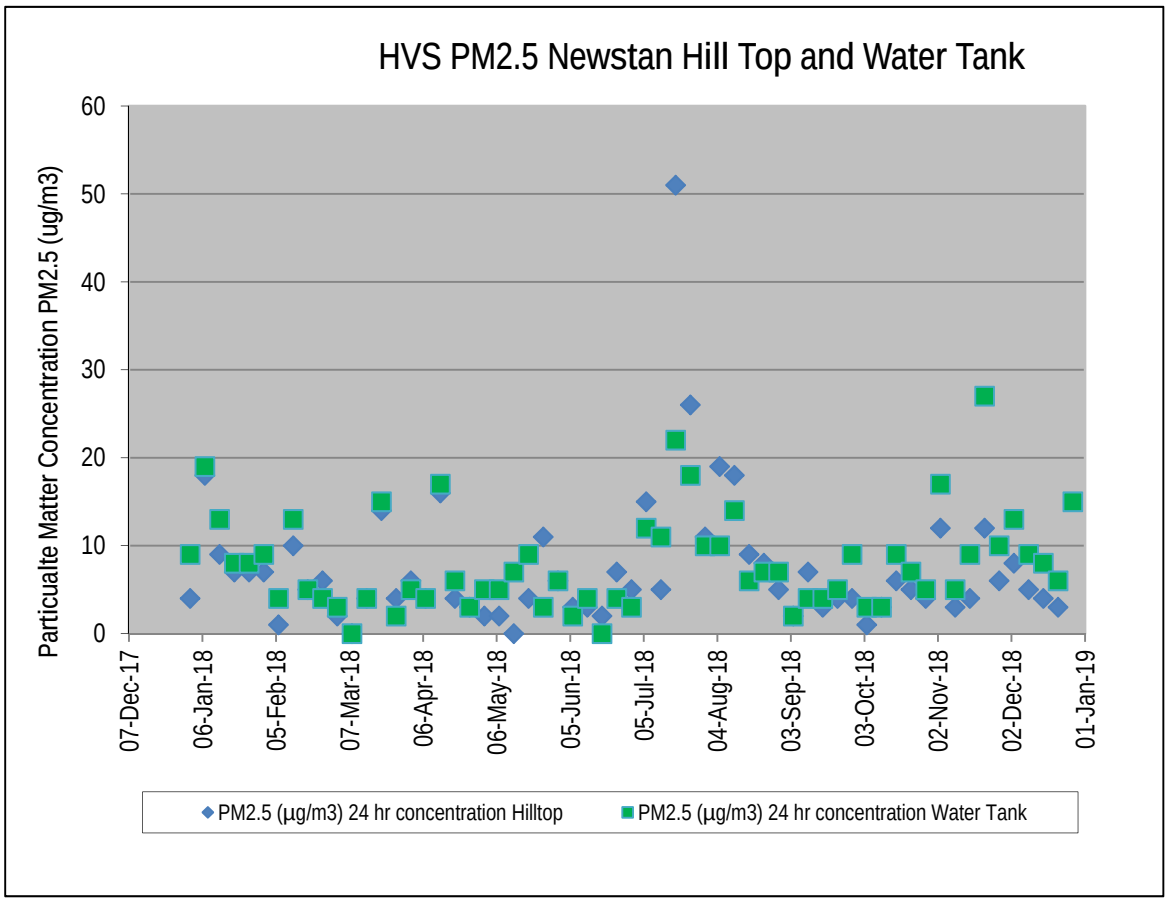

Figure 5: Newstan High Volume Dust Sampling for PM2.5

6.2.3 Greenhouse Gas Monitoring

Table 15 provides a summary of Newstan's main Greenhouse Gas emissions for the 2018 Annual Review reporting period. The Post Mining Activities began being included for the first time in 2015.

Table 15: Greenhouse Gas Emissions FY2013 - FY2018

Emissions Summary (CO2-eT)						
	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Electricity	31,391	28,960	18,556	10,624	13,628	11,883.7
Diesel	2,978	2,194	1,612	889	2,041	1,842
Fugitives – CH4	121,292	118,170	97,525	100,000	52,943	41,818.313
Fugitives – CO2	1581	910	1,077	1,020	724	1,017.655
Post Mining Activities*		9,691	2,084	0	0	0
Total of above GHG Emissions (tonnes)	**157,243**	**159,925**	**122,736**	**112,533**	**69,336**	**55,561,57**

* Note Emissions from Post Mining activities (e.g. surface stockpile), previously not included in the Annual Review.

6.3 SUBSIDENCE

Newstan Colliery did not mine coal in 2018. Yearly Subsidence Monitoring was carried out above the Main West Area (first workings only mining) in July and December 2018. Survey monitoring points levelled were on Transgrid transmission towers above the mine workings area, part of the old LW24B cross line, and MW Line 1 – which follows the edge of a bush track above 304 and Main West 4 Panels.

Subsidence modelling predictions for this first workings mining method were for up to 20mm. It is generally accepted that there can be up to +/-20mm of natural ground movement – due to the natural expansion and contraction of soils and clays. Note that when mining coal - a 100m mining barrier was maintained around Tension Tower #18 on Transmission Line 93.

The Monitoring of Transmission Towers in the first workings area show subsidence between +5 to -17mm after first workings mining. Monitoring along part of LW24B (XL21-44) shows subsidence between +5 to -24mm following first workings mining.

Monitoring along the bush track shows subsidence between +6 to -30mm. Monitoring points 1MW13-18 (-27mm to -30mm) are located in a low lying area.

Note that survey field method accuracy is +/- 5mm.

No visible signs of subsidence were observed while carrying out these surveys.

Newstan and Awaba Colliery have a joint rehabilitation program. In 2018 a series of sinkholes in the same locality above the Awaba workings were rehabilitated in accordance with the approved Awaba Colliery Sinkhole Management Plan which outlines a methodology for the effective rehabilitation and maintenance of sinkholes. The 2018 sinkhole rehabilitation activities are reported within the Awaba Colliery Annual Review. Any sinkholes or subsidence cracks identified are added to the rehabilitation program and they are rehabilitated in accordance to environmental and public safety risk.

Sinkholes associated with underground mining generally occur in areas that have a shallow depth of cover (less than 30m), weak overburden and geological discontinuities. Subsidence Rehabilitation will be ongoing during 2019.

6.4 BIODIVERSITY

The Northern Region Biodiversity Management Plan has been developed to guide the management of terrestrial and aquatic biodiversity at a regional scale and to comply with statutory approval conditions. The plan was submitted to the DPE for approval in December 2016. Various biodiversity monitoring programs have been established to assess biodiversity impacts and inform implementation of adaptive management measures for improved environmental outcomes.

A revised Northern Region Biodiversity Management Plan has been submitted for approval with the Northern Coal Services Biodiversity Offset Strategy, Myuna, Newstan and Awaba.

Management measures for 2018 included the implementation of recommendations included in the 2017 Annual Monitoring report with on going weed management and the introduction of ground habitat to encourage ground dwelling animals. The 2018 report which is discussed below also includes a range of additional recommendations which Newstan endeavours to implement in the 2019 period. This report can be found in Appendix 3.

6.4.1 Annual Flora and Fauna Monitoring

Condition 3.4 and 8.5 of Development Consent DA 73-11-98 require an Annual Ecological Monitoring Program at Newstan Colliery. Surveys conducted over the site targeted birds, microbats and invertebrates along with habitat.

This report can be found in Appendix 3.

6.4.2 Tetratheca juncea

The Longwall TJ transect monitoring ceased in 2014.

Annual Tetratheca juncea monitoring within the NREA and SREA ceased in 2017. These sites were reference sites for the construction of the SREA and monitoring was deemed no longer necessary to continue due to consistent monitoring results. The last monitoring report found that monitoring to date had shown considerable variation in clump counts between years for each REA quadrat. However, it is apparent that the presence of the reject emplacement areas has not had a negative impact on the viability of the associated Tetratheca juncea populations. There was no evidence that the overall habitat in the monitored areas had declined in quality between monitoring occasions.

