Gardens of Stone Alliance submission: Angus Place Mine Extension Proposal

Ms Genevieve Lucas
Senior Environmental Assessment Officer
Mining and Industry Projects
NSW Department of Planning, Infrastructure and Environment
Locked Bag 5022
Parramatta NSW 2124

Dear Ms Lucas,

Objection to State Significant Project – Angus Place Mine Extension

SSD 5602 - Amendment Exhibition

About the Gardens of Stone Alliance

The Gardens of Stone (GOS) Alliance is a community group which membership consists of the Colong Foundation for Wilderness, Lithgow Environment Group (LEG) and Blue Mountains Conservation Society (BMCS), as well as interested non-affiliated individuals.

These three community conservation organisations have campaigned for the protection of the Gardens of Stone region for over 30 years. The scenic and biodiversity values of the region include the "pagoda" landscapes of stone pinnacles, slot canyons, waterfalls and extensive cliff lines that are associated with highly diverse plateau and tableland forests, rare plants, nationally endangered swamps and windblown sand dunes from the last Ice Age. These significant natural features make up a complex and stimulating natural wonderland just two hours from Sydney and readily accessible by vehicle.

Formed in October 2013, the alliance sought to reserve in a state conservation area the 'pagoda country' of the Gardens of Stone region, which extends over 39,000 hectares of unreserved public forest around Lithgow. To achieve this, it has developed *Destination Pagoda* last year that presents the proposed reserve as a great new tourism vision for Lithgow that has gained support from many quarters.

Destination Padoda outlines how Lithgow could maximise its potential as a tourist destination through the reservation of the Gardens of Stone State Conservation Area (Stage 2) proposal. Under reservation state forest would be transformed into a highly desirable and accessible tourist destination. It would showcase the areas unique geomorphology, it's stunning vistas and the unique ecosystems it supports.

A Gardens of Stone Conservation Area is an essential step in Lithgow's transition out of coal-mining and into a low-carbon future, with tourism an essential industry in the future diversification in what is currently a mono-industry town. This plan would also allow existing coal mining and the protection of the areas unique, stunning internationally significant pagoda landscapes to occur simultaneously.

The GOS Alliance opposes the Angus Place Mine Extension Proposal (APMEP) for the following reasons:

- Inadequate flora assessment, with 12 threatened species of flora recorded in the area not properly assessed, or searched for, by the proponent during surveys.

- Extensive, irreversible damage to nationally threatened groundwater-dependant swamps, including Newnes Plateau Shrub Swamp (NPSS) and Newnes Plateau Hanging Swamp (NPHS).

- Loss of populations of groundwater-dependent species which are restricted to these endangered peat swamp ecological communities, including the Endangered Blue Mountains Water Skink (*Eulamprus leuraensis*) (BMWS) (EPBC Act, BC Act) and the Endangered Giant Dragonfly (*Petalura gigantea*) (BC Act).

- Reduced flow regime in streams on Newnes Plateau and within adjacent World Heritage Area.

- Continued pollution of the Wolgan River, downstream within the World Heritage Area.

- Damage to the internationally significant 'pagoda landforms'.

- Lack of mitigation plans to limit damage to geological and biodiversity values found within the extension proposal lease zone.

- Key exclusions in offset calculations.

- Inflation of positive socio-economic benefit the APMEP would bring Lithgow, contrary to need for a just transition now.

- An excessive and unrealistic consent period that is at odds with global action to mitigate climate change and the future viability of coal as an energy source.

- **Failure to identify and adequately search for threatened species**

The *Amendment Report* (page 76, 8.2.1.1) states: *A comparison between the Initial APMEP Likelihood of Occurrence (LoO) and the amended APMEP LoO has identified 40 additional threatened species that require survey within the Study Area. Of these, three are likely to occur within the Study Area in Swamps and 13 are likely to occur within the Impact Envelope (refer Section 8.2.3).*

Forty (40) Threatened Flora and Fauna Species were missed in the original 2014 EIS. This is appalling! Centennial Coal have had 20 years to study the Flora & Fauna within their mining leases in Newnes State Forest, are admitting that 40 Threatened Species have been missed in previous Approvals, yet want this Proposal to be approved as Exhibited, promising to monitor for these Threatened Species after approval, and will avoid them if possible.

The whole purpose of an EIS is to identify where Threatened Species occur in a Proposal area prior to commencement of works, so that any adverse impacts can be avoided or mitigated by altering the mine plan accordingly.

This is contrary to the principles of the Biodiversity Offset Hierarchy of **'avoid, minimise, offset'**.

Inadequate flora surveys

The *Amendment Report* and *Appendix I Revised Biodiversity Impact Assessment* claim that on-ground Flora Surveys have been conducted, and desktop searches have been done.

Those surveys failed to find the 12 Threatened Flora Species listed below, which occur within the Angus Place Colliery mine lease. LEG finds it disturbing that they are also not listed on the DoPIE Wildlife Atlas (www.bionet.nsw.gov.au). However they are recorded on either the NSW Herbarium database, (https://avh.ala.org.au*),* the Atlas of Living Australia database (https://spatial.ala.org.au), or the international iNaturalist Biodiversity Database (https://www.inaturalist.org*).*

Therefore, anyone in the world who searches for these Threatened Flora Species within the Angus Place Mine Lease can locate them, except apparently for Centennial Coal and their Consultants.

EPBC Act listed Threatened Species not identified in the Amendment Report or Appendix I

LEG has identified twelve (12) Threatened Flora Species not identified in the Amendment Report -

1. ***Pultenaea parrisiae*** – Vulnerable EPBC Act. Recorded 2019 in Sunnyside West Swamp and Birds Rock Hanging Swamp. Not identified in *2014 EIS*. Not identified in current *Amendment Report* or *Appendix 1 Revised Biodiversity Impact Assessment*. No EPBC Referral has ever been done for *Pultenaea parrisiae* in APMEP. Moisture-dependent species confined to swamps and seepage areas. Only known from far NE Gippsland in Victoria and 3 sites in NSW (Wadbilliga Trig area & 2 sites S of Nalbaugh). This Newnes State Forest population is the most northerly limit of its distribution.

