MINE SUBSIDENCE – HISTORY OF BORD & PILLAR MINING DAMAGE

Government, Council, Unions and Industry have historically denied, lied, and covered-up inconvenient truths about coal mining in the Lithgow region to fit their 'economic benefits' dialog. All routinely ignore cumulative impacts, offsite minewater pollution, threatened species, aboriginal heritage, legacy mining issues, post-mining impacts, the non-compliance culture, and take the drug dealers defence on emissions, whilst forever increasing mining intensity, extraction ratios, and the severity of impacts.

Subsidence damage due to longwall mining in the Lithgow area since first introduced at Angus Place Mine in 1979 has been well documented. Not by Government, Council, Unions or Industry, but by outraged traditional owners, residents, bushwalkers, volunteer-run community groups, and a diligent media.

Subsidence damage due to Bord & Pillar mining is also widespread, but less well documented. The mining industry, Federal & NSW Governments appear to be exploiting this information gap to rewrite history by endorsing inaccurate predictions of mine subsidence impacts to claim 'No evidence' & 'Negligible impacts' from Bord & Pillar mining methods, despite substantial evidence to the contrary at –

- Airly Mine
- Canyon (Grose Valley) Colliery
- Clarence Colliery
- Cobar Park Colliery
- Hassans Walls Reserve (Hassans Walls Colliery, Lithgow Valley Colliery)
- Katoomba Colliery (Dogface Rock)
- Invincible Colliery
- Ivanhoe Colliery
- Newcom Colliery
- Newnes Shale Oil Mine
- Oakey Park Mine
- State Mine
- Tyldsley Mine
- Vale of Clywdd Colliery, and Vale of Clywdd No. 2 Colliery
- Wallerawang Colliery
- Western Main Colliery

Below are 80 examples at 20 Bord & Pillar mines refuting claims of 'No evidence' and 'Negligible impacts'.

1. AIRLY MINE

The original 1993 consent was for 'Bord & Pillar' mining. A word change to 'Partial Extraction Methods' in the December 2016 consent deceptively turned Airly into a longwall mine using 'mini-longwalls'. The consent allowed for <125mm vertical subsidence, however up to 700mm occurred, causing major surface fractures in Mugii Murum-ban SCA. In May 2022 Centennial Airly Pty Ltd signed a $150,000 Enforceable Undertaking under Section 9.5 of the *EP&A Act 1979*. Too little too late however, irreversible damage had been done. A cliff fall also occurred above the old 'New Hartley Shale Mine'.

2. CANYON (GROSE VALLEY) COLLIERY

A Bord & Pillar mine in the Katoomba Seam originally opened as Hartley Vale No. 4 Colliery in 1956, Grose Valley Colliery from 1960 – 1987, and Canyon Colliery from 1990 - 1997. Subsidence cracks above the mine on Kamarah and Jungaburra Ridge allow vertical flow of surface and groundwater into mine workings, where it is contaminated with salts and heavy metals before discharge via a mine adit into Dalpura Creek and Grose River within the Blue Mountains Heritage Area (GBMWHA).

Zinc & nickel levels are up to 500 times above guideline limits, toxic to macroinvertebrates relied on by all aquatic life. Wright, I. and Burgin, S. (2009), 'Comparison of sewage and coal-mine wastes on stream macroinvertebrates within an otherwise clean upland catchment, Southeastern Australia', *Journal of Water, Air and Soil Pollution*, vol 204, no 40634, pp 227 – 241. www.smh.com.au/environment/sustainability/disused-mine-leak-is-killing-life-in-river-20080504-2atg.html

Photo 1, 2, 3: Mine subsidence cracks on Kamarah Ridge and Jungaburra Ridge above Canyon Colliery – 10 February 2015

Photo 4, 5, 6: Contaminated mine water discharge from Canyon Colliery into Dalpura Creek and GBMWHA – 5 May 2015

3. CLARENCE COLLIERY

A Bord & Pillar mine which claims <100mm vertical subsidence, despite 131mm being recorded above the 900D Line in 2022 and 115mm above the 609D line in 2016. Centennial claimed in a 2024 EPBC Referral that there was '*no known evidence of mining-related impacts*' above Clarence Colliery. Yet LEG has recorded at least 28 Hectares of dead or damaged nationally endangered swamps, 10.5 km of dry and desiccated creeklines, cliff falls, surface cracks, and other damage at 25 separate sites. The DCCEEW and DEWHA do not appear to be aware of and/or have not formally acknowledged this damage, nor the loss/damage of 15 nationally endangered swamps above Clarence Colliery.

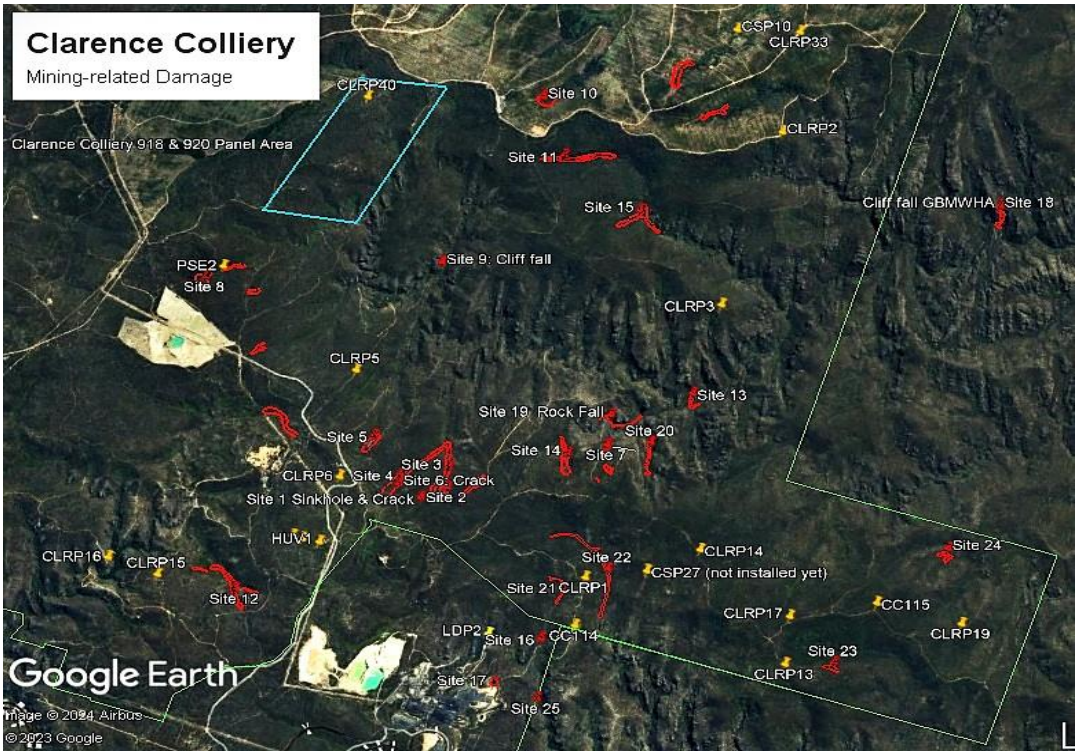


Figure 1: Mining-related damage – Clarence Colliery. Location of sites referred to below.

3.1 Site 1: (-33.442041, 150.240876) Subsidence Crack, Sinkhole, Dead THPSS, & Dry creek downstream

First recorded July 2010, last sighted April 2024. Large sinkhole 200m long x 10m wide x 2m deep with a 150-250mm wide subsidence crack at its eastern end. The crack runs east-west across a northerly flowing tributary of Bungleboori Creek. All surface water that once flowed down this creek now flows down that crack, and the creek and THPSS downstream are totally dry. Groundcover vegetation has not recovered in 14 years of observation, with many bare and denuded areas.

LEG notes the IESC Advice on the Clarence Colliery Extension (EPBC 2012/6446) on 31 July 2012 - "*The IESC committee notes that the design adopted by Clarence Colliery is expected to limit the subsidence to less than 100 mm, with tilts and strains less than 2 mm/m and 1 mm/m respectively, and that to date, no surface cracking has been observed above Clarence Colliery.*" No surface cracking??? (see also Site 6).

Photo1: Site 1 Crack in sinkhole - July 2010

Photo2: Site 1 Crack in sinkhole June 2024

Photo 3: Dry creek downstream 2024

Photo 4: Site 1 Sinkhole – July 2010

Photo 5: Site 1 Sinkhole – June 2024

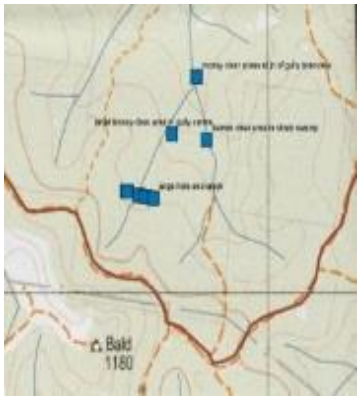


Photo 6: Damage around Site 1

3.2 Site 2: (-33.440710, 150.243709) Dead THPSS & Hanging Swamp

First recorded July 2010, last sighted April 2024. Dead THPSS extending 300m downstream with dead Hanging Swamps along verges. Visible on Google Earth. White sand/peat with dead *Leptospermum grandifolium* and *Lepidosperma limicola* stumps. Very little natural regeneration has occurred over 14 years, as the creek is totally dry. Nature doesn't appear to know how to heal desiccated peat swamps.

Photo 7: Site 2 Damaged THPSS – June 2024

Photo 8: Site 2 Damaged THPSS – June 2024

3.3 Site 3: (-33.438415, 150.243364) Dead THPSS Swamp, Silt Plug, lack of groundcover vegetation

First recorded July 2010, last visit April 2024. Clearly visible on Google Earth. A silt-plug about 20m x 10m in a dead THPSS with a dry creekbed. After 14 years this creek remains completely dry, and the swamp remains bare. All this silt will eventually end up in Bungleboori Creek and the GBMWHA.

Photo 9: Site 3 Silt plug - June 2024

Photo 10: Site 3 Moss was the only vegetation in July 2010

Photo 11: Site 3 All this unstable silt will end up in GBMWHA

Photo 12: Remnant Leptospermum stump in dead THPSS

3.4 Site 4: (-33.439850, 150.238116) Dead/Damaged THPSS Swamp, Dry Creek

First recorded July 2010, last visit June 2024. At least 400m of this THPSS is dead (entire length not walked), and dead Hanging Swamps occur along the verges. Severe erosion downstream has liberated 1000s of tonnes of silt which will end up in Bungleboori Creek and ultimately the GBMWHA.

Photo 13: Site 4 Dead/Damaged THPSS - July 2010

Photo 14: Dead/Damaged THPSS – June 2024

3.5 Site 5: (-33.436064, 150.234311) Damaged THPSS Hanging Swamp

First recorded July 2010, last visit April 2024. Damaged THPSS Hanging Swamp extending 240m or more along a slope below a ridge. Occasional bare patches further downhill towards swamp in creek.

Photo 15: Site 5 Damaged Hanging Swamp - June 2024

Photo 16: Site 5 Damaged Hanging Swamp – June 2024

3.6 Site 6: (-33.440885, 150.238142) – Mine Subsidence Crack

Recorded June 2024. A subsidence crack 600mm long x 300mm wide running east-west along an old motorbike track. Water flowing down the track is funnelled underground. LEG notes the IESC Advice on the Clarence Colliery Extension (EPBC 2012/6446) on 31 July 2012 - *"The IESC committee notes that the design adopted by Clarence Colliery is expected to limit the subsidence to less than 100 mm, with tilts and strains less than 2 mm/m and 1 mm/m respectively, and that to date, no surface cracking has been observed above Clarence Colliery."* No surface cracking??? (see also Site 1 above).

Photo 17 & 18: Site 6 Mine Subsidence Crack 600mm x 300mm – June 2024

3.7 Site 7: (-33.433493, 150.260677) Dead/Damaged THPSS Hanging Swamp

First recorded October 2008, last visit June 2024. Dead Hanging Swamp, more damage upstream. Little has regrown in 16 years as the creek and swamp are totally dry. Severe erosion & siltation.