6.5 HERITAGE

In 2012 Centennial Coal developed the Centennial's Northern Holdings Aboriginal Cultural Heritage Management Plan. This document aims to provide a consistent approach to consultation between Centennial and the Aboriginal community as well as identify standard Aboriginal cultural heritage monitoring and management requirements. A revised Northern Region Aboriginal Cultural Heritage Management Plan was submitted to DPE in July 2016 and was approved on 15 September 2016.

The LEA EIS identified rock shelters within sandstone outcrops on ML1452 to the east of current mining operations. It also suggested that there may be potential sites along Lords Creek that may be impacted by subsidence repair works in Lords Creek. Mining has not occurred in the eastern sections of ML1452 therefore there has been no potential for impact on the rock shelters. LW24 and 25 were shortened such that no mining occurred

under Lords Creek hence the need to undertake subsidence repair works in Lords Creek is negated.

The LW24 SEE identified a scar tree approximately 400m north-west of LW24. This scar tree has not been impacted by mining operations.

Due to Newstan Colliery being on care and maintenance during the reporting period, no pre and post mining monitoring was required to be conducted to assess any impacts on archaeological heritage as a result of mine subsidence.

The Northern Region Historic Heritage Management Plan was approved on 15 September 2016 for Mandalong Mine and Northern Coal Services.

The Plan was reviewed in 2018 to incorporate Awaba, Newstan and Myuna. The revised Plan was approved on 13 July 2018.

6.6 WASTE

All opportunities for waste avoidance and minimisation are considered by all staff and contractors across all areas including; contracts, purchasing, equipment procurement and waste generation processes.

Waste oil and greases are stored in tanks and drums within bunded areas for removal by a licenced waste management contractor for recycling or disposal. Oil water separation is achieved by the use of hydro-cyclone oil water separators at Newstan flows from vehicle work and storage areas and the wash down bays.

Hydrocarbon spill kits are inspected monthly by a licenced waste management contractor and re-stocked as required. Oily rag bins and oil filter bins are also serviced on a monthly basis.

Office paper and cardboard is collected and recycled by a licenced waste management contractor. Metals are collected and stored in steel bins onsite prior to removal. In 2018, a total of 74.86 tonnes of scrap steel was recycled. This compares with 30 tonnes recycled in 2017 due to a clean up undertaken within the reporting period.

General refuse and non-recyclable materials are sorted and stored in 15m steel bins. The material was collected by a licenced waste management contractor for disposal. In 2019, 54tonnes of refuse material was taken off-site for disposal.

Of the total waste collected at Newstan in 2018 (170 tonnes), approximately 75% was recycled including steel, plastics, liquid waste, oils, paper and cardboard, filters grease, oily rags and oil filters. This compares with a recycling result of 42% in 2017.

6.7 RAINFALL MONITORING RESULTS

The total monthly rainfall data is shown below in Table 16.

Table 16: Rainfall at Newstan Colliery for the Period January 2018 to December 2018.

2018 Month	Newstan Colliery Total Rainfall (mm)
January	20.5
February	140
March	194
April	35.5
May	6.97
June	172
July	0.2
August	31.5
September	88
October	213
November	96
December	68.8
Total	1066.47

*October to December met data obtained from Awaba Colliery weather station due to technical difficulties with the Newstan Colliery weather station.

A total of 1066.47 mm of rainfall was recorded at Newstan Colliery during the reporting period. The total annual rainfall for 2018 was more than the total rainfall recorded in 2017 (1016.33). The wettest period was in March 2018 recording 194mm.

7 WATER MANAGEMENT

7.1 SURFACE WATER MANAGEMENT

Water monitoring is undertaken in accordance with the Northern Coal Services Water Management Plan, the Mine Water Discharges Management Plan, Development Consent and Environment Protection Licence 395 requirements. Newstan Colliery's Environmental Protection Licence (EPL) was last varied on 17 November 2015.

The basis of the mine's water management is based on reuse of water on site including sediment laden runoff contained in sediment dams.

Water runoff is concentrated via a network of kerb and guttering, collection sumps, pipes and drains, sediment sumps and pollution control dams. Water is then pumped to Connolly's Dam for reuse in the coal preparation plant.

An assessment of the potential impact on LT Creek and Lords Creek was undertaken for the Main West Project Approval. The Newstan Colliery pit top lies within the upper catchment of LT Creek. The creek consists of a North Arm and South Arm that combine within the residential/ commercial area of Fassifern before flowing into Fennell Bay on

the western side of Lake Macquarie. LT Creek is originally an ephemeral system but discharges into LT creek have continued for over 35 years and the North Arm has been receiving water from the underground mine water storage since 2001 via LDP001; this has resulted in a continuous baseflow within LT Creek.

The Newstan Colliery, Surface Water Quality Assessment examined the existing surface water quality in order to determine background and baseline values for the watercourses associated with discharge from Newstan Colliery's operations. The assessment found that downstream water quality in LT Creek has generally been slightly to moderately alkaline and brackish, and generally within the background trigger value limits for LT Creek (North Arm).

Underground mining in the Main West Area was within the catchment of Lords Creek. Lords Creek is a tributary of Jigadee Creek, Jigadee Creek drains to Dora Creek, which is a major tributary of Lake Macquarie. Surface impacts have been negligible and cannot be measured. The potential surface water impacts associated with Main West have been identified and assessed. It is concluded that surface impacts to Lords Creek are negligible.

The underground water management system at Newstan Colliery involves mine water injections into, and extractions out of, an underground mine water storage. The underground storage is a combination of the goaf in the Great Northern and Fassifern seam workings at Newstan Colliery. The Water Management Plan reports that the existing outputs from the underground water system are:

- extraction of water from the underground storage via the Fassifern No. 1 borehole (up to 11.0 ML/day); and
- discharge through the underground emergency discharge pipeline (known as the "Stony Creek pipeline" & EPL Point 17).

Water extracted from underground storage is transferred and discharged to the North arm of LT Creek via LDP001. Investigations by GHD have identified that underground water extraction (via the Fassifern No. 1 borehole) of 11 ML/day is required under operational conditions to maintain the underground water level at least 2 metres below the invert of the Stony Creek pipeline (EPL Point 17). Newstan Colliery received an EPL variation in October 2012 to increase the volume of water discharged through LDP001 from the current EPL limit of 7 ML/day to 11 ML/day. This variation also included discharge limits for a range of pollutants. There were no non-compliances associated with the EPL water quality limits in 2018.

In 2014 Newstan commissioned the Clean Water Plant at Newstan Colliery. This allows Newstan to treat water from the surface and the Fassifern Seam, prior to discharging through LDP001. The CWP employs coagulation, flocculation, sedimentation, and filtration treatment to reduce the turbidity, concentration of total suspended solids (TSS) and as a by-product also reduce the total (unfiltered) metal concentrations before water is discharged to LT Creek via LDP001. Water that was previously transferred directly from the Fassifern Underground Storage to LDP001 is now directed to McKendry's Dam and treated by the CWP at a maximum rate of 14 ML/day. Water treated by the CWP may also be used to supply mining processes and the CPP at Newstan. The CWP does not remove all total metals and dissolved metals.

With the increase in LDP001 volume discharge and the installation of the CWP, Newstan Colliery has generally been able to maintain the Fassifern Storage at a low level. Figures 6, 7, 8 and 9 show the pH, total suspended solids (TSS), oil & grease & conductivity for discharge waters through LDP001 in 2018. Note: If results are less then the limit of reporting, a value of 0 is put in for the development of the below graphs.