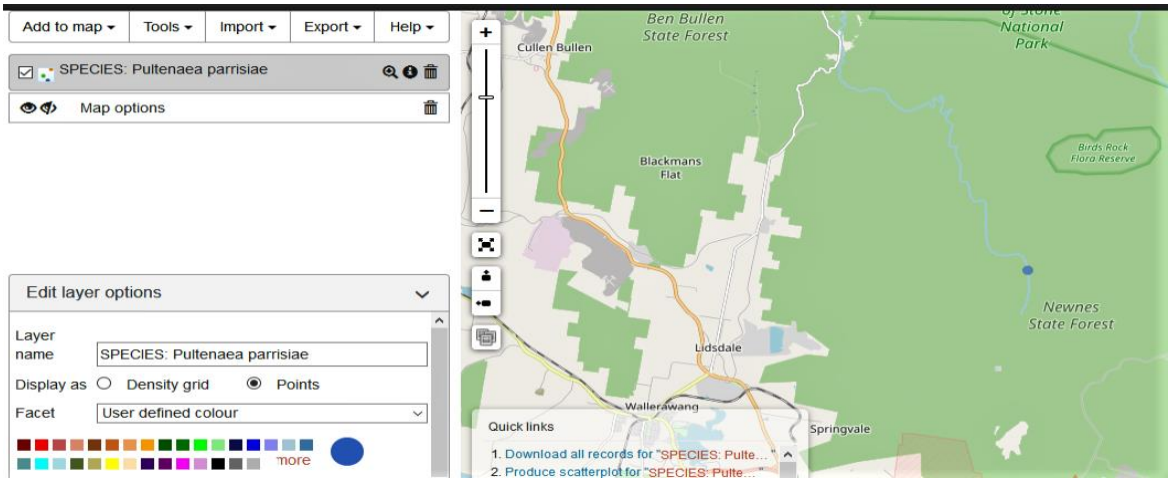

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Pultenaea parrisiae 20/4/2020

Figure: Pultenaea parrisiae showing characteristic leaf stipules 5-7mm long, leaves with acuminate recurved tip

2. ***Pultenaea glabra*** – Vulnerable EPBC Act & NSW BC Act. Recorded in 2010 and since in Angus Place 300 area, near Wolgan Falls on boundary of current proposal, and Clarence Colliery mine lease area. Not identified 2014 EIS or current APMEP. No EPBC Referral ever done. Moisture dependent species. A Key Threatening Process in Recovery Plan is altered hydrology due to longwall mining.

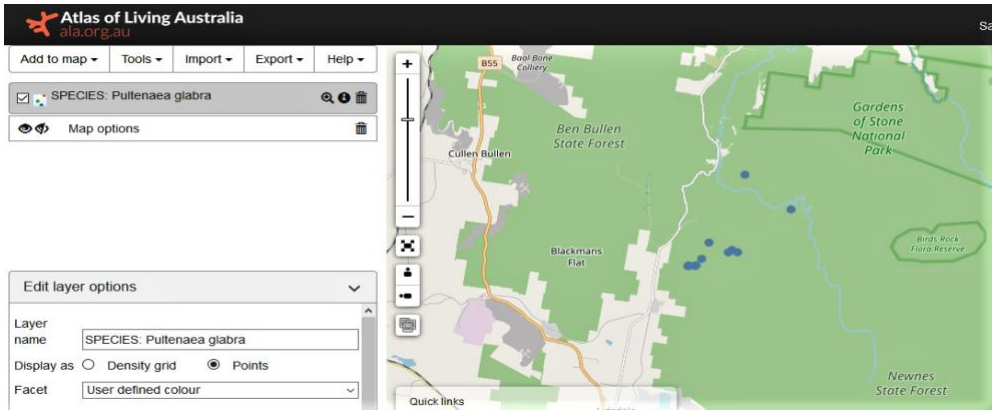

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Pultenaea glabra 20/4/2020

3. ***Kunzea cambagei*** **–** Vulnerable EPBC Act and NSW BC Act. Recorded in 2010 and since near Angus Place 800 Area. No EPBC Act referral conducted in 2014 EIS or for current Proposal. A Key Threatening Process identified in the Recovery Plan for *Kunzea cambagei* is alteration of hydrology. The Angus Place record is the most northerly record for this species in NSW.