Photo 19-22: Site 7 Dead THPSS Hanging Swamp with more damage upstream – after 16 years little has regrown – June 2024

3.8 Site 8: Upper Paddys Creek Swamp (-33.421619, 150.212010)

First recorded August 2020, last visit April 2024. In 2020 LEG assessed the recovery of THPSS on Newnes Plateau after the 2019 fires. Undermined THPSS were severely damaged (eg. Carne West Swamp), whereas THPSS that were not undermined recovered very quickly (eg. Broad Swamp).

Upper Paddys Ck Swamp exhibited all the hallmarks of a THPSS which had been undermined. A*tt 17 Clarence 2023 Groundwater Monitoring Results* states '*PSE2 exceeded the trigger level in 2023*. *In August 2022 active mining of Panel 909 occurred approx 200m east of PSE1, and while PSE2 was undermined no mining impacts were observed. During the reporting period, active mining of Panel 919 was approx 50m east of PSE1 and 800 to 850 m north-east of PSE2. No impacts were observed*".

Clearly Upper Paddys Creek Swamp was drained by Panel 909, and subsequently damaged by the December 2019 fire. This damage is only a short distance from vegetation monitoring points SV184 & 185 and Centennial must have been fully aware of it. Why wasn't this THPSS damage reported?

Photo 23, 24, 25: Site 8 – Upper Paddys Creek Swamp, Panel 909. Damaged THPSS, SV185, & limited recovery after fire

Photos 26, 27, 28: Site 8 - Upper Paddys Creek Swamp, Panel 909. Moss but little else regenerating 4.6 years after fire.

3.9 Site 9: Cliff collapse – Panel 912 (-33.416420, 150.238266)

Recorded by LEG on 9 March 2018. The Clarence Colliery 2016 End of Year Report states that Panel 912 was approved on 7 June 2016 as part of the 900 Area Variation 3. The EPBC Referral for Clarence Colliery Panels 918-920 stated *"the proposed action is not expected to result in any measurable direct or indirect impacts to geodiversity values (ie clifflines)".* Really??? (see also Site 18 & 19)

Photo 29: Cliff collapse - Panel 912

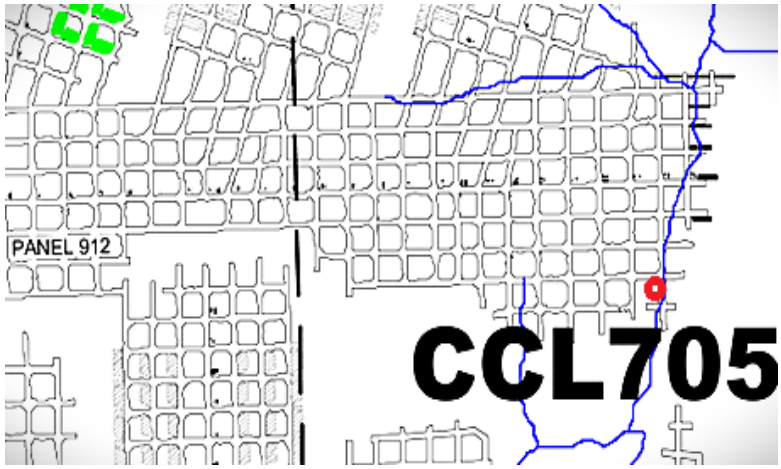


Figure 2: Location of Cliff fall (Red Dot) in Panel 912

Dewatering of Bord & Pillar mines is also known to exacerbate subsidence risks.
https://www.researchgate.net/publication/325562642_Effects_of_dewatering_flooded_abandoned_room-and-pillar_mines_on_surface_subsidence

3.10 Site 10: Dead Vegetation on THPSS verge (-33.396996, 150.246106)

Google Earth imagery showed intact vegetation east of the Aboriginal grinding groove site off Waratah Ridge Road in July 2021, yet in August 2023 vegetation die-back was clearly visible. A dramatic drying event had occurred. The only disturbances in this area between 2021 and 2023 were Mustard Gas removal (didn't occur near this swamp) and mining of Clarence Colliery Panel 906 or possibly headworks for Panels 908 & 910. Groundwater levels may have been lowered to facilitate mining.

Photo 30: Site 10 Google Earth Imagery July 2021

Photo 31: Site 10 Google Earth Imagery August 2023

3.11 Site 11: Swamp Damage, Rusty Water (-33.402892, 150.248769; -33.402273, 150.252433)

Vegetation along this creekline was damaged by early Clarence Colliery mining (Longwall 1). What was once a swamp is slowly reverting to Eucalypts and Acacia, however little groundcover vegetation has regenerated to stabilize the sand and peat to control erosion and siltation.

In addition the water has a distinct rusty-red discoloration not sighted in nearby creeks. This is not unlike Lambs Creek in the Angus Place 300 Area where subsidence cracks allow vertical groundwater flow from upper aquifers into incised valleys, picking up oxidizing sulphuric minerals along the way.

All coal seams slope downhill in a north-east direction, Panel 414/Longwall 4 are the lowest Clarence mine workings, and it is feasible that minewater seepage contaminated with Iron, Manganese, Nickel etc is resulting in metal pollution of Bungleboori Creek which flows into the GBMWHA – a MNES.

Photo 32 & 33: Site 1 1- Rusty-red discoloured water & swamp damage Longwall 1 – June 2024

3.12 Site 12: Panel 707 Damage to THPSS Farmers Creek South Swamp (-33.454730, 150.221975)

Farmers Creek South Swamp was drained by Clarence Colliery Panel 707 in 2012 and subsequently severely damaged by the State Mine Fire in October 2013. Previous damage had occurred due to the Clarence Water Transfer Scheme (CWTS) discharge point (33.456013, 150.222956).

Neither Centennial nor Lithgow City Council reported this THPSS damage. LEG was forced to report it to the Sydney Catchment Authority (SCA).

Photos 34,35,36: Site 12 - CWTS Discharge Point into Farmers Creek Swamp on 31 January 2010, and after the 2013 fire.

Photos 37, 38, 39: Site 12 – Erosion, channelization, slumping downstream of Clarence Transfer discharge – 31 January 2010

Photos 40, 41, 42: Site 12 – Erosion, scouring, slumping after undermining by Panel 707 and State Mine Fire – 24 November 2013

The Sydney Catchment Audit 2010 included Recommendation 9: *Lithgow City Council & Centennial Coal should ensure that water transfers from the Clarence Water Transfer Scheme are piped around, rather than flow through, Farmers Creek Swamp.* The Federal Government provided $4 million in funding.

That work was completed in August 2013, however just 8 weeks later was partly destroyed by the October 2013 State Mine Fire which melted poly pipes that had been laid above-ground. Meanwhile damage due to undermining of this swamp by Panel 707 slipped under the radar.

This issue highlights systemic failures that continue to occur with coal mines in the Lithgow region – failure to take responsibility. The minewater emanates from and was polluted by Clarence Colliery; pumping infrastructure and header tanks are located on Clarence Colliery premises; the discharge point is in Clarence Colliery Panel 707; Panel 707 undermined this swamp in 2012; and the October 2013 State Mine Fire irreparably damaged this swamp because it had been dried out by mining.

Why were regular inspections not done? Why wasn't this damage officially reported by Centennial Clarence Colliery, the DCCEEW, or DEWHA? Why has this THPSS damage not been rehabilitated?

3.13 Site 13: Panel 606 – Altered flow path of Bungleboori Creek (**-33.426634, 150.269177)**

GoogleEarth imagery in November 2014 (after the October 2013 State Mine Fire) shows the stream path of Bungleboori Creek at the southern end of Clarence Colliery Panel 606 as being intact. In September 2024 (after December 2019 Gospers Mountain Fire) it was significantly disturbed.
On inspection it appears that Bungleboori Creek has changed course in a more easterly & southerly direction. LEG believes this is not fire-related. Undermining of Bungleboori Creek by Panel 606 has likely resulted in subsidence altering the slope of the land surface and tilting of the creekbed.

Photo43: Google Earth Imagery 11/2014

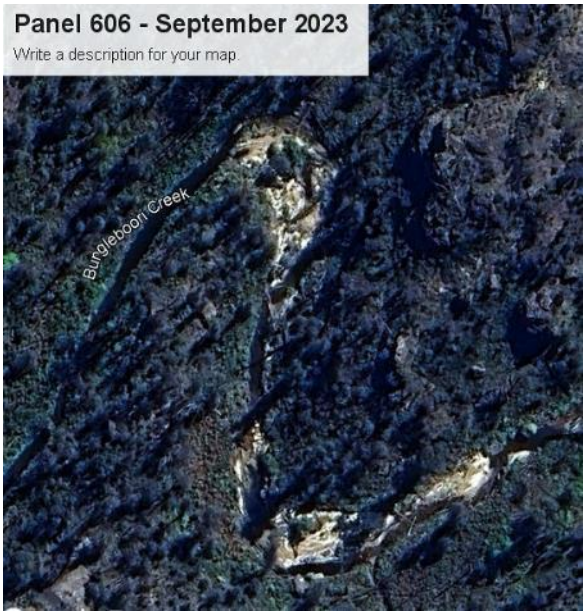


Photo 44: Google Earth Imagery 09/2024

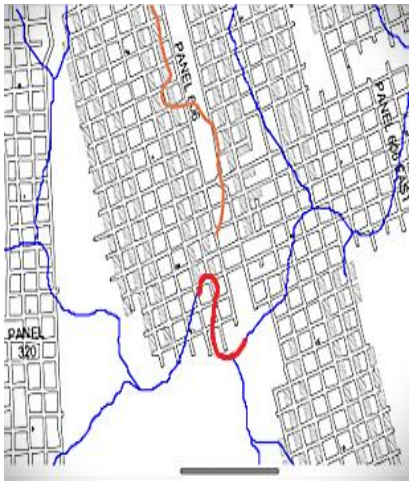


Fig 3: Panel 606 creek damage(Red)

Photo 45 & 46: Bungleboori Ck under-cutting bank & forming new channel

Photo 47, 48,49: Bungleboori Creek tilted by Panel 606, abandoning old channel, and forming new channel

Photo 50 & 51: Bungleboori Creek tilted by Panel 606 & forming a new channel

3.14 Site 14: Dead THPSS Hanging Swamps, dry and damaged creek (-33.435046, 150.256391)

THPSS Hanging Swamps above Panel 308 have died, the entire length of the creek for about 1km to its junction with Bungleboori Creek has dried up, there are possible sinkholes, and severe erosion.

Photo 52-55: Site 14 - Dead hanging Swamps, dried up creek, possible sinkholes, severe erosion

3.15 Site 15: Dead Hanging Swamp, dried up creekline (-33.407745, 150.259405)

Several dead hanging swamps occur in this area, the creekline is dry and desiccated, and an arm of Bungleboori Creek downstream is totally dry. Whilst inspecting this site LEG recorded the threatened species *Pultenaea glabra* (EPBC Act - Vulnerable; NSW BCA - Vulnerable), not previously reported by Centennial as occurring in the Clarence Colliery Mine Lease. This raises serious questions about the adequacy of Centennials recording/reporting of Threatened Species at risk to its mining operations.

Photo 56-58: Site 15 Dead Hanging swamps, dry and desiccated creekline, dry creekbed downstream

3.16 Site 16: Clarence Colliery Coal Fines Spill – 22 December 2023 (-33.455350, 150.257381)

The Clarence Colliery coal-fines spill into the Wollangambe River on 22 December 2023 was reported by LEG, not by Centennial. This highlights an ongoing issue with Centennial mines in the Lithgow area - failure to report incidents of environmental harm.

On the 22 December 2023 the EPA issued the licensee (EPL726) with a Prevention Notice (Reference Number 3507989 SR-2006) in response to observations made by EPA officers that turbid water was discharging from the Premises via the Main Dam and was discharging into the Wollangambe River. The EPA officers also suspected that there was a build-up of coal fines/coal material in the Polishing Lagoon, and the Main Dam. The Clean-up Notice required the Licensee to engage a suitably qualified

ecologist to undertake an ecological assessment of any environmental impacts that may have resulted from the discharge of turbid water and coal particles entering the Wollangambe River, and to recommend options to recover any coal fines and remediate the environmental impact. The Clean-up Notice also required the Licensee to engage a suitably qualified engineer to recommend options to improve the water management system at the Premises to prevent turbid water and coal fines from polluting waters. On the 15 January 2024, the EPA undertook a follow-up site inspection and meeting with Centennial staff at Clarence Colliery. During the site inspection EPA officers inspected the water management system at the Premises as it relates to flow towards the Polishing Lagoon and the Main Dam. At the conclusion of the meeting, EPA staff advised Centennial staff members that the EPA intended to issue additional notices in relation to the incident.