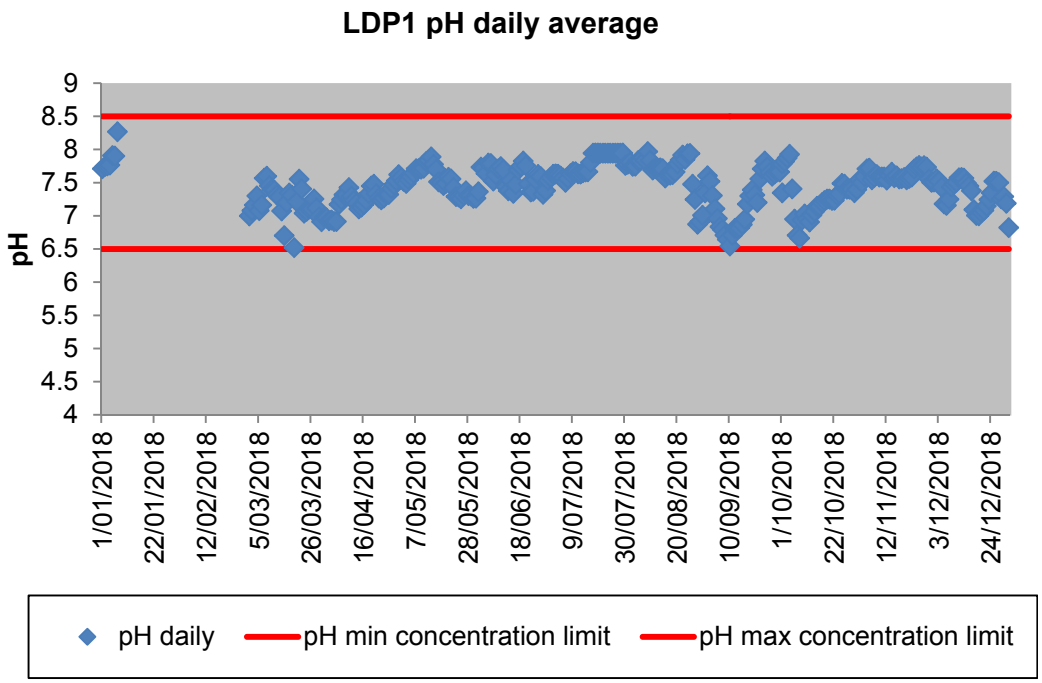

Figure 6: LDP001 pH Result 2018

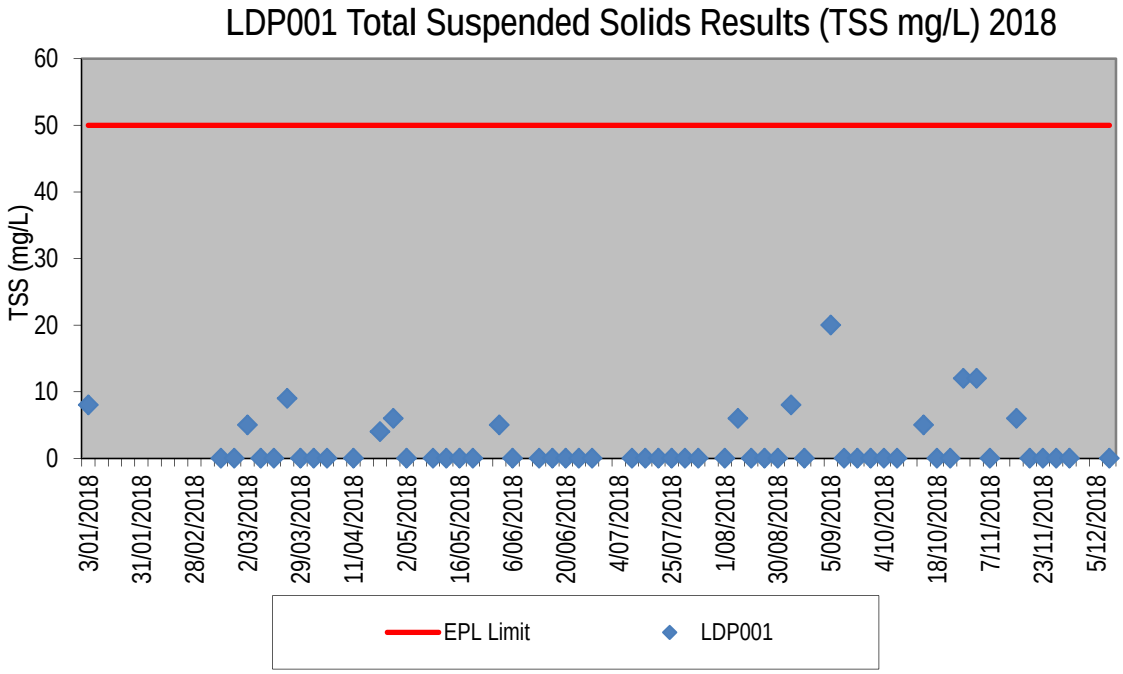

Figure 7: LDP001 Total Suspended Solids Result 2018

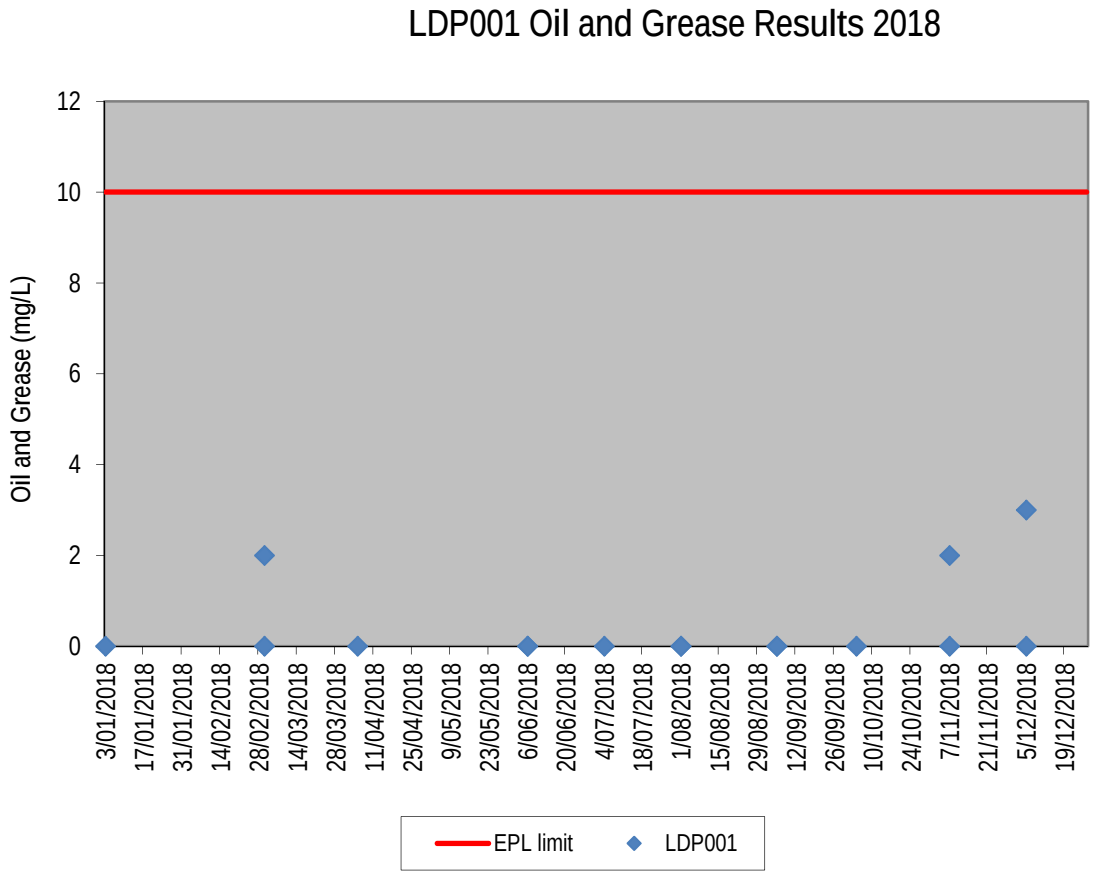

Figure 8: LDP001 Oil and Grease Result 2018

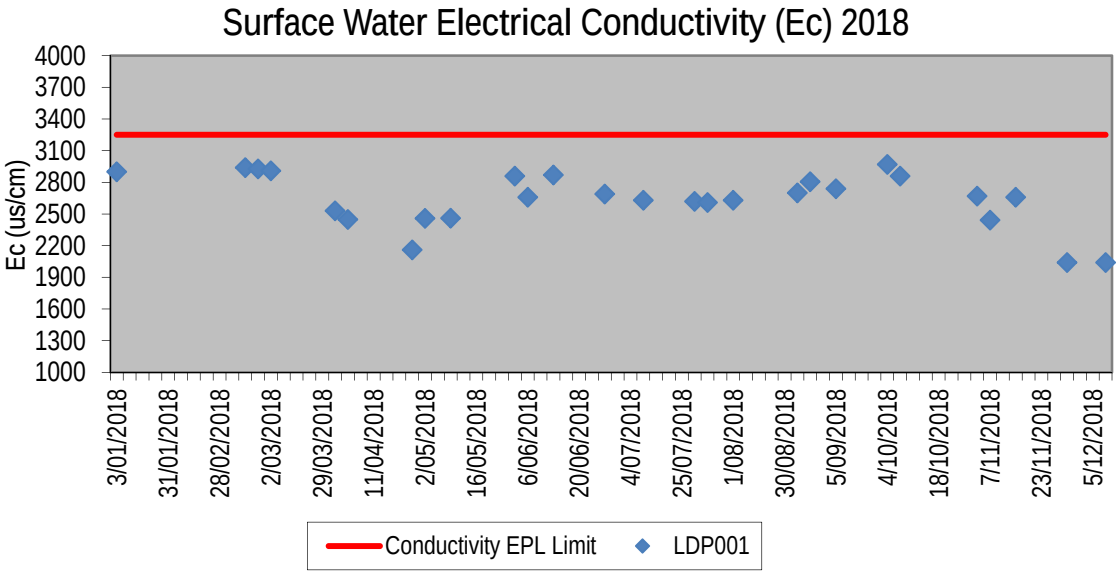

Figure 9: LDP001 Electrical Conductivity Result 2018

An historical overview of monitoring results (including metals) is provided in the report in Appendix 2. Surface monitoring locations are provided in Plan– NS2541A.

A summary of the water volume and quality data of EPL monitoring points can be found in Table 17 and Table 18. All parameters in Table 17 and Table 18 were within EPL limits.

Table 17: Licenced Discharge Points Volume

Frequency	Licenced discharge point	No. of measurements made	Lowest result (ML/day)	Mean result (ML/day)	Highest result (ML/day)
Daily during any discharge	LDP001	365	0	4.9	10.82
Daily during any discharge	LDP002	No discharge occurred during reporting period			
Daily during any discharge	LDP017	No discharge occurred during reporting period			

Table 18: LDP001 Water Quality Summary

Pollutant	Unit of measure	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Aluminium (dissolved)	milligrams per litre	12	29	LOR	0.0005	0.03
Arsenic (dissolved)	milligrams per litre	12	29	LOR	0.0001	0.0002
Barium (dissolved)	milligrams per litre	12	29	0.039	0.1064	0.174
Bicarbonate alkalinity	milligrams per litre	12	63	72	519.5397	710
Boron (dissolved)	Milligrams per litre	12	29	LOR	0.1891	0.24
Cadmium (dissolved)	milligrams per litre	12	29	LOR	0.0000	LOR
Calcium (dissolved)	milligrams per litre	12	29	10	30.35	45
Chloride (dissolved)	milligrams per litre	12	24	130	458.2069	635

Pollutant	Unit of measure	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Chromium (total)	milligrams per litre	12	24	LOR	0.0000	0.001
Cobalt (dissolved)	milligrams per litre	12	29	LOR	0.0001	0.0006
Conductivity	Microsiemens per centimetre	Continuous	Continuous	371	2442.1724	2970
Copper (dissolved)	milligrams per litre	12	29	LOR	0.0006	0.003
Iron (dissolved)	milligrams per litre	12	29	LOR	0.0329	0.47
Lead (dissolved)	milligrams per litre	12	29	LOR	0.0009	0.002
Lithium (dissolved)	milligrams per litre	12	29	0.004	0.1413	0.196
Magnesium	milligrams per litre	12	29	6	11.3379	15
Manganese (dissolved)	milligrams per litre	12	29	LOR	0.0353	0.284
Mercury (dissolved)	milligrams per litre	12	29	LOR	0.0000	LOR
Molybdenum (dissolved)	milligrams per litre	12	29	LOR	0.0195	0.0344
Nickel (dissolved)	milligrams per litre	12	29	LOR	0.0093	0.021
Nitrogen (total)	milligrams per litre	12	29	LOR	0.2500	1.5
Oil and Grease	milligrams per litre	12	20	LOR	0.3500	3
pH	pH	Continuous	Continuous	7.31	8.0110	8.42
Phosphorus (total)	milligrams per litre	12	29	LOR	0.0057	0.05
Potassium (dissolved)	milligrams per litre	12	29	3	3.9103	5
Selenium (total)	milligrams per litre	12	29	LOR	0.0001	0.0004
Sodium	milligrams	12	29	55	502.5	603

Pollutant	Unit of measure	No. of samples required by licence	No. of samples collected and analysed	Lowest sample value	Mean of sample	Highest sample value
	per litre				862	
Sulfate (dissolved)	milligrams per litre	12	21	3	69.4286	92
TKN-N	milligrams per litre	12	29	LOR	0.1079	1
Total sulfate	milligrams per litre	12	29	10	74.6207	100
Total suspended solids	milligrams per litre	52	59	2	5.8475	35
Turbidity	Nephelometric turbidity units	Continuous	Continuous	0.2	0.4834	3.6
Zinc (dissolved)	milligrams per litre	12	29	LOR	0.0012	0.007

7.2 GROUNDWATER MANAGEMENT