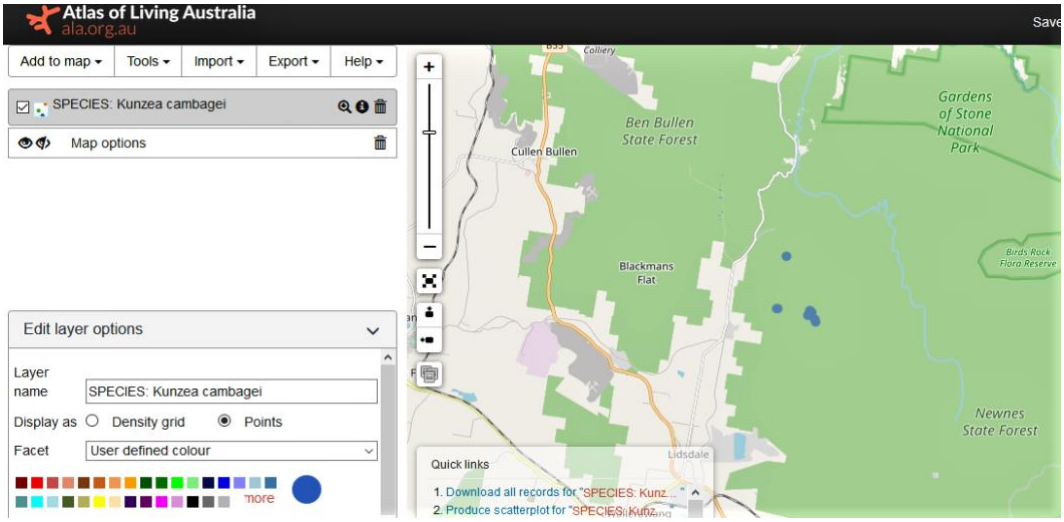

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Kunzea cambagei 20/4/2020

4. ***Commersonia prostrata*** **–** Endangered EPBC Act, Endangered NSW BC Act. Recorded Newnes Plateau 2007 and 2011. Not identified 2014 EIS, Amendment Report, or Appendix I. No EPBC referral done. Bo targeted searches. Occurs only in swamps. Moisture dependent. Highly likely to occur.

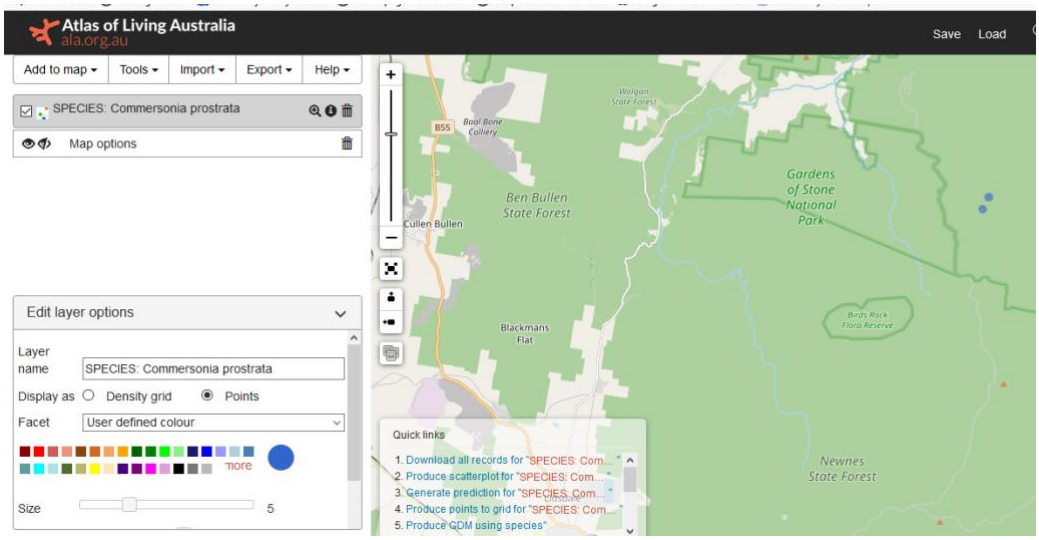

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Commersonia prostrata 20/4/2020

5. ***Eucalyptus aggregata*** – Vulnerable Commonwealth EPBC Act & NSW BC Act. Occurs Angus Place Colliery 300 Area. Moisture dependent species. May be impacted if 300 Area or hydraulically interconnected 700, 800, or 900 areas are drained to facilitate mining in the new Proposal area.

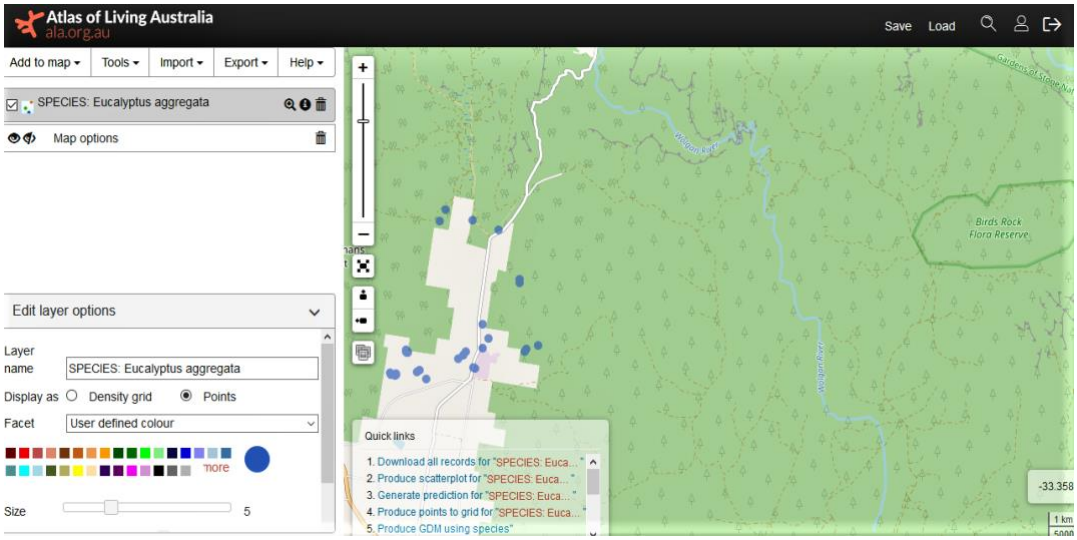

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Eucalyptus aggregata 20/4/2020

6. ***Xerochrysum palustre*** – Vulnerable EPBC & NSW BCA. Not identified in 2014 EIS. No EPBC Referral done. Recorded 7 March 2019 in Pine Swamp within Springvale Colliery Extension Area, after 2015 Approval. Pine Swamp has now been undermined, and it and *Xerochrysum palustre* will most likely die. Discovered in April 2020 by LEG in Angus Place Colliery 300 Area. Only occurs in waterlogged areas of swamps. Will be lost of 6 NPSS + hanging swamps in the APMEP are drained.