Photos 59-61: Clarence Colliery coal-fines spill into Wollangambe River – 22 December 2023

3.17 Site 17: Collapse of Reject Emplacement Area ("REA") 3 on 2 July 2015

On 2 July 2015 part of the eastern wall of Reject Emplacement Area (REA) 3 failed, resulting in the release of coarse reject and 2,330 tonnes of coal fines into the Wollangambe River & GBMWHA. The Land & Environment Court convicted Clarence Colliery P/L of two offences and imposed financial penalties totalling $1,050,000 plus $106,010 in investigation and legal costs - the single largest fine following prosecution by the EPA.

REA3 was approved by Lithgow City Council in 1993. The collapse of a dam built out of coarse reject material was clearly foreseeable. The likelihood of anything approved by Lithgow Council failing was clearly foreseeable. The fact REA3 had been full since 2011 and overtopping could occur was clearly foreseeable. Lithgow Council's development approvals 174/93 and IRM.GE.76 are in Perpetuity.

Further instances of environmental harm such as this are clearly foreseeable – in Perpetuity.







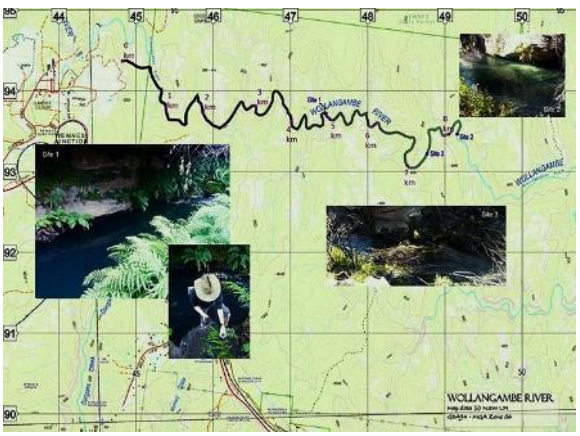



Photo 62-69: Clarence Colliery Reject Emplacement Area ("REA") 3 – collapsed on 2 July 2015

3.18 Site 18: Cliff collapse in GBMWHA east of Panels 611A & 611B (-33.401661, 150.299628)

Centennial claimed in the EPBC Referral for Clarence Colliery - Secondary Extraction of the 918 & 920 Panels using Partial Extraction Mining Methods *"…considered improbable that subsidence impacts will extend more than 1km away from the proposed action. Consequently, the proposed action is not expected to result in any measurable direct or indirect impacts to geodiversity values (ie clifflines), biodiversity values, species habitats nor ecological and biological processes within the GBMWHA."*

Centennial also claim that Secondary Extraction of the 918 & 920 Panels will limit vertical subsidence to less than 100 mm, with tilts and strains less than 2 mm/m and 1 mm/m respectively.

Yet a Condition Red TARP along the 900D line was notified to the NSW Resources Regulator on 26 July 2022 when 131mm vertical subsidence was recorded. Eight (8) other marks also exceeded the 100mm threshold. LEG recorded a cliff collapse at the end of Panel 912 in March 2018 (see Site 9 above). Previously a Condition Amber was triggered for the 600 Panels when subsidence of 115mm exceeded the maximum allowable 100mm threshold.

Mine dewatering is known to increase the subsidence risk well beyond the mining footprint – 'Effects of dewatering flooded abandoned room-and-pillar mines on surface subsidence' https://www.researchgate.net/publication/325562642_Effects_of_dewatering_flooded_abandoned_room-and-pillar_mines_on_surface_subsidence

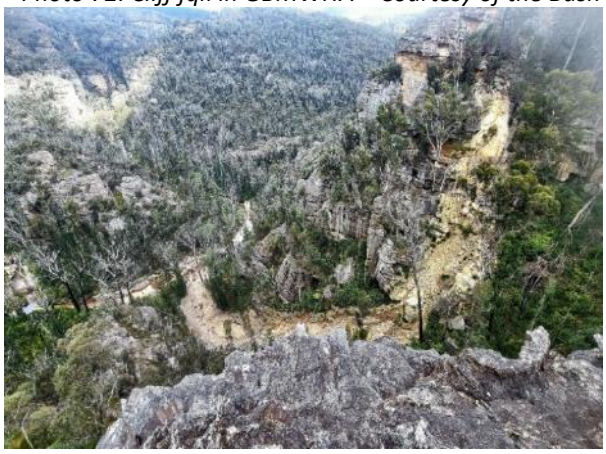
Mining near Lineaments and Faults is known to have far-field subsidence effects (eg. Loss of Carne West Swamp to Springvale Colliery longwalls undermining the Deanes Creek Lineament Zone). Several Lineaments and Faults have been recorded at the northern-eastern end of the 600 Panels.

The cliff fall below occurred in the GBMWHA about 1km east of Clarence Colliery Panels 611A & B between 2019 and 2023. The cliff was about 60m high, and fallen rubble extends some 200m into Bungleboori Creek which appears to have been dammed-up. Far-field effects are entirely possible.

Photo 70: GoogleEarth imagery - August 2019

Photo 71: GooglEarth imagery - September 2023

Photo 72: Cliff fqll in GBMWHA – Courtesy of the Bush Explorers, Yuri Bolotin and Brian Fox – 19 August 2024



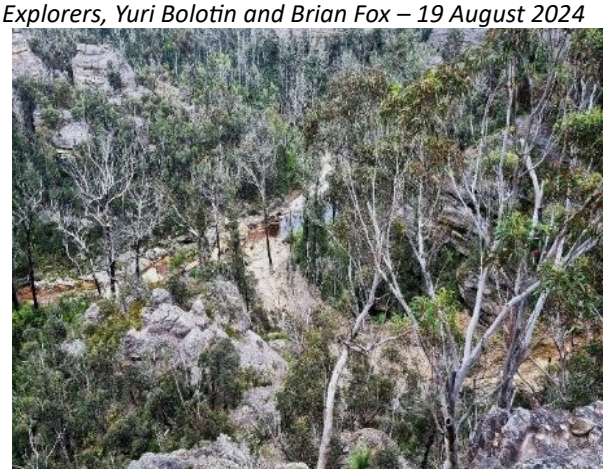


Photo 73-74: Cliff fall in GBMWHA east of Clarence Colliery Panels 611A & 611B – 19 August 2024

3.19 Site 19: Rock Fall – Panel 307 (-33.430213, 150.260434)

Recorded 4 September 2024. Appears to be a relatively recent rock fall. The creek (a tributary of Bungleboori Creek) in this vicinity has also dried up, both upstream and downstream.

Figure 4: Rock fall (red dot), dry creek

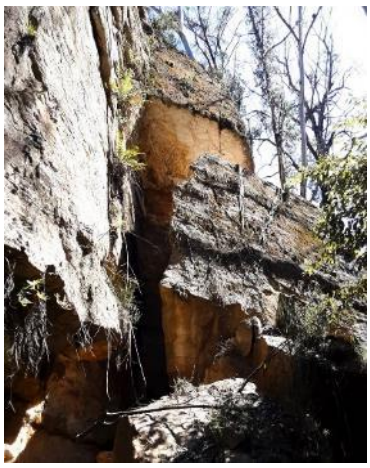


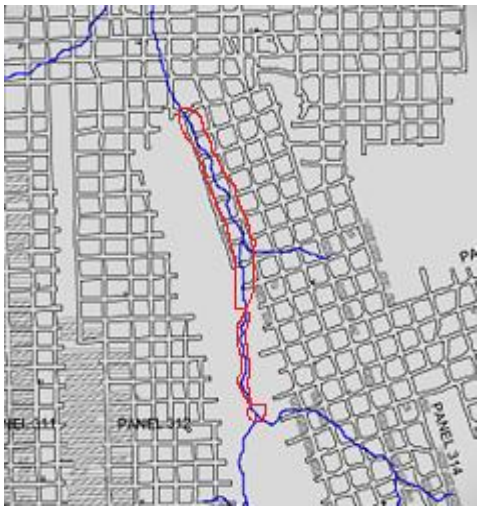
Photo 74 & 75: Site 19 Panel 307 – Rock fall and dry creek

3.20 Site 20: Panel 314 - Severe channelisation, THPSS damage, rusty water (-33.432554, 150.265502)

Recorded on 4 September 2024. Panel 314 was approved on 19 February 2010 and expired on 1 February 2015 as part of the Clarence Colliery Panel 314 & 316 Area Subsidence Management Plan.

This is the most severe channelisation and erosion LEG has seen on Newnes Plateau. The most recent damage is clearly visible on Google Earth, extending for 200m and up to 20m wide x 4m deep. It corresponds almost exactly to where Panel 314 passed underneath this creek. Remnant *Olearia quercifolia* and other swamp species suggest THPSS or Hanging Swamps once occurred pre-mining.

Older channelisation and erosion extends a further 150m upstream, near to a patch of rusty-red water visible on GoogleEarth, possibly minewater seepage, which disappears underground. Old pegs along a subsidence monitoring line occur on the ridge to the west. LEG believes the initial damage was caused by early 300 Panels (Wongawilli Full Extraction), and reactivated by Panel 314 post 2010.



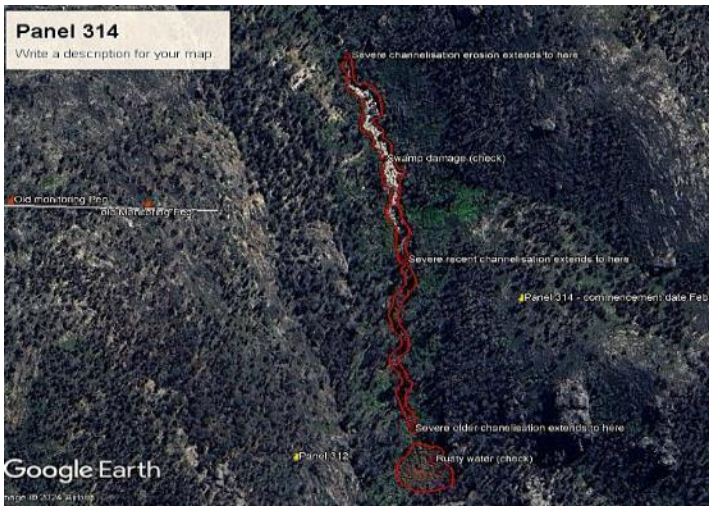


Photo: 76 & 77 Clarence Colliery Panel 314 – Severe channelisation, erosion & dried-up creek in former THPSS

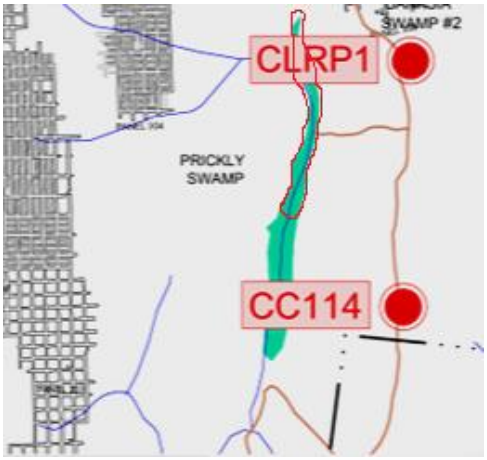

Photo 78, 79: Clarence Colliery Panel 314 – relatively recent severe channelisation, erosion, slumping, dry creek

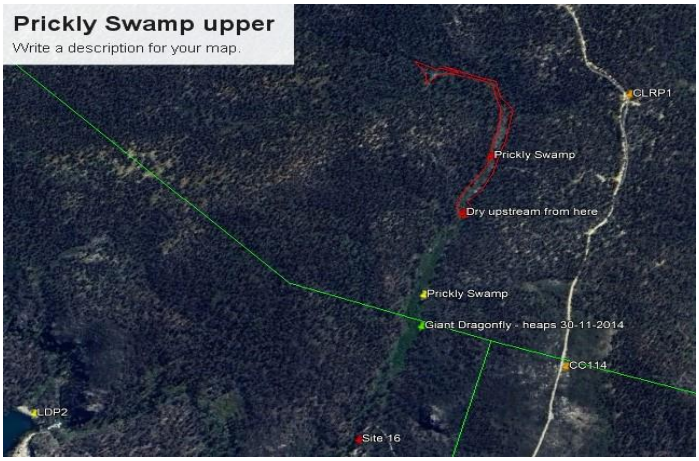


Photo 80-82: Panel 314 – Severe channelisation, erosion, rusty-red discoloured water, old mine subsidence peg

3.21 Site 21: Upper Prickly Swamp (-33.449634, 150.258727)

Prickly Swamp is mapped by Centennial as a Newnes Plateau Shrub Swamp (*Clarence Colliery Annual Environmental Monitoring Report (AEMR) 1 January 2023 to 31 December 2023, Appendix A*). The upper half of this swamp has dried out, and erosion is visible. The first sign of any surface water is at -33.450783, 150.258430. CLRP1 (Vibrating Wire Piezometer) reported "Data gaps exist due to logger issues". CC114 (VWP) reported "A new logger was installed in October 2021 due to reliability issues."