Newstan has eighteen groundwater monitoring bores that were installed to establish groundwater baseline conditions for the proposed Awaba Open Cut Mine. Even though the application for the Awaba Open Cut Mine was withdrawn, it was determined appropriate to continue monitoring the groundwater bores to determine the impact of longwall mining on the groundwater levels and quality. Biannual analyses monitoring and reporting of water level, pH and electrical conductivity (EC) is undertaken.

The EIS states that in the Eastern part of the Life Extension Area (LEA) where the depth of cover ranges up to 400 metres, the height of interconnected fracturing of 80 metres is considered to have very low to negligible probability of tapping into any surface alluvial aquifers. In the far western part of the LEA with the depth of cover reduced to as low as 50 metres in the vicinity of Palmers Creek, there is an increased potential for drainage of alluvium aquifers into the mine workings.

It was considered that the potential for significant mine water inflows from the surface alluvial deposits is minimal and the rate of water inflow into the mine in the proposed LEA should be similar to that experiences from the earlier workings in the existing Newstan Colliery.

The SEE subsidence predictions for LW24, and the general concept of strata disturbance above longwall mines, indicates that vertical fracturing may extend to a height of 100m above LW24. Therefore the shallow aquifers within the SEE boundary may potentially be impacted where the depth of cover between the longwall panel and base of alluvium is less than 100m. The cover thickness review indicated that the thickness is greater than 100m over the whole of LW24. It was considered that there is minimal risk of impacting the alluvium of Lords Creek.

In all subsided areas there may be shallow surface cracking. Where this occurs beneath saturated alluvium of regolith and does not provide hydraulic connection to the mine,

there is still potential for short-term loss of alluvium /regolith groundwater in this zone of increased permeability. This may lead to very temporary, minor lowering of groundwater levels that will only persist for as long as is required to fill the new void cracks.

Where the Main West Area underlies the Lords Creek alluvium (north-eastern section), the depth of cover is approximately 70 – 90 metres. At this depth of cover it is very unlikely that fractures would develop and that there would be loss of groundwater from the alluvium for the past bord and pillar mining.

Any reduction in groundwater levels within the Lords Creek alluvium is also unlikely, based on the predicted subsidence calculations. It is predicted that the vertical subsidence above the proposed Main West mine area will be less than 20 millimetres and that surface impacts will be negligible and cannot be measured.

Monitoring of groundwater levels within Lords Creek alluvium indicates that recent mining, using longwall mining methods, adjacent to the Main West Area has not resulted in a reduction in groundwater levels or a loss of groundwater from the alluvium.

Therefore it is unlikely that the bord and pillar workings within the Main West Area will impact the groundwater in the overlying Lords Creek alluvium. It is not anticipated that mining within the Western Zone will impact on alluvial groundwater or groundwater-dependent ecosystems.

The Modification to Development Consent (DA-73-11-95 Mod 4) in 2012 required the preparation of a Groundwater Monitoring Program for the Main West Mining Area. This management plan has been submitted for approval. This monitoring plan stipulates quarterly monitoring of MB10, MB11, MB12, MB13 & MB15 for depth to water, conductivity and pH which commenced in 2013.