From the 2019 Springvale Annual Report "*Water levels in Pine Swamp piezometers dropped suddenly and some have dropped below the loggers while LW425 passed during the review period. Paddys Creek Swamp, PC2, located on a surface lineament that is within 100 m of LW425 experienced large declines in water levels, whereas PC1 remained in a stable condition. Both Pine Swamp and Paddys Creek Swamp are under current investigation.*"

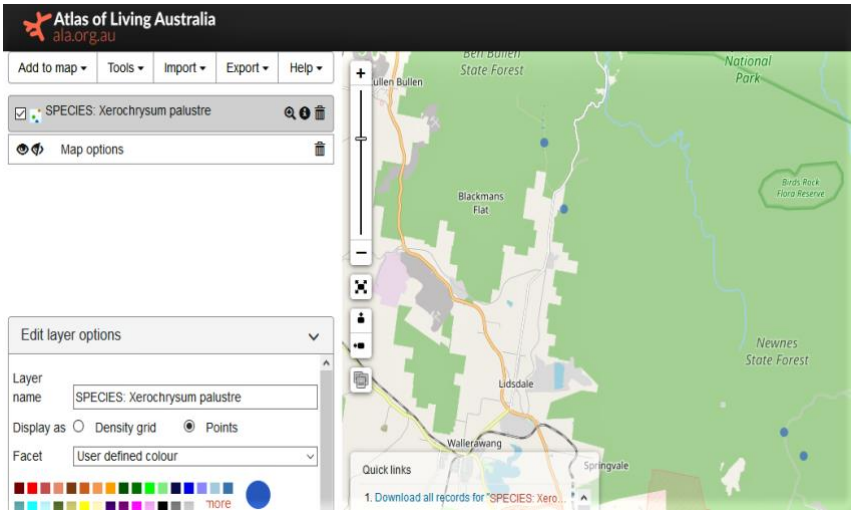

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Xerochrysum palustre 20/4/2020

NSW BC Act Species missed in Amendment Report and Appendix I

1. ***Persoonia hindii*** **–** Endangered NSW BC Act**. W**idespread in APMEP area, only occurs on Newnes Plateau. not protected in any NPWS Reserve in NSW. At risk from this proposal.

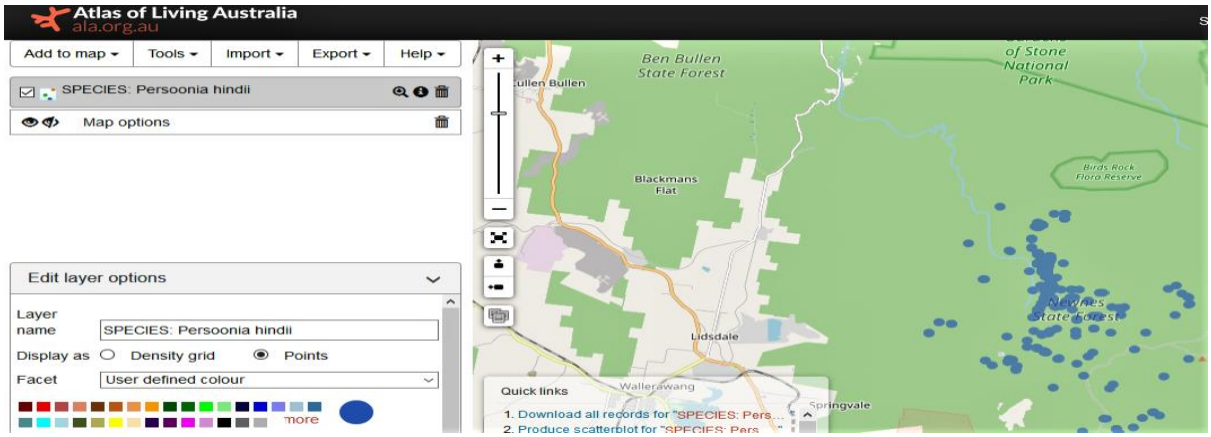

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Persoonia hindii 20/4/2020

2. ***Caesia parviflora var. minor*** – Endangered NSW BC Act. Occurs throughout APMEP area. Moisture dependent. At high risk of being lost in the 6 NPSS + hanging swamps that will destroyed.

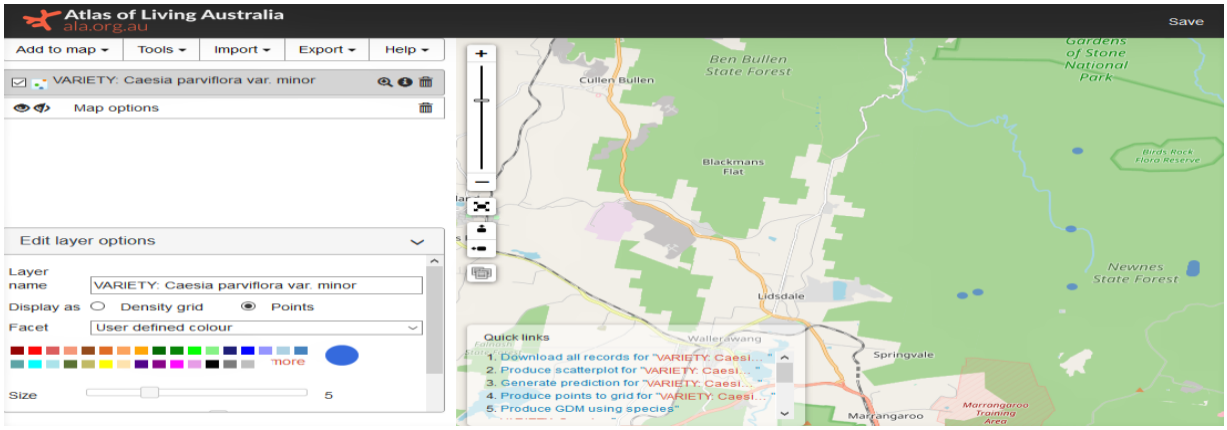

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Caesia parviflora var. minor 20/4/2020

3. ***Genoplesium superbum*** – Endangered NSW BC Act. Recorded near Wolgan Falls 2005, and many areas since in Newnes State Forest. Never been recorded by Centennial Coal in Newnes SF.