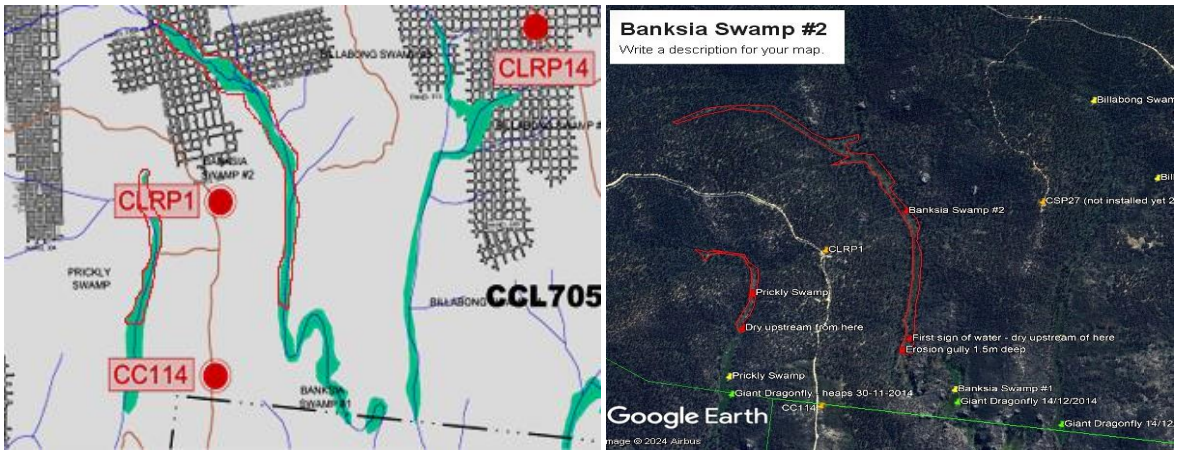




Photos 80-82: Maps of THPSS damage to upper Prickly Swamp

3.22 Site 22: Banksia Swamp #2 (-33.446771, 150.263533)

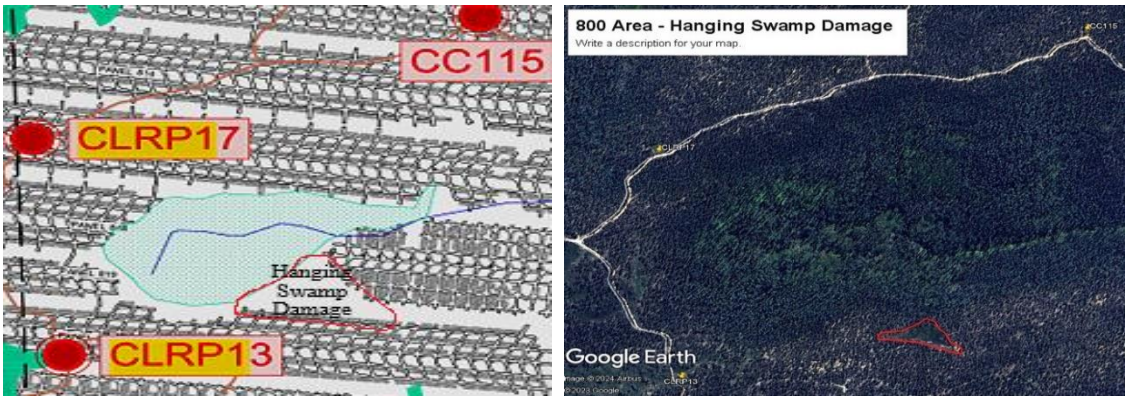
Banksia Swamp #2 is mapped by Centennial as a Newnes Plateau Shrub Swamp (*Clarence Colliery Annual Environmental Monitoring Report (AEMR) 1 January 2023 to 31 December 2023, Appendix A*). At least 1km of this swamp was dry at the time of visit. The first sign of any water was at -33.451538 150.263433, and that was 1.5m below the swamp surface in a deep erosion gully. The upper sections of this swamp were undermined by Panel 330 & 332. Mine dewatering may be a contributing factor. Erosion nick-points are forming (eg. -33.451538, 150.263433) and should be monitored/stabilised.



Photos 83-88: Site 22 – Banksia Swamp #2. Dry desiccated THPSS, erosion & nick points starting to occur.

3.23 Site 23: Hanging Swamp Damage – Panel 818A/820 (-33.453466, 150.290740)

This small MU51 Hanging Swamp is desiccated and showing signs of mining damage. It is about 500m east of CLRP13 on the eastern edge of the diatreme which Panels 818A/820 had to avoid.

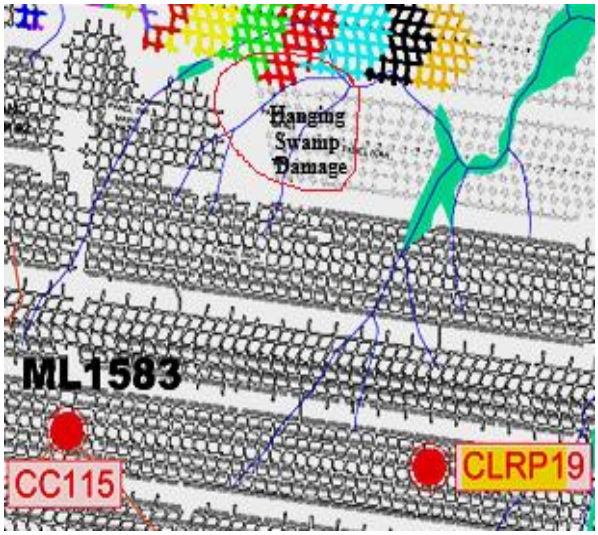


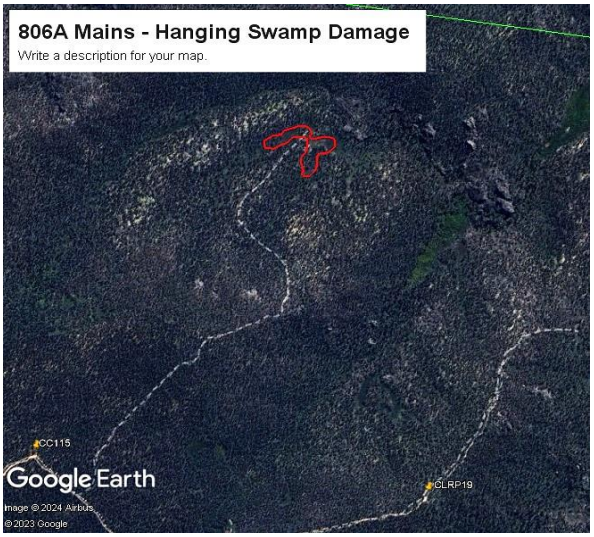
Photos 89-92: Site 23: Dead Hanging Swamp in 800 Area ("The Boot") about 500m east of CLRP13.

CLRP13 reported '*depressurisation in early May 2022 likely due to mining, and continued decreasing trend during 2023, probably mining related*'. CLRP13 overlies Panel 820 which was mined in 2018. *'There are large data gaps at all piezos from October 2018 to July 2021 due to logger issues. Further data gaps exist between 10 February 2023 and 18 April 2023 for Piezo #1 (below MYC). Piezo #5 (above MYC) appears to have malfunctioned in early December 2022.'*

3.24 Site 24: Hanging Swamp Damage - 806A Mains (-33.439578, 150.301448. -33.439431, 150.300625)

Several Hanging Swamps in this area are showing early signs of deterioration and the creek upstream is dry. Panel 806A is currently being mined. CLRP19 reported "*Depressurisation response since August 2021 due to mining Panel 818A. Continued decreasing trend during reporting period*." Panel 812 undermined CC115 and all piezos depressurised due to first workings in June *2013. "Further depressurisation was observed in May 2016 following pillar extraction. A depressurisation response in Piezos #1, #2 and #3 (below the MYC) was observed in August 2021 due to mining of Panel 818A. During the reporting period, active mining of Panel 804 and Panel 806A was within 1 km of CC115. Following initial depressurisation observed in 2021, Piezos #1, #2 and #3 continue to show a decreasing trend".*





Photos 93-97: Site 24: Damaged Hanging Swamps Panel 806A Mains, 800 Area ("The Boot").

3.25 Site 25: Hanging Swamp collapse, GBMWHA boundary east of REA3 (-33.461881, 150.258171)

This small Hanging Swamp collapse above the Wollangambe River on the GBMWHA boundary is fairly recent, and based on historic Google Earth imagery occurred sometime between July 2021 and September 2023. Whilst perhaps not mining related, it is only 400m east of Clarence Colliery REA3.

Photos 98-101: Site 25 Hanging Swamp collapse above Wollangambe River on GBMWHA boundary

Summary of Clarence Colliery mining-related impacts

First-workings at Clarence Colliery (eg. 700 Panels approved 2005) removed <50% of the coal seam. Current and reasonably foreseeable future mining in the 700, 800, 900 and Northern Area plan to remove 62% or more. Panel & Pillar Partial Extraction (PPPE) in the 918-920 Panels propose 1.5km long panels with an 85m void width. This exceeds the 61m void width of Airly Mine mini-longwalls which resulted in irreversible damage to Muggi Murrum-ban SCA and a $150,000 Enforceable Undertaking in 2022.

Recurring themes in the above 20 examples of mining-related impacts at Clarence Colliery include –

- Inaccurate predictions of subsidence impacts on swamps, cliffs, waterways, and the GBMWHA;

- Failure to report THPSS damage to relevant agencies such as the EPA, SCA, DCCEEW, DEWHA;
- Failure to record/report threatened flora species, contravening the EPBC Act and NSW BCA;
- Failure to record/report all vegetation communities likely to be impacted by mining (eg. MU1);
- Failure to heed previous IESC advice that adaptive management and trigger action response plans (TARPs) are unlikely to be successful for mitigating and managing impacts to THPSS;
- Failure to heed previous IESC advice that the only way to prevent impacts to THPSS is to avoid directly undermining swamps and their water supply aquifers;
- Failure to heed previous IESC advice that current Groundwater monitoring networks do not monitor the full extent of minewater drawdown; Vibrating Wire Piezometers (VWPs) don't allow actual measurements of water levels, have a limited lifespan and aren't replaced; and predicted drawdown will extend well into the Greater Blue Mountains World Heritage Area;
- Changing from star pickets to Feno markers, which can't accurately measure Strain & Tilt;
- Failure to consider Cumulative Impacts and Likely Foreseeable Future Developments on THPSS, groundwater drawdown, downstream water pollution, siltation, sedimentation etc in the Gardens of Stone SCA and GBMWHA by assessing each proposal as stand-alone in isolation;
- Knowingly endorsing inaccurate predictions of subsidence and issuing Enforceable Undertakings, fines, or Prosecutions after damage has occurred is a perversion of due Planning processes;
- Relying on volunteer groups rather than Centennial to report swamp and other subsidence damage is too little too late. The DCCEEW and DEWHA must be more proactive, force Centennial to report, or get out into the Gardens of Stone SCA and find this damage for themselves;
- Absence of remediation, rehabilitation, or revegetation requirements once THPSS are damaged.