The shallow bores are purged and sampled with foot valves and tubing dedicated to each bore, whereas the deeper bores (MB02-MB06, MB16 and MB18), monitoring the coal seam aquifers, are sampled with a Bennett Auto Sample Pump with tubing dedicated to each well.

Baseline water samples were collected from the installed bores during the first sampling round in October 2005. Subsequent monthly sampling to date has involved measurement of water level and field measurement of pH and EC.

Table 19: Alluvial Aquifer Results for 2018

Alluvial Aquifers									
Monitoring Bore		MB9	MB10	MB11	MB12	MB13	MB14	MB15	MB17
Groundwater Level (Baseline)	mbgs	0.96	3	2.52	5.33	4.88	3.73	5.88	2.63
Groundwater Level (Historical Average)	mbgs	1.51	2.63	2.55	4.84	4.75	3.54	3.95	2.79
Groundwater Level (2018)	mbgs	3.42	3.18	3.14	4.66	5.19	4.30	3.49	3.90
Chemical Parameters									
pH (Baseline)	pH unit	7.16	5.98	5.85	6.2	6.55	6.33	5.71	6.53
pH (Historical Average)	pH unit	5.76	6.19	6.12	6.60	6.59	6.46	6.05	6.20
pH (2018)	pH unit	NA	6.68	NA	6.82	6.87	6.87	6.56	6.70
Electrical Conductivity (Baseline)	uS/cm	300	1000	2400	1000	600	580	100	225
Electrical Conductivity (Historical Average)	uS/cm	255.9327	1386.573	3523.027	1414.88	833.8611	473.7705	297.2868	193.5593

Alluvial Aquifers									
Monitoring Bore		MB9	MB10	MB11	MB12	MB13	MB14	MB15	MB17
Electrical Conductivity (2018)	uS/ cm	NA	1067.5	3730	1035.5	1215	414.5	253.25	222

Graphs of water level, pH and EC trends for the history of the bores are shown on Figures 10, 11 and 12 respectively.

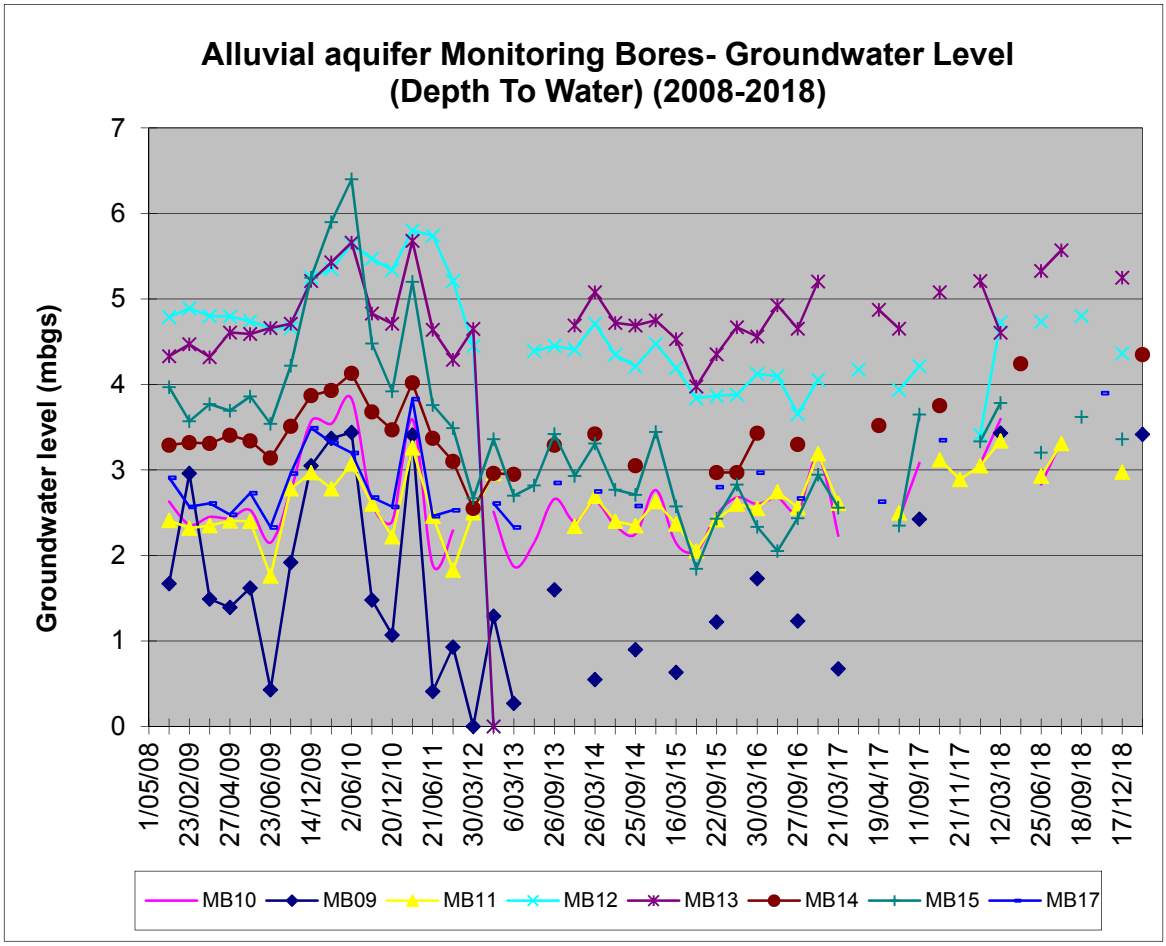

Figure 10: Alluvial aquifer monitoring bores – level trends (2008 – 2018)

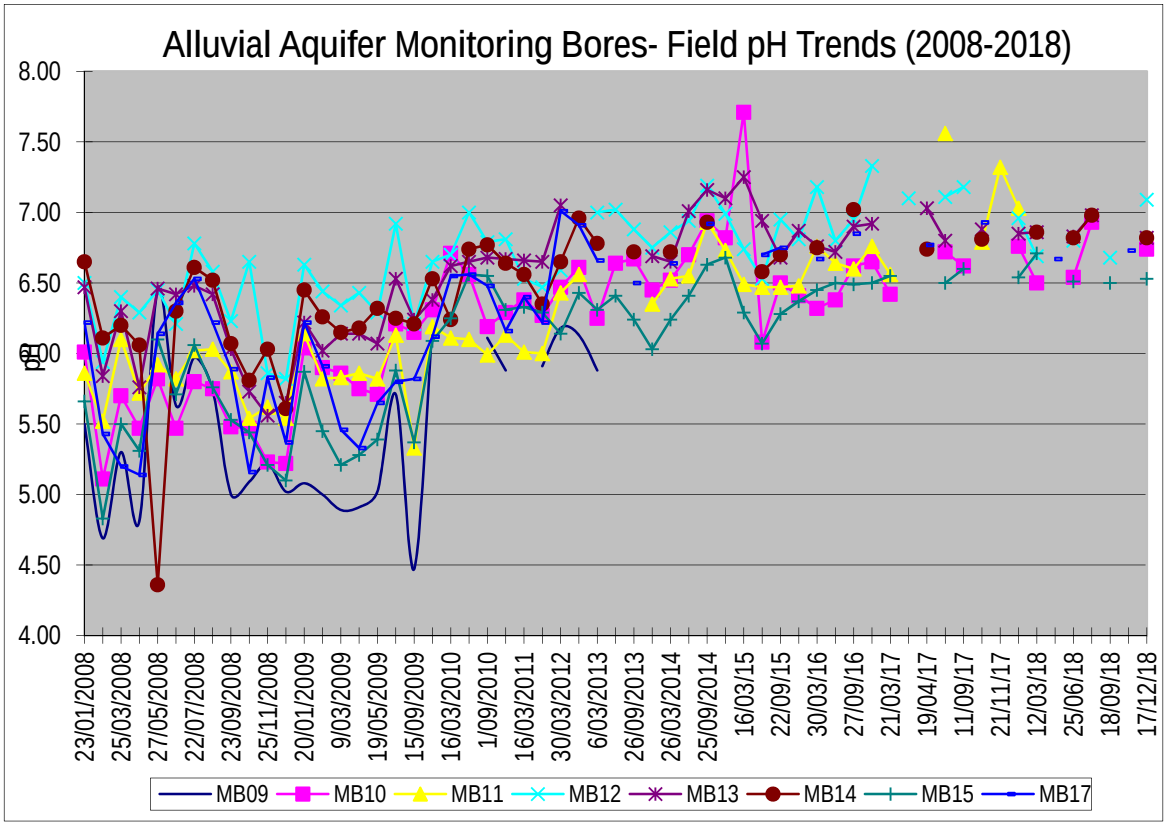

Figure 11: Alluvial aquifer monitoring bores – pH trends (2008 – 2018)