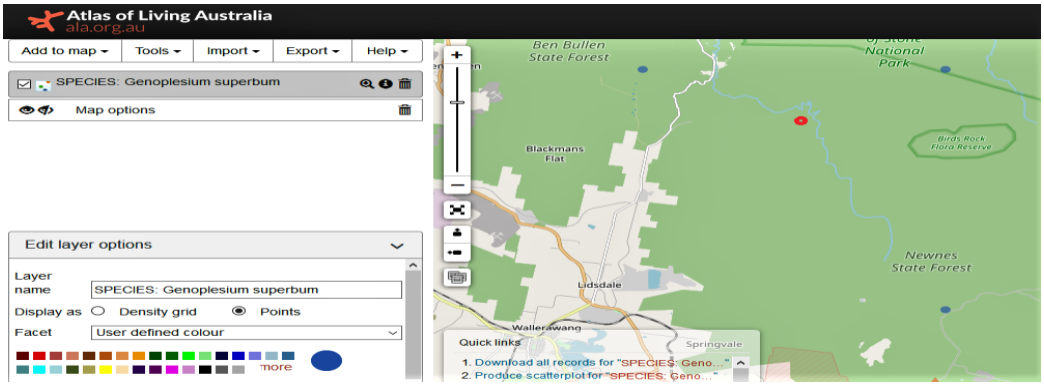

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Genoplesium superbum 20/4/2020

4. ***Veronica blakelyi*** – Vulnerable NSW BC Act. Widespread Proposal area. Moisture dependent.

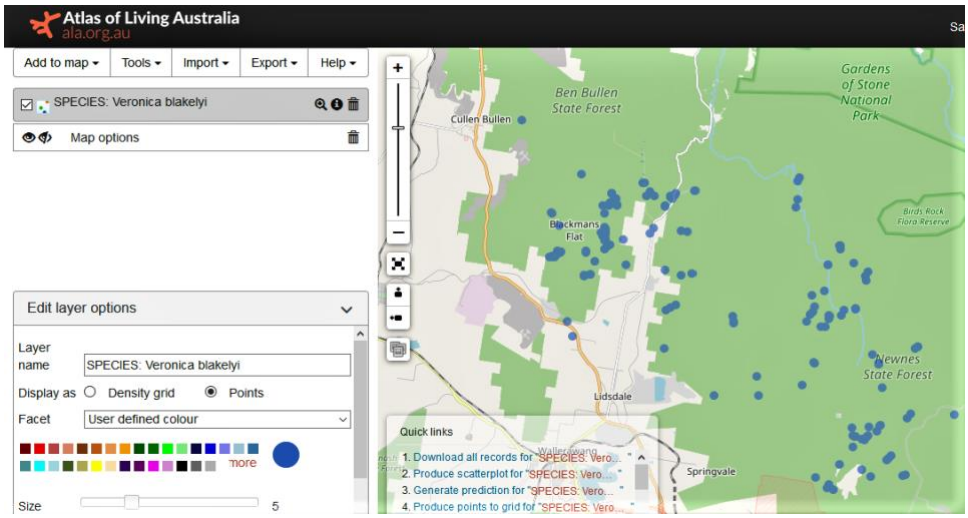

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Veronica blakelyi 20/4/2020

5. ***Leucopogon fletcheri subsp. fletcheri*** (Endangered NSW BC Act). Recorded in Angus Place 900W Panel (still to be completed), and along Wolgan River bordering the Proposal Area.

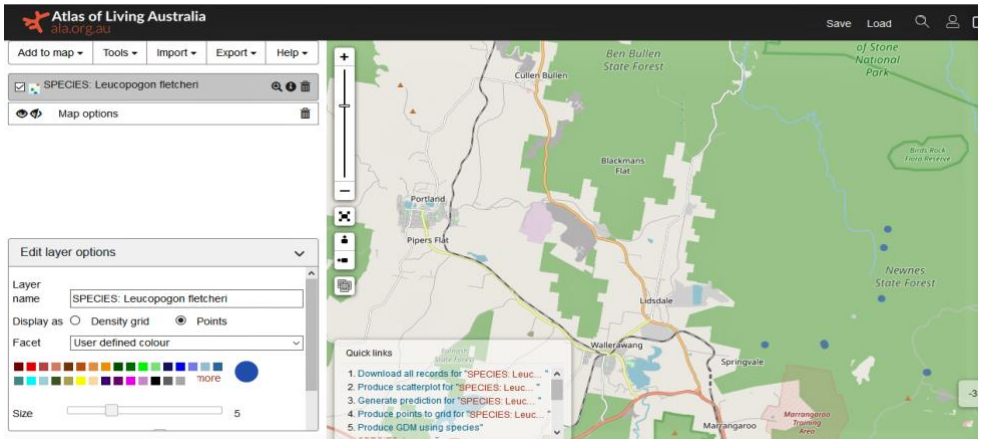

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search Leucopogon fletcheri ssp fletcheri 20/4/2020

6. ***Carex klaphakei*** **–** Endangered NSW BCA. Not listed in 2014 EIS. Recorded in Marrangsroo Creek Swamp prior to 2015 Springvale Mine Extension approval, but was somehow "lost" from DPIE Wildlife Atlas (http://www.bionet.nsw.gov.au). That swamp and those plants are doomed if Marrangaroo Creek Swamp is drained by approved Springvale longwalls. Surprisingly *Carex klaphakei* was recorded in EIS for this Proposal, however no Biodiversity Offset Credits have been calculated.