4.0 COBAR PARK COLLIERY (includes old STEELWORKS COLLIERY, parts of old HERMITAGE COLLIERY)

Cobar Park Colliery was a Bord & Pillar mine in the Lithgow Coal Seam. Numerous incidents saw Farmers Creek disappear into the mine void; 2.7km of the creek having to be concrete lined; houses lost; a drowning; subsidence cracks; a cliff fall; and culminating in the closure of the State Mine in 1964.

Photos: Cliff fall and subsidence cracks on Newnes Plateau above Cobar Park Colliery bord & pillar workings – March 2009

Photos: Subsidence cracks on Newnes Plateau above Cobar Park Colliery bord & pillar workings – March 2009

4.1 Flooding of Cobar Park Mine 1928

Lithgow Mercury: Tuesday 21 February 1928
http://trove.nla.gov.au/newspaper/article/93662787

CLOUDBURST AT LITHGOW
A cloudburst occurred at Oakey Park yesterday afternoon. John Brennan (67), a retired dairy farmer, was standing on the banks of the creek when it collapsed and he fell into the water. He was carried downstream. The body has not yet been recovered.

The roof of Cobar tunnel collapsed, leaving a gap 40 feet deep by 150 yards wide and about 200 yards in length, through which the water poured into the colliery. Fortnately no men were in the mine at the time. The mine has been completely flooded.

Deputies descended mines affected by the weekend floods. Today at Hermitage Colliery they found the black damp very bad and had to come to the surface. "Water is still pouring into Cobar mine, but attempts are being made to check it by means of sandbags. Hoskins and Co. have decided to start pumping operations as soon as possible.

4.2 Subsidence causes gardens to subside, calls for Mine Subsidence Board to act.

GARDENS DROPPED AFTER TREMOR. SYDNEY, Monday. — Advocate (Burnie) Tues 28 Sept 1948 https://trove.nla.gov.au/newspaper/article/69185337

After a slight earth tremor, two neighbours in Sandford Avenue, Lithgow, found that their back gardens had fallen five feet.

They found a subsidence eight feet wide, five feet deep, and 30 feet long near their back doors. One of the men found his outhouse and portion of a fence down the hole, while the other lost the greater part of his back lawn.

The subsidence is believed to have been caused by a partial fall in a disused colliery under Lithgow.

Routine Matters at Lithgow City Council Meeting
Lithgow Mercury: 30 September 1948)
https://trove.nla.gov.au/newspaper/article/219748150/24344373

Recent subsidences in Sandford Avenue indicated the necessity for speeding up negotiations in connection with the proposal to have Lithgow incorporated in the area covered by the Mines Subsidence Act, declared two aldermen at Monday night's Lithgow City Council meeting.

They were speaking in support of a resolution that Council provide information of property values in Lithgow to the Department of Mines.

Recently Council had decided to request the Mines Subsidence Board to give an indication of the approximate premiums that would have to be met if Lithgow were declared a "subsidence area."

On Monday night a reply was received from the Department of Mines advising that it was not possible at present to indicate what the premiums would be. Such a rate would need to be determined by the full Board after consideration of all factors, including property values, extent of workings and reports of the inspectorial staff of the coalfields branch of the Department.

The Department pointed out that the Board would no doubt be guided by experiences in the Merewether district. In that district at the commencement of operations the rate had been 3/- per cent on the value of property improvements.

This had provided a nucleus fund, but the rate had been successively reduced to 2/-, 1/6 and 1/- per cent, and since 1942 only a nominal rate of sixpence per cent, with a minimum of one shilling had been paid.

Council was requested to provide the values of property likely to be involved if Lithgow were declared a "subsidence area."

Mr. A. Howell, Town Clerk, stated that preparation of this report would involve considerable work. Ald J. Dudley then moved that the information requested be supplied. "There have been frequent subsidences in the Lithgow area," he said, "and something has to be done."

Ald. N. Summons also stressed that haste was necessary in providing the required details. He referred to the recent subsidences in Sandford Avenue and stated that this area was still "creeping" with the possibility of considerable damage.

"If we don't do something forth with to take some positive action we may find ourselves in a difficult position," declared Ald. Summons. "If we do not give that information some culpability could be placed on this Council for the delay," he added.

The motion was carried.

4.3 House destroyed by subsidence, earth tremors - McCauley Street

A mining creep in Lithgow
The Northern Daily Leader
Tuesday 26 April 1921, Page 2.
Earthquake at Lithgow.
HOUSE DESTROYED. Earth Tremors Common Lately. SYDNEY, Monday.

The home of Mrs. W. Hodge was wrecked by an earth tremor at Lithgow about 8 o'clock Saturday night. The first intimation of the danger was a rumbling sound under the house. This was immediately followed by a shower of mortar. Miss Hodge and a friend, the only occupants of the cottage, rushed out and gave the alarm.

Neighbours helped to carry the furniture out of the wrecked building; and other residents, fearing a further earthquake, also removed the valuable furniture from their homes. The creep extended about 200 yards along the west side of Macaulay-street. Residents stated that they have felt earth tremors along the street for the past six weeks.

Obviously this was a man-made, mining-related event and not a tectonic earthquake.

4.4 Grave danger seen to Cobar Park homes, subsidence risk warnings, blasting

The Lithgow Mercury, Tuesday November 10, 1953
https://trove.nla.gov.au/newspaper/article/223417382

Hundreds of people in the Cobar-McKellars Paddock area were in grave danger of a serious mine subsidence and unless official action were taken to prevent the indiscriminate extraction of pillars from the Cobar colliery leases valuable lives might be lost, Ald. J. H. King said last night.

He said Council had "stood idly by and did nothing" several years ago when the Vale of Clwydd Colliery subsided and many homes were damaged.

Asking last night's meeting of the City Council not to ignore the plight of people living in Cobar Paddock he said: "In Thursday night's Mercury attention was drawn to the fact that the Hammant family had had to evacuate their home, because of a subsidence.

"I raised this matter at Council some time ago in an effort to get some satisfaction. Further to that our check inspector has again warned us of imminent danger to the whole of Cobar Paddock if the colliery lessees are allowed to keep taking out pillars.

"We must ask the Joint Coal Board to take action before there is a tragedy because hundreds of people are in danger."

Stressing that he was not an alarmist, Ald. King, who is secretary of the Western Miners' Federation, said Council should request both the Coal Board and the Mines Department to confer with it for the express purpose of obtaining satisfaction for the people living in the area.

"The people are unaware of the danger in which they are living at the present time. They do not know what is happening beneath the surface of the ground on which they have their homes. Some idea has been given by the damage to Mr. W. Hammant's home".

Council, by unanimous vote, then carried a motion by Ald. King and Ald. P. M. Grace that the Coal Board be asked to meet a deputation and that the co-operation of the Mines Department be sought "in taking steps to prevent a tragedy."

Ald. Grace then asked the Mayor for a report on "very heavy blasting from Cobar". He said blasting from the direction of the colliery land some weeks ago had been so severe that the concussion shook the Small Arms Factory. "The force was terrific" he said, asking: "Has an assurance been obtained that future operations will be carried out with smaller charges".

Reporting for the Mayor (Ald. H. C. Heffernan), the Town Clerk (Mr. H. Baker) said "At the time it happened we did take action and the health inspector visited the mine. Appropriate steps were taken to reduce the charges. To the best of my knowledge over the past few weeks I do not think there has been cause for complaint."

4.5 The 1964 floods saw Farmers Creek break into old Cobar Park Mine, flooding and closing the State Mine. The creek downstream dried up, and concrete lining had to be installed along 2.7km of Farmers Creek, which was therefore no longer a natural waterway. “Negligible impacts”???

Concrete solution a thing of the past

LAST week's Mercury report of an impending start of work on removing some of the concrete from the Farmers Creek canal through Lithgow revived memories for many older residents who were involved in installing concrete back in the 1960s.

● **PICTURED** at top from the Mercury archives was the scene when further sections of Farmers Creek were concrete lined after a disastrous incident during the floods of 1964.

At that time the concrete canal began just west of this point and extended along its present course through Hermitage Flat.

Near where the unsealed section ended the flood created a whirlpool effect that quickly eroded the overburden and broke through into Cobar Colliery, flooding and closing that mine and eventually breaking through to the State Mine workings, also forcing its permanent closure.

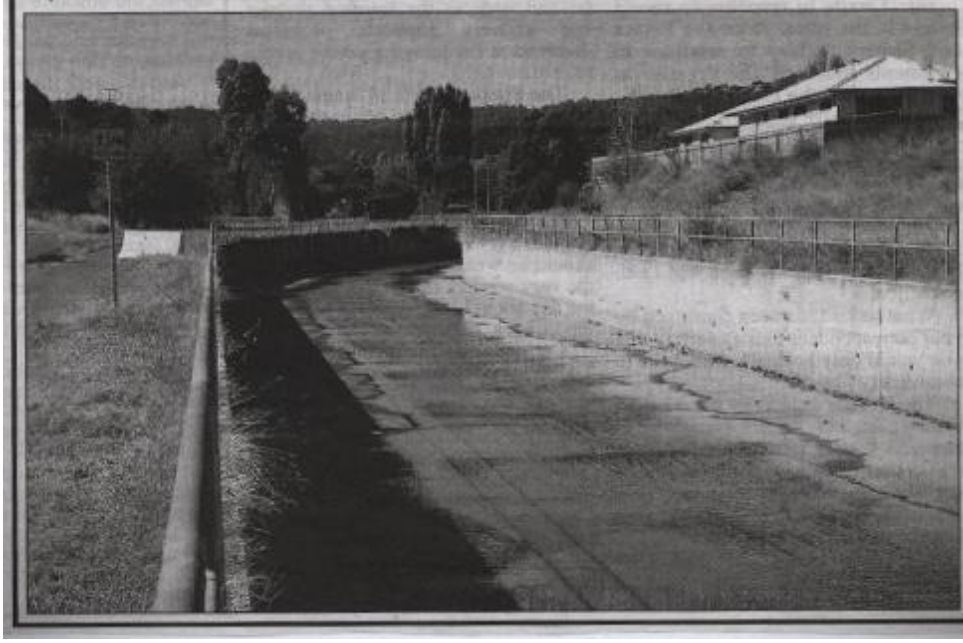
Numerous old car bodies were brought from the City Dump to be dropped into the hole to help plug the flood but it proved to be a huge operation.

It was a true milestone in the city's industrial history and was the beginning of the end for mining in the valley as it left only the related Lithgow Valley and Hermitage mines operating.

The flooding influenced a decision to extend the concrete canal in an easterly direction as far as Montague Street to prevent a recurrence.

Now, some 40 years later, Council is about to begin the removal of all the concrete canal walls along the entire length from Montague Street to near the showground as part of the flood mitigation program intended to return Farmers Creek to a more natural flow. The concrete creek bed will be retained.

● **BELOW** is the same section of canal as it is today — at least for now.



5.0 HASSANS WALLS RESERVE (HASSANS WALLS COLLIERY & LITHGOW VALLEY COLLIERY)

Partial extraction mining in the Lithgow Valley Colliery & Hassans Walls Colliery occurred beneath Hassans Walls Reserve between 1938 and 1974. LEG has recorded thirteen (13) cliff falls, the most recent of which occurred in June 2015, March 2015, and August 2007. Previously two cliff falls occurred before 1969, two (2) in 1970 or 1971, and at least nine (9) more since mine closure. Cliffs continue to fall 50 years after mining ceased. Surface cracking also occurred, with large fissures up to 0.5m wide. Monitoring continued long after mining ceased, and showed that some cracks were continuing to widen.