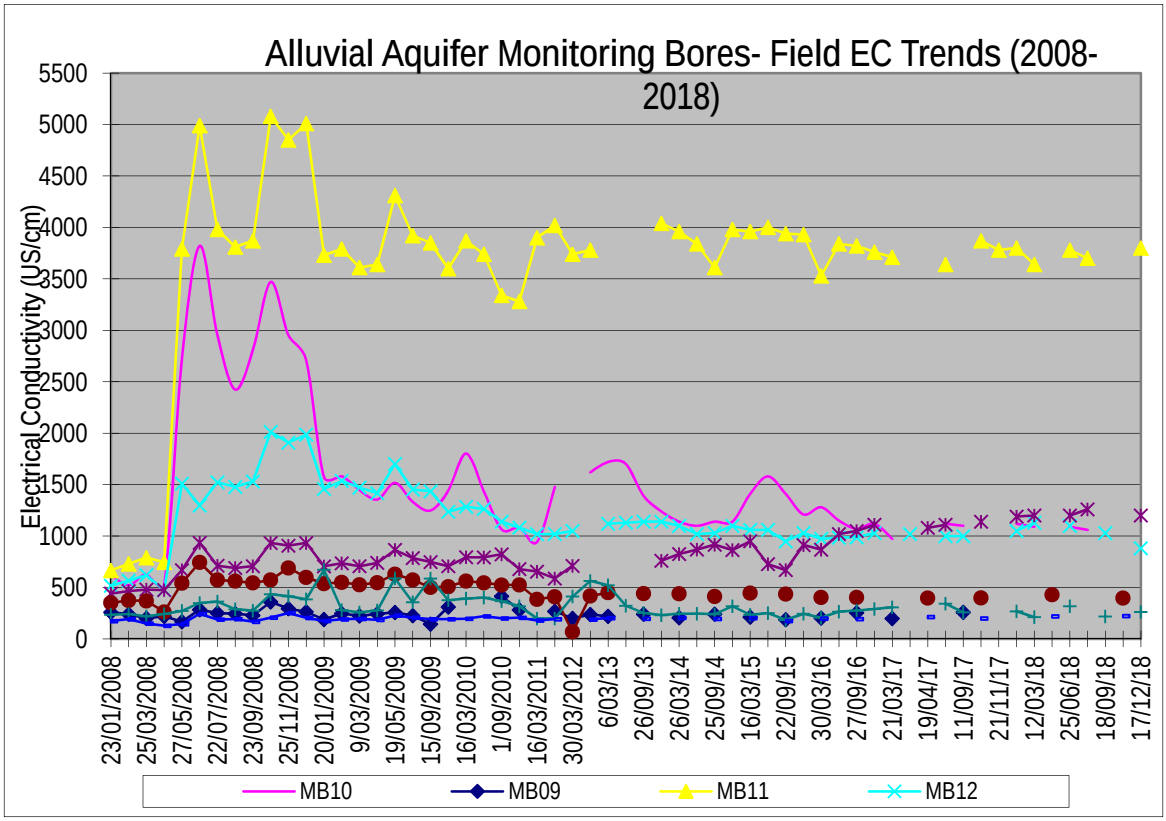

Figure 12: Alluvial aquifer monitoring bores – Ec trends (2008 – 2018)

The water levels indicate that generally the aquifer levels are higher then baseline and the average water levels over the historical monitoring period. The data indicates a slightly acidic to neutral pH generally in the range of 6.5 to 7.1 for 2018 for the alluvial groundwater, which is similar to baseline and historical data. The electrical conductivity (EC) has a wide range of 308-3870µS/cm. This large range may reflect the recharge source of the alluvial groundwater at the monitoring locations by either;

- direct surface infiltration from rainfall, giving relatively low EC readings; or
- upward leakage or lateral flow from the Permian sediments into the alluvium, giving higher EC readings.

Figure 12 indicates that monitoring bore MB11 has relatively high EC levels (although variable), ranging from 666 to 5080 µS/cm. The EC of the remainder of the bores is generally less than 2000µS/cm.

Table 20: Coal Seam Bedrock Aquifer Results for 2018

Coal Seam										
Monitoring Bore		MB1	MB2	MB3	MB4	MB5	MB6	MB16	MB18	MB19
Groundwater Level (Baseline)	mbgs	29.78	11.25	9.9	22.01	24.35	45.17	33.28		
Groundwater Level (Historical Average)	mbgs	30.02	11.45	10.73	20.04	24.16	44.79	33.46	19.37	22.23
Groundwater Level (2018)	mbgs	NA	NA	11.28	20.30	24.34	45.92	34.51	NA	26.55
Chemical Parameters										
pH (Baseline)	pH unit	6.79	6.53	6.73	5.64	6.39	6.51	6.1		
pH (Historical Average)	pH unit	6.88	6.01	7.23	5.32	6.26	6.60	5.98	7.11	6.73
pH (2018)	pH unit	NA	NA	7.75	5.06	6.35	6.75	6.37	NA	7.12
Electrical Conductivity (Baseline)	uS/cm	3020	1620	652	291	1820	1440	780		
Electrical Conductivity (Historical Average)	uS/cm	2820	1340	1264	225	1718	1292	616	2048	1766
Electrical Conductivity (2018)	uS/cm	NA	NA	1545	437.5	1885	1295	680.5	NA	NA

Graphs of water level, pH and EC trends for the history of the bores are shown on Figures 13, 14, and 15 respectively.

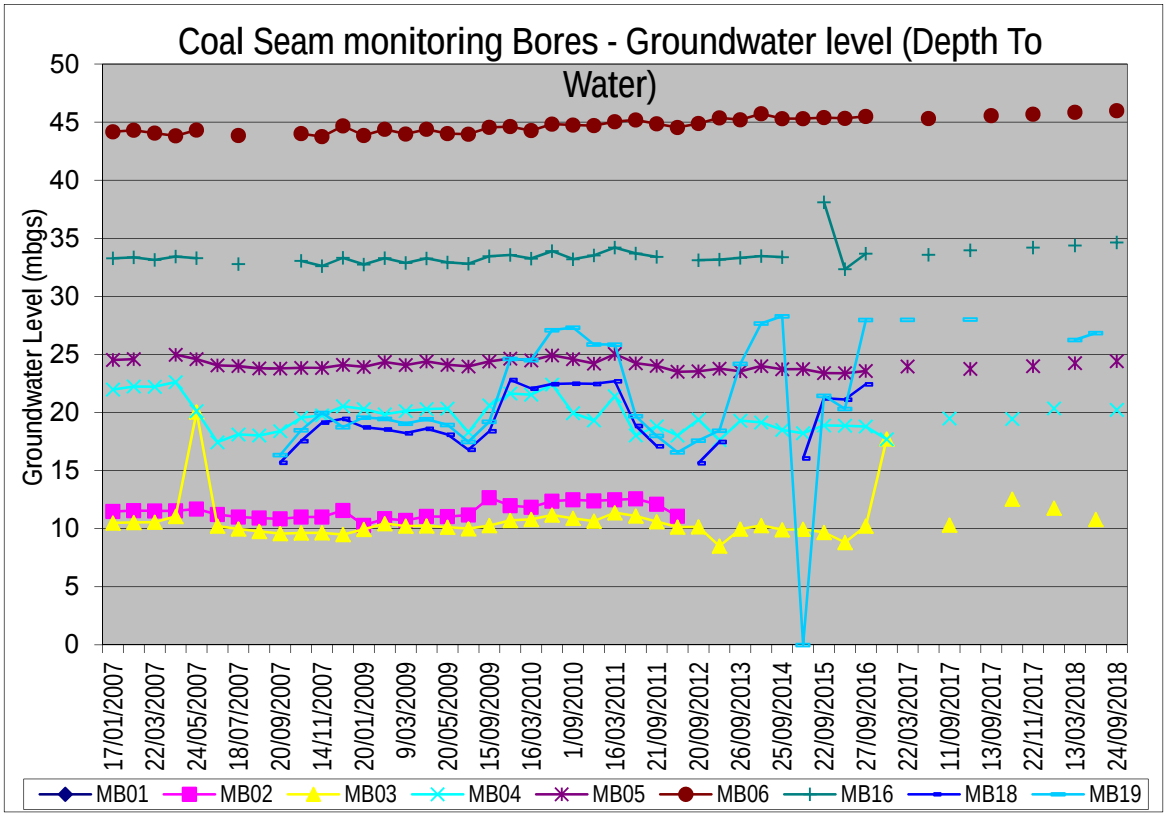

Figure 13: Coal Seam monitoring bores – level trends (2008 -2018)