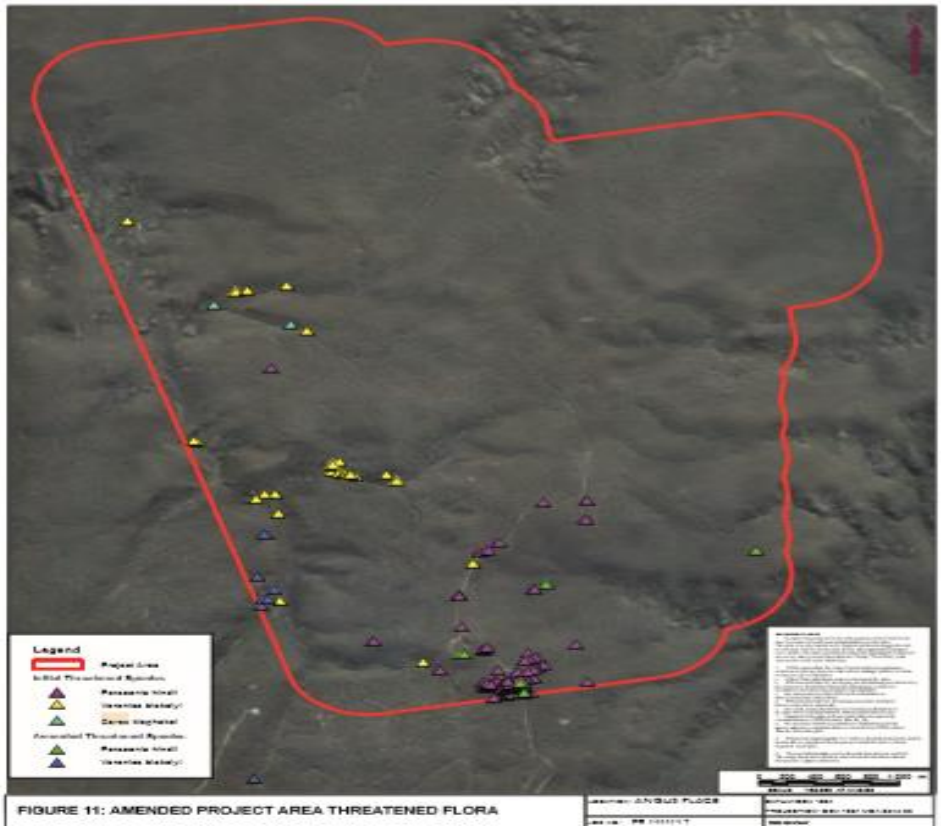

FIGURE 11: Appendix I Revised Biodiversity Impact Assessment. Carex klahakei = Green placemarks

Other rare flora species not identified in Amendment report or appendix I

Corunastylis reflexa – first recorded 1885 near Mt Jamberoo. Not recorded for 130 years. Recently rediscovered at 5 locations in Newnes State Forest, including along a Centennial Coal subsidence monitoring line. Occurs on edge of NPSS. Highly likely to occur in Proposal area.

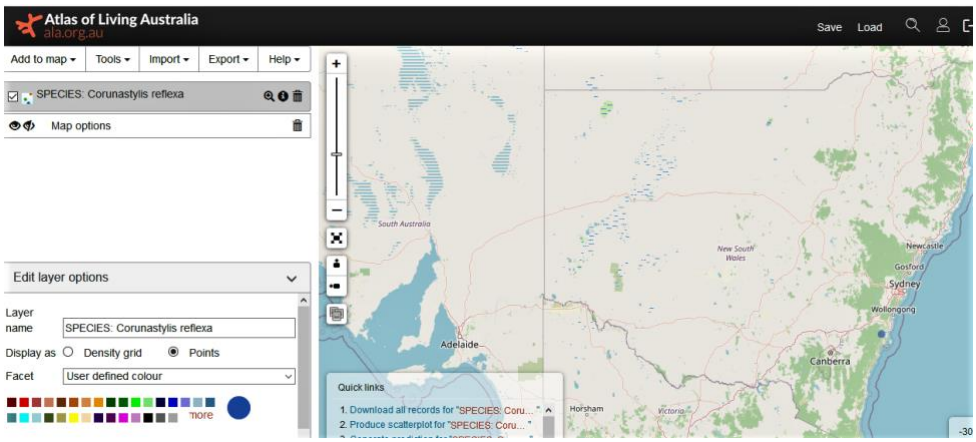

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Corunastylis reflexa 20/4/2020

Cunningham's Snow Gentian (*Gentianella cunninghamii*) – Not recorded in any previous Centennial Coal Flora Surveys in swamp communities. Recorded by LEG in Angus Place Colliery 300 Area in March 2020. The most northerly record, the nearest other records are in Kanangra-Boyd NP. A totally moisture-dependent species. Will be lost of Angus Place 300 Area or hydraulically inter-connected 700, 800 or 900 Areas are drained to enable mining of new Proposal area.

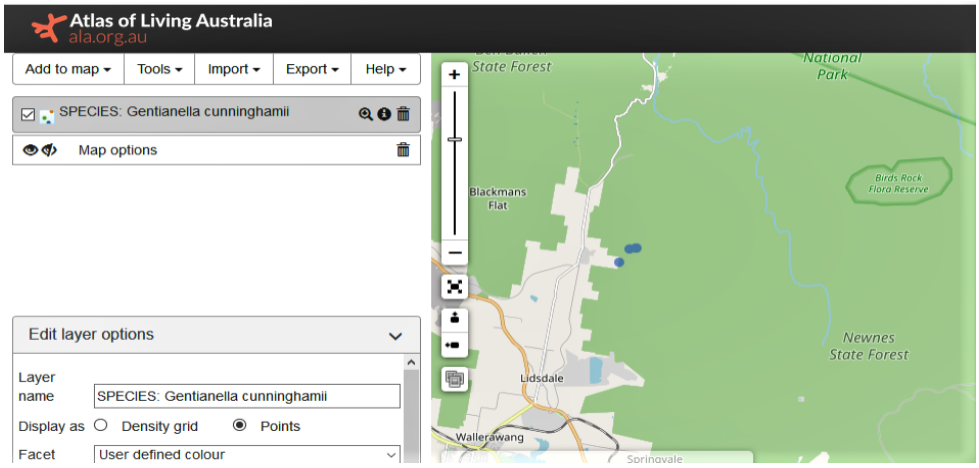

Figure: Atlas of Living Australia (https://spatial.ala.org.au) search for Gentianella cunninghamii 20/4/2020