Photo 1: Cliff Fall - Hassans Walls 1960s

Pnoto 2: Lithgow Mercury 28/7/2007

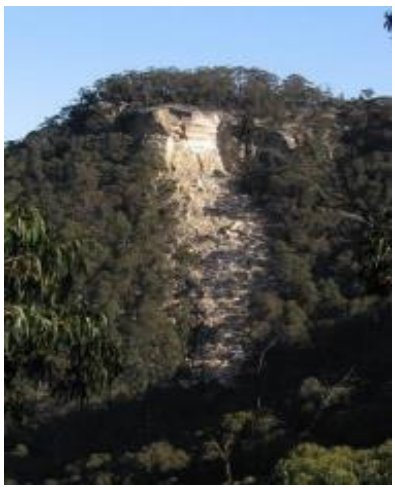


Photo 3: 15 July 2008

Photo 4: Hassans Walls – March 2015

Photo 5: Lithgow Mercury 10/3/2015

Photo 6: Hassans Walls – March 2015

Photo 7: Hassans Walls – 20 June 2015

Photo 8: Hassans Walls – 20 June 2015

Photo 9: Hassans Walls 20 June 2015

Photo 10, 11, 12: Hassans Walls cliff falls - Undercliff Track – photos taken 1 July 2023

Photos 13, 14, 15 - Mine subsidence cracks – Hassans Walls Reserve – May 2009

Photos 16, 17, 18 - Mine subsidence cracks – Hassans Walls Reserve – May 2009

Source: **MINE SUBSIDENCE TECHNOLOGICAL SOCIETY** Proceedings of the Second Triennial Conference on Buildings and Structures subject to Mine Subsidence

Mine Subsidence Technological Society Maitland, 25th to 27th August 1991 ISBN 0 646 05155 5

A Note on Escarpment Instability Associated with Mining

Subsidence P.J.N. PELLS MSc(Eng), DIC, F.I.E.Aust., Director, Coffey Partners Int.

Coal mining beneath the Hassans Walls Reserve at Lithgow occurred in the Lithgow Valley Colliery and the Hassans Walls Colliery between about 1938 and 1974. Figure 5 shows a detail of one section of the Reserve beneath which pillar extraction occurred in 1968.

Major cracking has occurred within the Reserve with open fissures up to 0.5m wide. Four rock falls occurred, the first two before 1969 and two smaller ones either in 1970 or 1971. Crack monitoring has continued in the area up to the present time and this shows that some of the cracks are continuing to open and there is some evidence of further rock falls in the vicinity of the four large collapses.

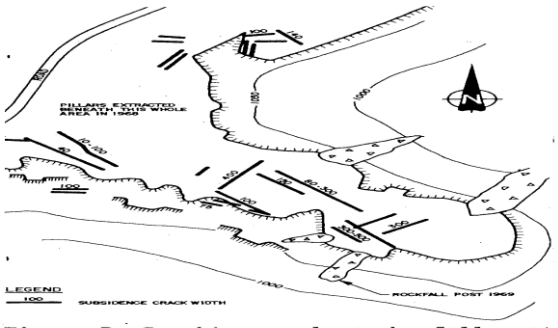


Figure 5 Cracking and rock falls at Hassans Walls

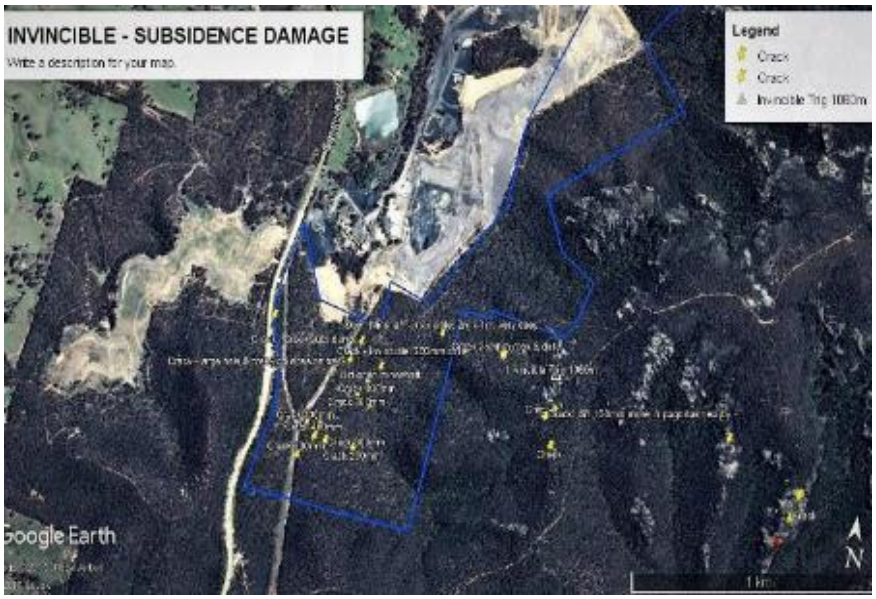
Figure 1: Hassans Walls Reserve Mine Subsidence (Pells 1991)

6.0 KATOOMBA COLLIERY – DOGFACE ROCK CLIFF COLLAPSE

Partial extraction at the Katoomba Colliery extended directly beneath Dogface Rock in June 1930. The collapse occurred on 28 January 1931, with additional falls on 2 May 1931 and 20 June 1931.

7.0 INVINCIBLE COLLIERY (includes old RENOWN COLLIERY)

Invincible Colliery operated as a Bord & Pillar mine from 1905. Widespread surface cracking, cliff falls, creeks disappearing into mine voids, sinkholes, and water pollution impacts occurred. Longwall, high-wall, and open-cut was also used, however subsidence damage in those areas is not included below.



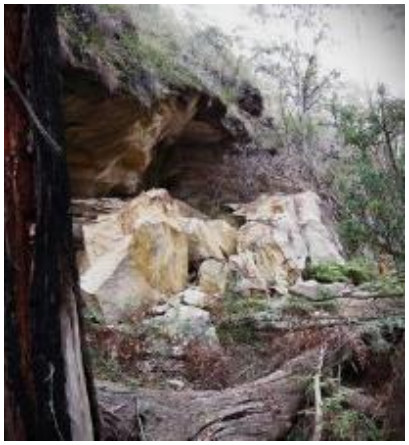


Photo: Cliff fall Invincible 14 March 2013

Photo: Cliff fall Invincible 9 August 2009

Photo: Cliff fall Invincible 9 August 2009

Photos: Invincible Colliery – Creeks disappearing down subsidence cracks into mine void – 19 August 2017

Photos: Invincibe Colliery LDP01 discharge into Coxs River – EC 1710uS/cm, pH 6.5, DO 0%, Anoxic odour - 2 September 2007

Invincible Colliery held two licenced discharge points into the Coxs River - LDP01 & LDP02. In June 2007, while conducting regular water quality monitoring under the SCA Streamwatch program, LEG observed LDP01 flowing strongly with an anoxic odour, extremely low Dissolved Oxygen levels, and the Coxs River downstream had turned a rusty-red colour. LEG advised the Sydney Catchment Authority (SCA), who conducted the sampling below on 28 June & 18 July 2007 –

Sampling Results: Yeo-Kal 611 Meter

28 June 2007

A) Invincible Borehole Discharge:
Time: 2.15pm
Temp: 19.8 C
D.O.: 4.5 mg/l
D.O.: 42.3 % sat
pH: 6.58
Sal.: 0.64ppt
Cond.: 1640 us/cm
Cond.: 1.64ms/cm
Turb.: 7.2 ntu
The water leaving the dispersal pipe had a bad smell (anoxic smell)

B) Downstream 800m below Borehole discharge (u/s Bridge)
Time: 2.30pm
Temp.: 8.12 C
D.O.: 8.8 mg/l
D.O.: 74.9% Sat.
pH: 7.18
Sal. 0.28ppt
Cond.: 557 us/cm
nd.: 0.56 ms/cm
urb: 3.0 NTU
The river was flowing. The water was visibly clear.

18 July 2007

A) Invincible Borehole Discharge:
Time: 11.45am
Temp: 20.1 C
D.O.: 1.5 mg/l
D.O.: 16.9% sat
pH: 6.57
Sal.: 0.04ppt
Cond.: 1648 us/cm
Cond.: 1.64ms/cm
Turb.: 1.7 NTU
The water leaving the dispersal pipe had a bad smell (anoxic smell)

B) Downstream 800m below Borehole discharge (u/s Bridge)
Time: 12.15pm
mp.: 7.9 C
O: 8.1 mg/l
D.O.: 85.5% Sat.
pH.: 7.18
Sal.:0.61 ppt
Cond.: 1198 us/cm
Cond.: 1.19 ms/cm
Turb: 0 NTU
The river was flowing. The water was visibly clear.

C) Upstream of Borehole Discharge
Time: 12.05pm
Temp.: 7.9 C
D.O: 9.3 mg/l
D.O.: 77.4 % Sat.
pH.: 6.66
Sal: 0.03 ppt
Cond.: 35 us/cm
Cond.: 0.03 ms/cm
Turb: 0 NTU
The river was flowing. The water was visibly clear.

Despite this appalling SCA data, on 20 July 2007 the EPA approved Licence Variation No. 1073146 on Invincible POEO Licence 1095 doubling the discharge volume at LDP01 from 2 ML/day to 4 ML/day.

Research of the Coxs River many months after LDP01 ceased flowing identified the water downstream was more saline, had higher pH, and had a strongly modified ionic composition. "The change in water chemistry may constitute a 'Key Threatening Process' as defined in the NSW Threatened Species Conservation Act (1995), as this can cause considerable stress to downstream aquatic ecosystems of high conservation value". (Wright, I. A. (2012). Coal mine 'dewatering' of saline wastewater into NSW streams and rivers: a growing headache for water pollution regulators. *Proceedings Of The 6Th Australian Stream Management Conference, Managing For Extremes, 6-8 February, 2012 Canberra, Australia*, 206-213.)

PRIMEFACT 21, MINE SUBSIDENCE (www.dpi.nsw.gov.au/primefacts). *"Altered flows and stream chemistry may have an impact on the lifecycle of aquatic species and riparian vegetation. Surface water may permeate into the shallow groundwater system through the resulting open fractures. This water will usually return to the surface further downstream, but may be chemically altered by minerals in the rock strata. During extended periods of dry weather, the loss of surface water from rivers or creeks may become evident with a noticeable but localised reduction in surface flows."*

Photos: Subsidence cracks – Invincible Colliery Bord & Pillar/partial extraction areas

Photos: Invincible Colliery mine subsidence damage to pagodas, sinkholes, and open mineshafts

8.0 IVANHOE COLLIERY (includes old MAIN RANGE COLLIERY and IRONDALE COLLIERY)

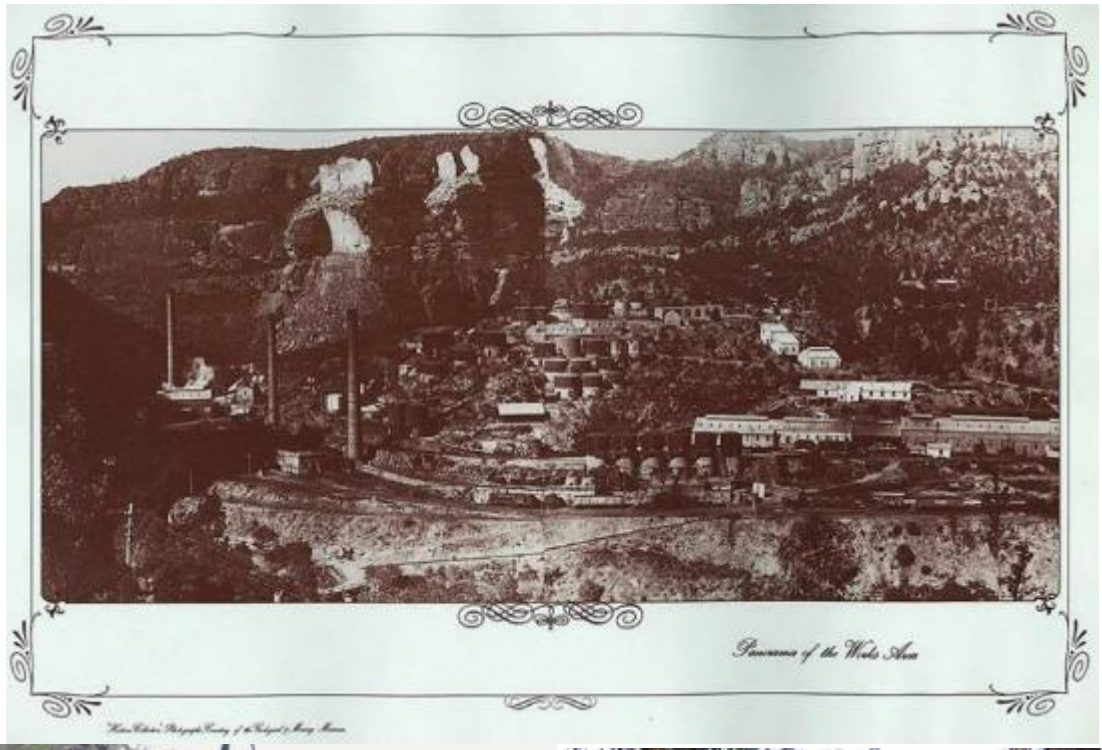
Ivanhoe Colliery was a Bord & Pillar mine. Subsidence cracks occur throughout. An EPA compliance audit of POEO Licence 631 on 25 June 2002 recorded "water containing visible oil and grease being discharged into underground workings of the mine." Two mine drifts (one about 400 metres long to the Mudgee Railway Line) conduct rusty water towards the old Irondale Mine, Pipers Flat Creek, and hence Coxs River.