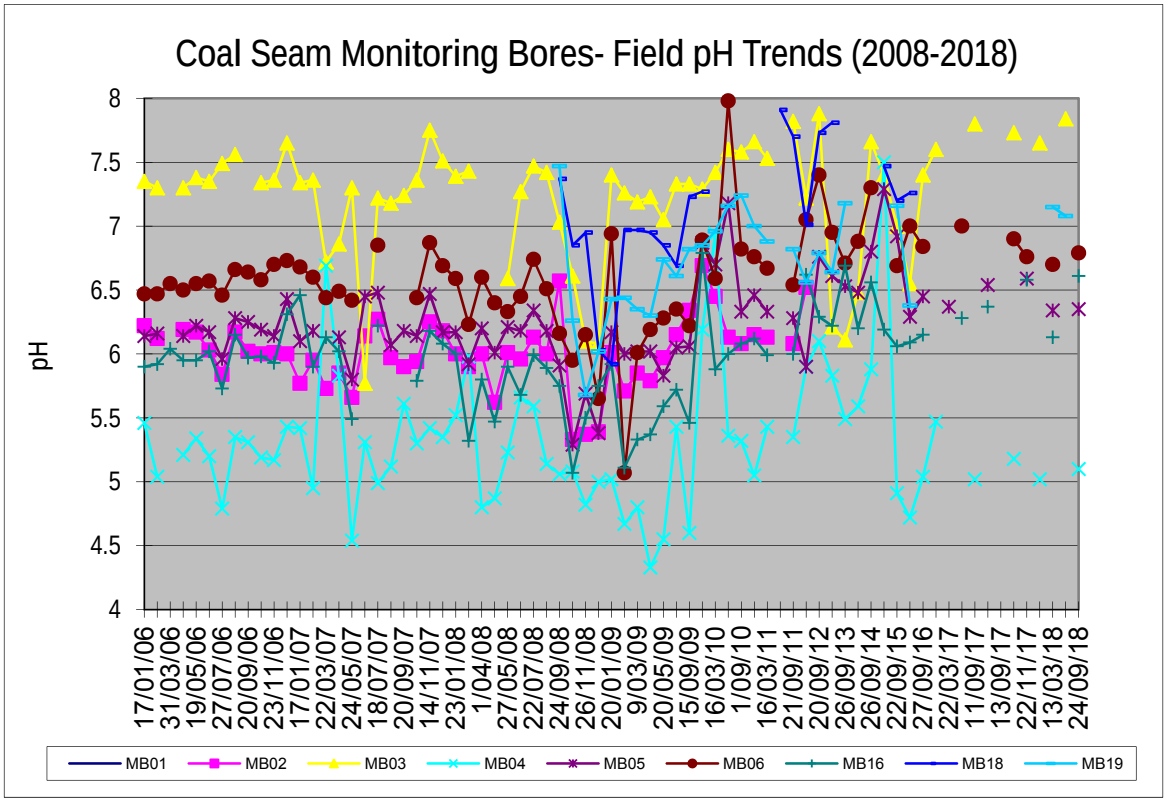

Figure 14: Coal Seam monitoring bores – pH trends (2008 -2018)

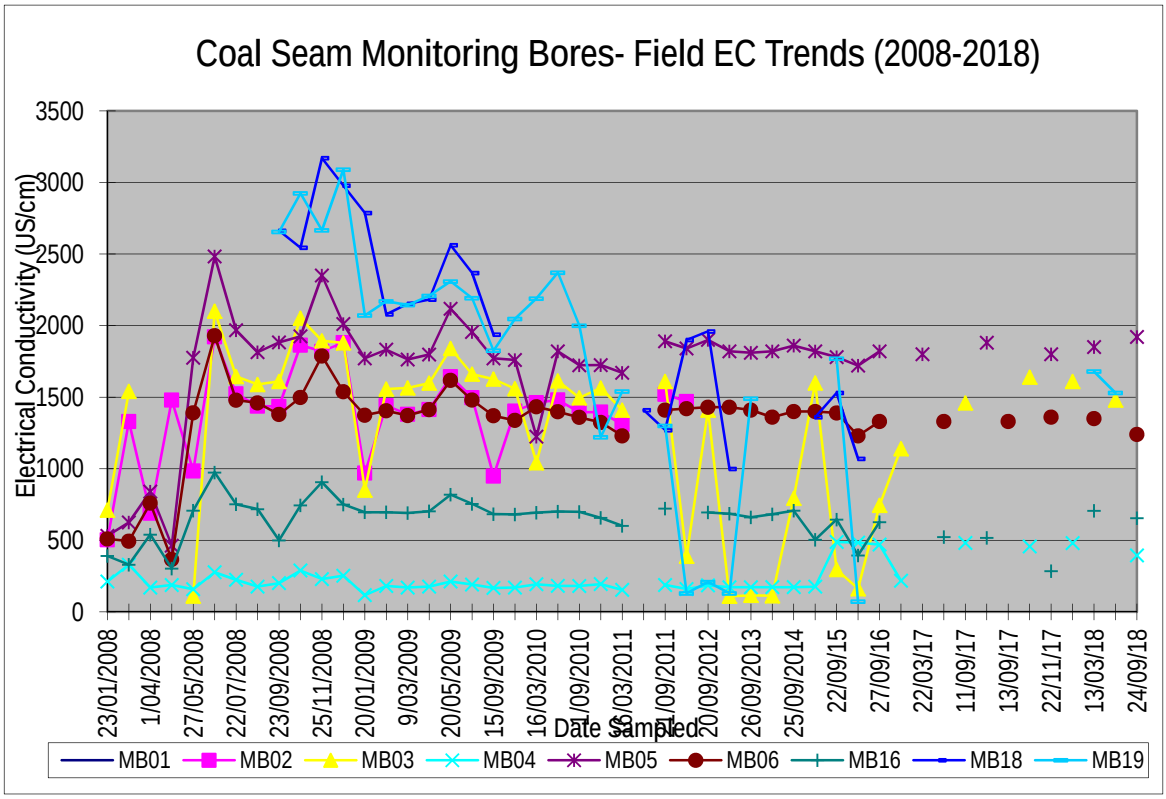

Figure 15: Coal Seam monitoring bores – Ec trends (2008 -2018)

The water levels within the Coal Seam bores were generally stable in 2018. The pH trends shown on Figure 14 indicate that groundwater from the coal seams were quiet variable, ranging from 5.02 to 7.84 during 2018. This could be a result of direct filtration into the shallower bores such as MB18.

Groundwater samples collected from the coal seam monitoring bores have a variable EC with the average conductivities ranging from 395µS/cm to a high of 1920µS/cm in 2018 as shown on Figure 15.

7.3 Water Budget

Newstan utilises potable and recycled water for surface operations and recycled water from dams and old workings for underground operations.

Potable water is used in the bathhouse and amenity systems. All other operations utilise recycled water from the colliery dams, Fassifern No 1. Bore, and the Clean Water Plant. The Clean Water Plant at Newstan Colliery commenced operating in December 2013.