LEG has recorded 134 flora species in Newnes State Forest not listed on the Wildlife Atlas, too many to list here. Suffice it to say that Flora Surveys in Newnes State Forest have been grossly deficient.

Threatened fauna species

The *Amendment Report* and *Appendix I Revised Biodiversity Impact Assessment* provide very scant information on Threatened Fauna within the APMEP Proposal area, and expect the reader to search for the original 2014 Angus Place EIS documents.

From what LEG can ascertain from searching several sources is that nine threatened fauna species have been recorded within the Study Area, and would be subject to subsidence impacts:

- *Eulamprus leuraensis* (Blue Mountains Water Skink): Endangered; EPBC Act & NSW BC Act;
- *Petalura gigantea* (Giant Dragonfly): BC Act = Endangered NSW BC Act;
- *Pseudophryne australis* (Red Crowned Toadlet: Vulnerable NSW BC Act;
- *Cercartetus nanus* (Eastern Pygmy Possum): Vulnerable NSW BC Act;
- *Petroica pheonicea* (Flame Robin): Vulnerable NSW BC Act;
- *Callocephalon fimbriatum* (Gang-gang Cockatoo): Vulnerable NSW BC Act;
- *Chalinolobus dwyeri* (Large-eared Pied Bat): Vulnerable EPBC Act & NSW BC Act;
- *Ninox strenua* (Powerful Owl): Vulnerable NSW BC Act
- *Petroica boodang* (Scarlet Robin): Vulnerable NSW BC Act
- *Daphoenositta chrysoptera* (Varied Sittella): Vulnerable NSW BC Act

Threatened species known to be associated with THPSS which should be included in Biodiversity Offset Credit calculations include:

- *Eulamprus leuraensis* (Blue Mountains Water Skink: Endangered EPBC Act & NSW BC Act;
- *Petalura gigantea* (Giant Dragonfly: BC Act = Endangered NSW BC Act;
- *Pseudophryne australis* (Red Crowned Toadlet: Vulnerable NSW BC Act;

Eastern Pygmy-possum (*Cercartetus nanus)* – Vulnerable NSW BC Act.

An apparent discrepancy in the APMEP is that the Eastern Pygmy-possum *(*Vulnerable NSW BC Act) was recorded at North Swamp (named Twin Gully Swamp in this Proposal) in the Angus Place Environmental Performance report – August to November 2017.

North (Twin Gully) Swamp has been assessed by Centennial for a *Maximum Offset Liability,* assuming a total loss of all NPSS and NPHS and associated Threatened Species within this swamp.

Because the Eastern Pygmy-possum was officially recorded by Centennial in Twin Gully Swamp in 2017, it should be included in *Threatened species known to be associated with THPSS*, and should be assessed as part of the Biodiversity Offset Credit calculations.

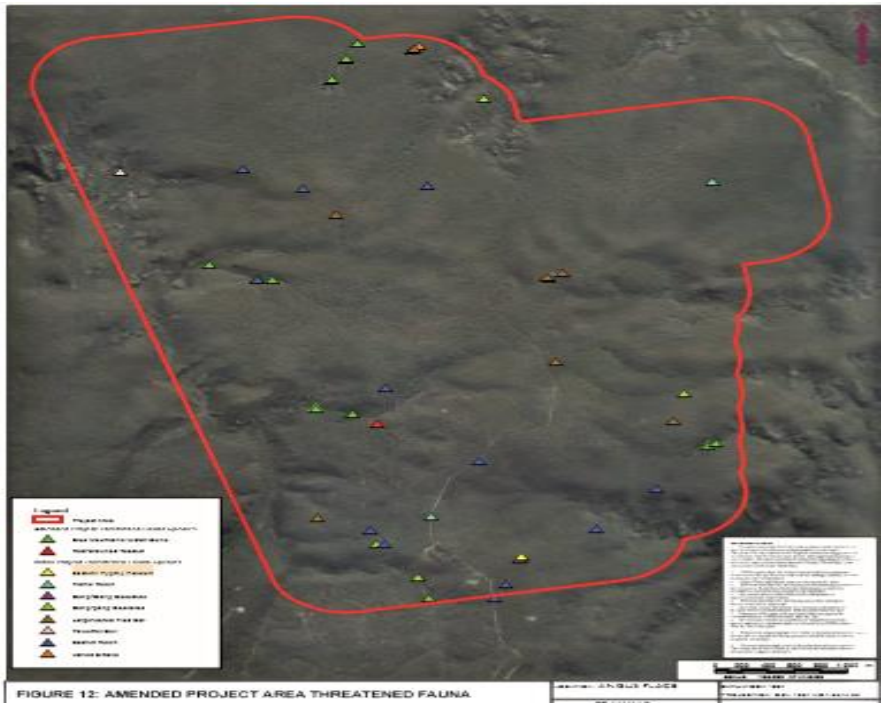

Figure 12: Amended Project Area Threatened Fauna - Appendix I. Eastern Pygmy Possum = Yellow placemark

Threats listed on www.environment.nsw.gov.au for Eastern Pygmy-possum include: Loss and fragmentation habitat through land-clearing for agriculture, forestry and urban development; changed fire regimes that affect the abundance of flowering proteaceous and myrtaceous shrubs, particularly banksias; and declining shrub diversity in forests.