Photos: Ivanhoe Colliery – old mine drifts allow water to flow SW under Boulder Rd to Pipers Flat Creek & Coxs River – March 2010

9.0 NEWCOM COLLIERY – Toxic leachate from Kerosene Vale Ash Repository has filled this mine.

10.0 NEWNES SHALE OIL MINE

The earliest recorded cliff falls due to Bord & Pillar mining in the Lithgow region occurred c1910 at Newnes Shale Oil Mine in the Wolgan Valley. Four cliff falls can be seen above the old industrial ruins.



Photos: Old photo (top) on display at the Newnes Hotel c1910. Cliff fall photos taken 27 February 2015.

11.0 OAKEY PARK MINE (includes old ZIG ZAG COLLIERY)

The Oakey Park Mine operated as a Bord & Pillar mine from 1888 to 1941. A coal fired power station and coke ovens also operated at the site. Coal reject material, coal-ash, and other waste was dumped along the banks of Farmers Creek upstream and have not been stabilised or rehabilitated.

In 2010 Lithgow City Council proposed pumping out the old Oakey Park Mine workings to drought-proof Lithgow. However Delta Electricity (then NSW Government owned) provided a report stating that mine dewatering increases subsidence risks. The risk for individual residential areas, industrial areas, and critical railway areas ranged from tolerable to extreme. The project was abandoned.

A watery grave?

http://www.lithgowmercury.com.au/news/local/news/general/a-watery-grave/1949152.aspx

LEN ASHWORTH
22 September 2010 04:08 PM

IS our city supported by water? And if that water disappears do we sink to a waterless grave?

These were the questions being posed in Lithgow Council this week when councillors were confronted with perhaps the most unusual challenge in the recent history of Local Government in this area.

At the root of the issue is a suggestion that if too much water is pumped from aquifers and old mine workings around the district then geological instability could occur and the surface could sink. It would be something like 'mine subsidence' from 'mined water' although union executive Cr Wayne McAndrew was quick to point out that water is 'extracted', not 'mined'.

The concern arises from a study by consultants engaged by Delta Electricity who have a major player interest in council's bid to identify new water sources to drought proof the district's domestic and industrial needs.

That study concluded there is plenty of water but its large scale extraction is not without potential risk.

The council itself had recently taken bore samples from the flooded workings at the long abandoned Oakey Park Colliery and testing indicated the raw water would require minimal treatment through the nearby Farmers Creek processing plant.

However Regional Service manager Andrew Muir said there is a new issue. Delta Electricity had commissioned an assessment of the potential subsidence risk from the dewatering of old mines.

This report had claimed the risk for individual residential and commercial areas ranged from 'tolerable to extreme'.

"Failure within one area is expected to result in failure propagating into the adjacent areas," the report said. The combined risk for such 'co-dependant' areas was seen as extreme for Oakey Park.

Mr Muir said the report had placed the entire Oakey Park investigation in jeopardy.

He said that because of the assessed risk levels it was unlikely that approval could be obtained for the extraction without control measures including cut-off barriers to prevent dewatering beneath residential, industrial and critical railway areas.

Consequently the risks associated with extraction depressurisation and instability meant the Oakey Park proposal was no longer considered feasible.

Mayor Neville Castle said because of the report Delta was not prepared to be involved in 'mining' the Oakey Park water. "They don't believe it is worth the risk, irrespective of who is ultimately using the water," Cr Castle said.

Cr Howard Fisher said the water in question was actually in the workings from one of the oldest mines, Zig Zag Colliery. He said the water from these workings is linked to the old State Mine which was also flooded with the breakthrough from the former Genders Mine.

"You can't tell me that pumping of that water would have any effect on the dewatering of endangered areas of Lithgow," he said. "It would have minimal effect."

Cr Fisher said if a new consortium ever took over the State Mine coal leases, which was a possibility, the first thing they would do would be to de-water the old workings. "This is just another way of putting a block on us and taking the soft option," he said.

"We should not just take Delta's word for it."

Cr Fisher said a subsidence in Sandford Avenue, Lithgow, at the weekend had been attributed to a saturated surface area after recent rain rather than the effect of mine subsidence.

Cr Wayne McAndrew said Delta were good at generating energy but were not mining experts.

"When you take out coal there is an effect on the surface. "But I've never heard of dewatering contributing to it," he said.

He successfully moved that council should seek expert advice from the NSW Department of Industry and Investment, followed up by a delegation to the appropriate Minister.

12.0 STATE MINE

The State Mine was a Bord & Pillar mine operated by the NSW Government from 1922 to 1964. The workings were - Heading & main winning bords: 5 yards wide x 7 feet 6 inches high; Bords: 8 yards wide x 5 feet 6 inches high; Cut-throughs: 5 yards wide; Pillars: 44 yard by 44 yard or 44 yard by 33 yard centres. Cliff falls & cracks occurred, and combustion of dumped coal reject continues to the present.

Photos: State Mine – cliff falls and surface fractures in the State Mine Airshaft No. 3/Lost City area – 17 July 2019

13.0 TYLDSLEY MINE (now CULLEN VALLEY MINE)

Tyldesley Colliery operated as a Bord & Pillar mine until the 1960's. Coal combustion has been an ongoing issue, with local residents complaining for almost 60 years about unpleasant odours. Most recently four (4) odour complaints were reported in the Castlereagh Coal CCC Minutes of April 2024. https://ccoal.com.au/wp-content/uploads/2024/06/ccc-minutes-april-2024.pdf

Acid Mine Drainage/Saline Drainage was identified near Tyldsley Mine in a 1998 NSW Soil Services report titled *"Erosion & Sediment Control and Remediation Plan. Wallerawang to Kandos Rail Line at Baal Bone Junction, 191.795 Km to 195.705 Km".* Another site occurs in Farley Street, Cullen Bullen. At both sites LEG recorded a salinity of 1600uS/cm (natural background levels are 30uS/cm), pH level of 4 (very acidic), and low Dissolved Oxygen level of 3.0 mg/L (healthy local streams are around 8 mg/L.)

Photos: Seepage from Tyldsley Mine/Cullen Valley Mine - Acid Mine Drain age/Saline Drainage – 12 September 2014

Photos: Coal combustion; Seepage and Acid Mine Drainage from Tyldsley Mine/Cullen Valley Mine – 12 September 2014

In April 2011, LEG recorded *Persoonia marginata* (Vulnerable EPBC, NSW BCA) at Cullen Valley Mine. Neither Coalpac nor the prior owners of Cullen Valley Mine reported it in EPBC Referrals to the Commonwealth; Preliminary Coalpac application 2010; Flora Assessments for Exploration Program (Borehole CP113 to CP129) February 2010; Flora Surveys for Cullen Valley Lease Extension (DA-200-5-2003) April 2003; or Flora Surveys for Feldmast Coal Project in 1997. This is an ongoing issue with coal mines in Lithgow region – failure to report Threatened Species in breach of the EPBC Act and NSW BCA.

Coalpac P/L also failed to identify two Aboriginal Hand Stencil sites in the Aboriginal Archaeology and Cultural Heritage Impact Assessment 2012 (https://www.abc.net.au/news/rural/2014-07-25/coalpac-rock-art/5624222). This is an ongoing issue with coal mines in Lithgow region – failure to record/report Aboriginal Heritage in breach of the *National Parks and Wildlife (NPW) Act 1974.*

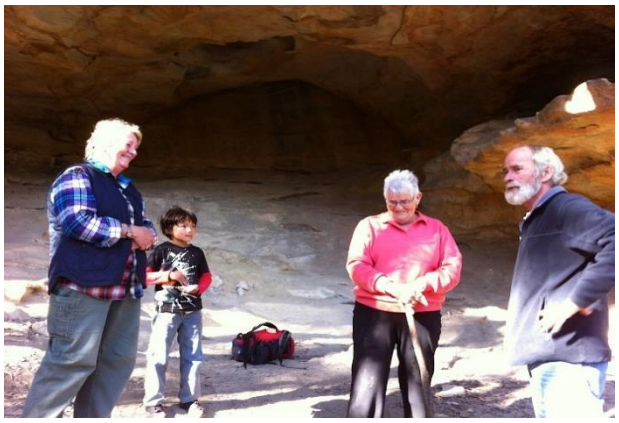


Photo: Aunty Helen Riley – Cave Art site Cullen Calley Mine

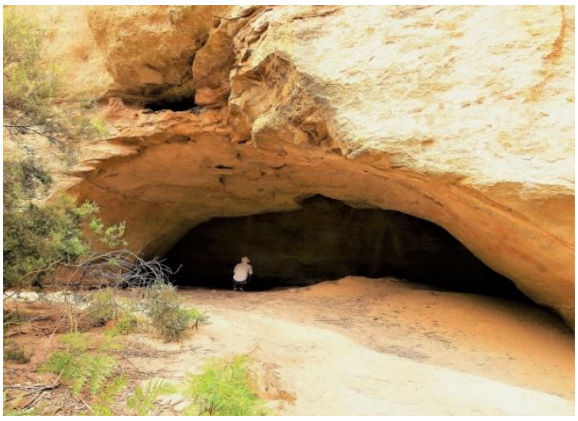


Photo: Cave Art site – Invincible Colliery

14.0 VALE OF CLYWDD COLLIERY

A Bord & Pillar mine from around 1865 until 1957. Major subsidence damage occurred in 1947 to homes, public utilities, and roads. Walls bulged away from roofs, huge gaps appeared in homes, ceilings partially collapsed, large cracks appeared in roadways, and water and gas mains burst. Some residents dreaded sleeping in their homes that night fearing that further subsidences might cause rocks to fall down from the mountains above.

VALE OF CLYWDD MINE 1947

16 May 1947 at 05:55, **Lithgow mine collapse** – not an earthquake
WIDE DAMAGE BY MINE "CAVE-IN" SYDNEY. https://trove.nla.gov.au/newspaper/article/127305989

Thousands of pounds worth of damage has been caused to homes, public utilities, and roads by the "creep," which began in the old workings of the Vale of Clwydd mine at East Lithgow late yesterday.

Many residents whose houses had been rocked and damaged by the subsidences spent last night with friends living in safe areas, while others less fortunate, spent a night of fear in their threatened homes. No further "cave-ins" had occurred up to this morning, but everybody in the affected area was on the alert.

It was just before 4 p.m. yesterday when 30 homes in East Lithgow were rocked by what residents thought was an earthquake. Walls bulged away from roofs, and huge gaps appeared in the homes. In other's ceilings partially collapsed. Four-inch wide cracks appeared in roadways, and residents, now certain about an earthquake, ran into the open for shelter.

Water and gas mains burst when roadways "opened up," and Lithgow Council officers immediately cut off all water and power supplies. Fearing further subsidences, a number of residents will not return to their own homes until the area has been declared safe. The danger is not yet past, according to local experts.

Sergeant Bardman, of the Lithgow Police, said today council employees had made attempts to make the damaged houses safe. Most homes in the area were weatherboard, otherwise greater damage, perhaps injury, would have resulted.