The average volume of water discharged from LDP001 during the reporting period was 4.9 ML per day with a total of approximately 1691.09 ML being discharged for the year. Water from LDP001 discharges to the By-wash Dam where it is allowed to discharge to LT Creek.

A summary of discharges recorded by Newstan Colliery is provided in Table 21.

Table 21: Discharge Data Recorded by Newstan for 2018

Discharge Point	Total Annual Discharge (ML)
LDP001	1691.09
LDP002	0
EPL Point 17 Stony Creek Pipeline	0

8 REHABILITATION

8.1 Buildings

No additional buildings were undertaken during the report period at Newstan. No buildings were removed during the reporting period.

8.2 Rehabilitation of Disturbed Land

The NREA tailings dam is approximately 70% capped at the end of the reporting period. These works are planned to continue in the 2019 reporting period when waste rock / chitter material becomes available. The NREA tailings dam also serves as an emplacement area for waste rock / chitter material. Coarse rejects are transported by truck from the CPP to the NREA where it is used as a rehabilitation capping material, as well as an emplacement area for course rejects material.

Progressive stabilisation and rehabilitation of disturbed areas is undertaken with all land disturbance activities associated with the Newstan Colliery activities.

Re-contouring of the old reject emplacement areas in the NREA continued during the reporting period. Capping and revegetation of this area was also undertaken during the reporting period, and seeding of rehabilitation growth media with a native species mix of an area of approximately 2.1ha completed.

In accordance with the current approved MOP Rehabilitation inspections will be undertaken to check for:

- Evidence of soil erosion;
- Evidence of cap slumping / settlement;
- Highwall instability (SREA)
- Slope instability
- The presence of declared weeds.

Rehabilitation monitoring will include flora and fauna monitoring methodologies as per the Flora & Fauna Management Plan, as well as any observed occurrences of invertebrate recolonisation (ants, soil faunal communities establishing). This monitoring commenced annually in 2015 and will continue until completion criteria have been satisfied.

Maintenance will be undertaken as required until the rehabilitation success criteria has been achieved, and continued until lease surrender.

Table 22 displays a rehabilitation summary for the Newstan Colliery.

Table 22: Newstan Awaba Rehabilitation Summary

Domain	Area Affected / Rehabilitated (ha)	
	Total Area at MOP start (Plan 3A)	Total Area at end of reporting period
Mine Lease Area		
Mine Lease(s) Area	3989.9	3989.9
Domain 1: Infrastructure Area		
Active Mining Area	102	102
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-
Relinquished Lands	-	-
Total	102	102
Domain 2: Tailings Storage Facility		
Active Mining Area	56.2	54.1
Decommissioning	-	-
Landform Establishment	7.0	7.0
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	11.7	13.8
Ecosystem and Land Use Sustainability	20.8	20.8
Relinquished Lands	-	-
Total	95.7	95.7
Domain 3: Water Management Area		
Active Mining Area	11.8	11.8
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-

Domain	Area Affected / Rehabilitated (ha)	
	Total Area at MOP start (Plan 3A)	Total Area at end of reporting period
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	
Relinquished Lands	-	-
Total	11.8	11.8
Domain 5: Stockpiled Material		
Active Mining Area	12.0	12.0
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-
Relinquished Lands	-	-
Total	12.0	12.0-
Domain 8: Underground Mining Area		
Active Mining Area	0 (Area above workings is 5088 ha)	0
Decommissioning	-	-
Landform Establishment	-	-
Growth Medium Development	-	-
Ecosystem and Land Use Establishment	-	-
Ecosystem and Land Use Sustainability	-	-
Relinquished Lands	-	-
Total	-	-

* Estimate only

8.3 Rehabilitation Trials and Research

No rehabilitation trials or research was undertaken at Newstan Colliery during the reporting period. Rehabilitation works undertaken to date on the NREA and SREA have proven successful therefore negating the need to undertake rehabilitation trials.

Analogue Rehabilitation areas were chosen in 2014 in accordance with the Flora & Fauna Management Plan to provide comparative data for the Rehabilitation of the Newstan Colliery lease area. Monitoring at these locations commenced in 2015. The areas chosen include historical rehabilitation site in the NREA, and the Fauna Corridor to the west of the Colliery. The Annual Monitoring Report can be found in Appendix 3.

9 COMMUNITY CONSULTATION

Newstan Colliery consults with the community through forums such as the Newstan Awaba Community Consultative Committee and community organised events.

A Community Consultative Committee (CCC) has been in place at Newstan since 1999. In 2011 Awaba Colliery was joined into the Newstan Colliery CCC. The Committee generally meets quarterly to review the environmental performance of the mine and other relevant matters. Minutes of the meeting are kept and distributed by the independent Chairman. The minutes are also available on the Centennial Newstan website. Meetings of the Newstan and Awaba Colliery CCC were held in April, July and November during the reporting period.

9.1 Community Sponsorship

Newstan Colliery continues to support the local community through various sponsorship avenues to the following community activities, groups and associations in 2018 –

- West Wallsend Public School;
- St Joseph's Primary School - trivia night;
- Awaba Public School - sponsorship contribution to a new playground;
- Catalina Festival sponsorship and assistance with spill kits.

9.2 Community Complaints

There was one community complaint regarding Newstan Colliery operations during the 2018 reporting period.

Table 23: Newstan Complaints 2018

Record of Complaints				
Site	**Date & Time of Complaint**	**Complaint Method**	**Nature of Complaint**	**Newstan/Awaba Response**
Newstan	24/09/2018	Phone call	Resident called to say that they can hear the compressors running at the	Newstan is investigating ways to enclose the compressor shed to minimise and or redirect

			Newstan compound 24 hours a day from their residence at Awaba.	the noise away from the Awaba township.

The Newstan community complaints and enquiries line is in place and contactable on 1800 247 662. Callers are directed to the Environment and Community Coordinator.

Table 24: Newstan Complaints Summary 2010 - 2018

Record of Complaints	
Year	**Total**
2010	21
2011	19
2012	5
2013	6
2014	0
2015	0
2016	2
2017	1
2018	1

10 INDEPENDENT AUDIT

An Independent Environmental Audit of Newstan and Northern Coal Services operations was completed by MCW Environmental Pty Ltd in March 2018. An action plan was prepared in response to the recommendations listed in the 2015 and was provided to the Department of Planning and Environment. The 2018 IEA has not yet been finalized in conjunction with the Department. Once finalized the action plan and audit will be provided within the 2019 Annual Review.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

Table 25: Non- Compliance 1

Nature of the incident/non-compliance	Activities from Newstan Colliery complied with the relevant development consent noise limits during the Q2 monitoring at all monitoring locations, with the exception of NC1, NC3 and NC6 during the evening period and NC1, NC3, NC4 and NC6 during the night period.
Date of incident / non-compliance (if known; if not known state not known)	26th June 2018.
The location of the incident / non-compliance (include a figure if appropriate), if known	NC1, NC3, NC4 and NC6.
Detail the cause of the incident / non-compliance	Exceedances of the noise limit criteria was noted to be due to the Newstan Coal Handling Preparation Plant (CHPP).
Detail action that has been, or will be, taken to mitigate any adverse effects of the incident / non-compliance	Newstan Colliery is currently undertaking work to implement a noise model to allow for the real time noise monitor on site to be used as a more precise management tool. A comparison of the model against the Quarter 2 compliance monitoring undertaken by Global Accoustics, showed a substantial difference in the predicted noise recorded at NC1. All other locations showed similar results. Newstan is investigating the precise sources of noise from the CHPP with the assistance of Advitect Environmental and will implement measures to ensure that compliance against SSD5145 is adhered too. Ongoing work to address the noise exceedances also includes screen and centrifuge testing to eliminate excessive vibrations within the CHPP. Centennial Newstan notified the affected land owners of the noise exceedance in accordance with schedule 4 condition 1 of the Development Consent SSD-5145.
Detail action that has been, or will be, taken to prevent recurrence of the incident / non-compliance	Newstan Colliery continues to investigate noise from the CHPP. Actions will be developed following the completion of the investigation.

12 ACTIVITES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Table 26: Activities to completed in the next reporting period

Newstan Colliery
Revision & update to Bushfire Management Plan.
Revision & update to Land Management Plan.
Revision & update to Landscape Management Plan.

Centennial Coal