FALL OF GROUND IN OLD LITHGOW MINE
Barrier Daily Truth (Broken Hill) Sat 17 May 1947
https://trove.nla.gov.au/newspaper/article/141112655?
Miniature 'Earthquake' Causes Excitement and Damage

Lithgow, May 16—Damage estimated at thousands of pounds was caused to homes in the Vale of Clwydd area of Lithgow today when there was an extensive fall in the old working of the colliery. After preliminary rumbles throughout the day it was apparent that a large fall had occurred in the old workings of the mine.

Residents rushed into the streets when large cracks appeared in their homes. The roadway was buckled badly in Redgate Street, blocking the customary bus run. Water mains and gas mains were fractured and water flooded out onto the roadways, while a heavy smell of gas hung in the air.

Mrs. Palmer was working in her home when she noticed a crack two inches wide run across the walls of a room.

Other residents experienced similar frights and crowds soon gathered in the streets. Asphalt roadways were split while footpaths are separated from gutter.

The Vale of Clwydd mine is one of the oldest in the State. It commenced operations in 1890. Today's fall occurred on what is known as the Ash Road. This is over 200 feet below the surface with a distance of ten feet between the floor and roof.

The Vale of Clwydd homes are located in a gorge like valley with a heavy outcrop of rocks on the top of the mountains. Some residents stated they would not sleep in their homes tonight fearing that further subsidences may cause a fall of rocks from the mountains. Others, however, stated that there was too much overburden between the site of the fall to the top of the mountain to cause the rocks to shift.

15.0 VALE OF CLYWDD NO. 2 COLLIERY

An early Bord & Pillar mine near Angus Place Colliery in Lidsdale, not in Lithgow as the name might suggest. In 2022 local residents complained to Centennial about mine 'sinkholes' in the proposed Angus Place West area. Centennial advised residents by letter on 24/11/2022 that the three (3) sinkholes were above Bord & Pillar first workings at the Vale of Clwydd No. 2 Colliery.

16.0 WALLERAWANG COLLIERY

A Bord & Pillar mine in Blackmans Flat from around 1923 until 1982. LEG has recorded many surface cracks above the mine (see Google Earth map below), one of which is the largest LEG has ever recorded in the Lithgow area at over 2m wide. In response to residents concerned about subsidence risks from the Angus Place West proposal, Centennial confirmed that cracks observed at Site 4 were located above the Wallerawang Colliery. *"The crack widths typically vary up to 0.5 m; however, some cracks have also undergone weathering and fretting and have overall widths and steps greater than 1 m."* (MSEC letter to Centennial, Angus Place Colliery – potential surface impacts, 24 November 2022*).*

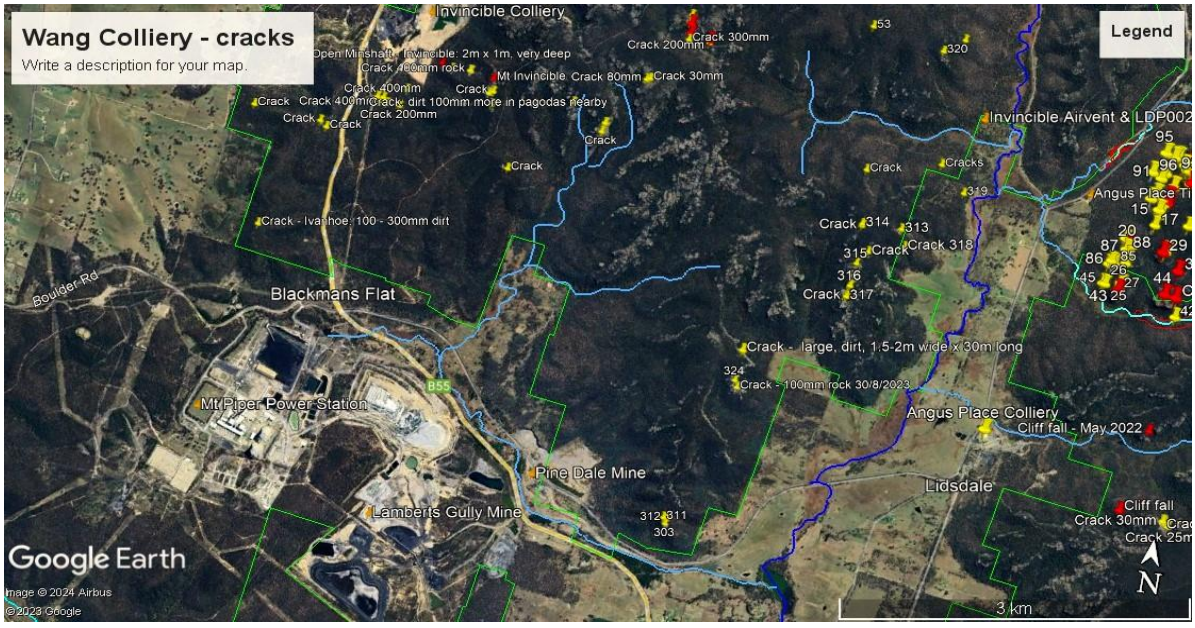


Figure: Mine subsidence cracks (Yellow Placemarks) recorded by LEG above bord & pillar workings of Wallerawang Colliery

Acid mine drainage issues were identified at the Wallerawang Colliery in February 2004 (see below).

Wallerawang colliery rehabilitation: the coal tailings briquetting process

Radloff, B.; Kirsten, M.; Anderson, R. Minerals Engineering 17(2):153-157. February 2004
The Coal Tailings briquetting process ... as a solidification and stabilization ***process*** for the control of ***acid mine drainage***
..burial of sulfidic (***acid*** producing) coarse washery reject by turning a waste material into power station fuel.
..avoid approximately 200 000 m3 for the burial of sulfidic (***acid*** producing) coarse ...***drained coal tailings*** (fine ***coal*** washery reject) stored within the site ***tailings*** dam.

17.0 WESTERN MAIN COLLIERY (includes old BOULDER, EASTERN MAIN, HUON, LAMBERTS GULLY)

A Bord & Pillar mine before being open-cut. Currently Springvale Western Coal Services. LDP001 has consistently recorded the poorest water quality parameters and highest salinity of any mine in the Coxs River catchment, increasing six-fold from 1200uS/cm in 2012 to 7,780 uS/cm in 2018, 22 times above the ANZECC Guideline upper limit of 350uS/cm. Most recently 3,516 uS/cm on 6/6/2024.

Australia's leading scientist on water pollution from coal mines, Dr Ian Wright from Western Sydney University, described LDP001 on ABC News on 7 November 2023 *"In the whole of the Warragamba drinking catchment that is the worst point source of waste I have ever measured."* And the EPA's POEO Licence for LDP001 *"That is one of the most ineffective pollution licences I have ever seen," he said.*

Dr Wright reported that the salt, nickel, and zinc pollutants in LDP001 minewater were poisonous to aquatic life. By his calculations a recent proposal to increase the LDP001 discharge by five Olympic-sized swimming pools per day would increase the amount of salt from roughly six to eight tonnes a day. https://www.abc.net.au/news/2023-11-07/water-contamination-lithgow-coal/103067856

In 2010 a former mine electrician provided LEG with a long list of names and details of coal miners who developed cancers and/or died prematurely, allegedly due to PCB exposure from leaking Transformers used underground. He named Western Main and Wallerawang Collieries, and alleged the Transformers and 44 gallon drums of PCBs were not removed after mine closure, but were left underground. The NSW Environment Minister responded that transformer disposal was managed under the national PCB Management Plan 1999, however these mines closed in the 1980s. Yet another legacy pollution issue.

'Deadly chemicals buried in drums'

June 6, 2010 https://www.smh.com.au/national/deadly-chemicals-buried-in-drums-20100605-xlra.html

Former miner John Hodgkinson. *Photo: Anthony Johnson*

THE OLD DIGGER

FORMER miner John Hodgkinson is an unlikely whistleblower. But the thought of rusting 44-gallon drums filled with deadly chemicals buried underground and possibly leaching into the water supply has forced him to speak out.

"We seeded the whole area underground. We had no idea how bad it was," Mr Hodgkinson said.

Standing at the mining monument in Lithgow, he listed at least nine mines that had used polychlorinated biphenyls or PCBs as a fireproof coolant in electrical transformers.

"The transformer seals were all cracked so this stuff was leaking out and we were constantly filling them up. Hundreds of 44-gallon drums of the stuff."

The chemicals burnt his skin so he always wore rubber gloves and boots. Others did not bother. They are all dead.

John pulls out a list pages long of the miners he worked with and their illnesses: brain tumour, bowel cancer, testicular cancer.

PCBs are now well-documented as the cause of cancers and were removed from the mines years ago.

But Mr Hodgkinson, now 79 and out of the pits for 20 years, wonders where the drums of chemicals went.

"I was told by one of the site managers that they had built a great big concrete bunker and stored it all in there but I could never find it."

He has also been unable to track down any of the paperwork for disposing of PCBs. He has his suspicions.

"If they were dropped down the old workings those drums will be corroding through now and that stuff will be in our water."

A spokeswoman for NSW Environment Minister Frank Sartor said the disposal of transformers was managed nationally through the federal government PCB Management Plan of 1999.

18. NATTAI NORTH COLLIERY - One of the largest cliff collapses recorded in a Bord & Pillar mine in NSW. By 1989 the escarpment collapse extended about 800m, with an average height of 170m.

19. DOMBARTON COLLIERY - Bord & Pillar mine from 1967 to 1970. A major cliff collapse in December 1969 extended about 150m along the cliff above Wollongong-Moss Vale railway line. Smaller cliff falls occurred in March & September 1969. Cracking in Avon Road was recorded in 1967.

20. NORTH CLIFF COLLIERY – An old Bord & Pillar mine with ongoing Methane emissions.
https://www.abc.net.au/news/2024-07-21/methane-seeping-out-of-the-north-cliff-mine/104108284

DISCUSSION

Are the above "Negligible Impacts"?

The word "Negligible" describes something so small, trivial, or insignificant that it can be disregarded or considered inconsequential. It implies that its influence, effect, or contribution is so minuscule that it can be safely ignored or excluded from further consideration. A "significant" impact is an impact that is important, notable or of consequence having regard to its context or intensity. The above impacts are clearly not 'negligible', but significant.

Are the above "Acceptable impacts"?

Centennial's arrogant right-to-mine attitude regards any and all impacts as acceptable, and the mine lease as their own private property to do with as they wish. But it is not Centennial land, it is publicly owned land belonging to all the people of NSW. And it is not just an ordinary patch of bush, but a

biodiversity hotspot within the Gardens of Stone SCA bordering on the Greater Blue Mountains World Heritage Area – of State, National, and International significance.

Were the above 'Avoidable Impacts'?

LEG believes that they were. The above examples clearly demonstrate that towards the end of mine-life companies became greedy and removed too many pillars, resulting in severe subsidence damage.

CONCLUSION

Centennial claim there is "no evidence" of subsidence damage above Bord & Pillar mining at Clarence.

LEG argues "There is no evidence of a local Bord & Pillar mine that didn't cause subsidence impacts."

Centennial claim that Bord & Pillar secondary extraction will have "Negligible impacts".

All 20 mines illustrated above were no doubt also approved based on claims of "negligible impacts".

Yet creeks have disappeared into mine voids; swamps are dead; cliffs continue to fall; waterfalls have dried up; surface fractures & sinkholes are everywhere; infrastructure & houses lost/damaged; ongoing coal combustion for 60 years; ongoing water pollution – much of that due to secondary pillar extraction.

The problem with long-term Government cover-ups of mining damage in the Lithgow area is that public servants approving and regulating coal mining developments start to believe their own government's 'disinformation' and 'misinformation', and the scale and severity of those impacts escalate exponentially.

Allowing damage to occur and then issuing non-compliances is too late. More enforceable undertakings, and prosecutions won't change Centennial's ingrained non-compliance culture. Relying on volunteer groups to report swamp and other subsidence damage is too little too late. The DCCEEW and DEWHA must be more proactive, get out into the Gardens of Stone SCA, and find this damage for themselves.

Changing the abhorrent culture and attitude of the coal mining industry towards the environment in Lithgow must come from the top down – the Prime Minister, Premier, and relevant Ministers.