Longwall mining will dry out and kill entire ecosystems in and adjacent the Proposal area, including TPPSS in Twin Gully Swamp where the Eastern Pygmy-possum has been recorded This will result in the loss of many flowering Proteaceous and Myrtaceous shrubs, in particular Banksia's, which predominately occur in open sunny heathland and swamps within the Proposal area.

Vegetation communities missed in the Amendment report and appendix I

- **MU1 Sandstone Canyon Warm Temperate Rainforest.**

Not identified in APMEP. Characterised by the presence of Coachwood (*Ceratopetalum apetalum*) and Sassafras (*Doryphora sassafras*). Recorded by LEG in a canyon near Birds Rock, and probably more widespread in canyons within Proposal area. A moisture-dependent rainforest community, which will dry up and become more fire-prone, which will kill this unique vegetation community. MU1 is historically significant, as the **Wollemi Pine** was discovered in the MU1 Vegetation Community. Below are photos of *Doryphora sassafras* within that Canyon near Birds Rock.

Figure: MU1 Sandstone Canyon Warm Temperate Rainforest and Doryphora sassafras - canyon near Birds Rock

LEG has identified ten (10) rainforest tree species in Newnes State Forest not listed on the DPIE Wildlife Atlas as occurring in this State Forest. These major discrepancies should be addressed by the DPIE, as other Rainforest Vegetation Community types may occur within and near the APMEP area.

- **Aeolian Sand Dune Vegetation Community**

Not identified in Amendment Report or Appendix I is an ancient wind-blown sand dune landform unique to Newnes Plateau. The vegetation community may also be unique on Newnes Plateau, a shrubby woodland with *Xanthorrhoea resinifera* not common in surrounding vegetation.

This geo-heritage feature is in the north-east corner of the Project area (LW 1014 & 1015). The Sunnyside Dune is a classic crescent-shaped body of sand, 280m long, 70–110m wide, up to 4.6m thick and thinning at the edges, with an estimated volume of 50 000m^3.

Sand stripped by wind from local landforms was deposited as dunes in the lee of cliff-lines. For wind erosion to occur, Newnes Plateau must have been above the tree line due not only to the climate being 8–9°C colder and drier, but also because atmospheric carbon dioxide was lower. The relatively large number of relict heath plant species found on the Plateau also must have survived these very harsh conditions.

Other examples of this rare landform on Newnes Plateau have been lost to sand-mining, quarrying and other developments before they could be adequately studied.

LEG believes that Centennial should be required to conduct a Flora Survey of this unique geo-heritage feature and take all possible steps to avoid or minimise any damage.

- **Potential loss of groundwater from endangered, groundwater-dependent, Newnes Plateau Shrub Swamp (NPSS) and Newnes Plateau Hanging Swamp (NPHS) ecological communities in mine project area and adjacent World Heritage Area.**

These NSW BC Act 2016-listed peat swamp communities form part of the Commonwealth-listed (EPBC Act 1999) Temperate Highland Peat Swamps on Sandstone Endangered Ecological Community and represent a unique assemblage of species which is restricted to the Newnes Plateau. Groundwater drawdown modelling of surface aquifers (referred to as “the uppermost watertable”) at 38 years post mining[1] suggests that there could be significant groundwater drawdown associated with identified and mapped NPSS patches, including Twin Gully, Tristar, Trail Six, Crocodile and Birdrock swamps, as well as various smaller NPHS, in the mine project area, with a potential 5-10 m drawdown predicted for all swamps above or adjacent to the mine. Groundwater drawdown is also possible, albeit to a somewhat lesser degree, outside the mine project area in the adjoining World Heritage Area as a result of ‘far field impacts’ associated with geological lineaments. The effect of even a much smaller 1-2 m drawdown, however, will be devastating for any of these swamps reliant upon a high or emergent water table. This could potentially include swamps in the headwaters of tributaries of Deanes Creek, Rocky Creek and Nayook Creek to the east in the World Heritage Area.

The impact of previous longwall mining on a number of the Endangered peat swamps on the Plateau (e.g. Narrow Swamp, East Wolgan Swamp, Junction Swamp, Sunnyside East Swamp, Carne West Swamp, Gang Gang West Swamp and Gang Gang East Swamp), which have been irreparably damaged, and on their associated populations of threatened species of plants and animals, provides dramatic evidence of the impacts of loss of groundwater on these groundwater dependent

[1] Jacobs. (2019). Angus Place Amended Project. Centennial Angus Place Pty Ltd. Groundwater Impact Assessment IA161511-RPT-0006. Rev0 31 October 2019

ecosystems[2]. Permanent and irreparable damage to Carne West Swamp, for example, resulted from so-called 'far field impacts' associated with geological lineaments draining surface waters. It is of serious concern that such far field impacts could also extend to swamps outside the proposed Angus Place mine area. Groundwater drawdown modelling for this Angus Place Extension Project did not appropriately consider the possibility of lineaments draining surface waters, the cumulative impact from drawdown associated with the Springvale mine, or appropriately consider surface to seam fracturing. Such fracturing is predicted to occur up to 340 m for extractions of 3.4 m; depth of cover ranges between 270 m to 450 m, so fractures are likely to reach the surface anywhere depth of cover is <340 m.

With lowering water tables, swamp soils dry out, the organic component of the peat swamp soils oxidizes, reducing the water holding capacity of the soils, reducing the soil bulk and depth, and increases their vulnerability to combustion and further degradation (e.g. erosion and channelization) during and subsequent to fire events. The evidence of fire impacts on dry peaty swamps has recently been starkly demonstrated in undermined swamps in the upper Wolgan River (e.g. Junction Swamp and East Wolgan Swamp) and Carne Creek (e.g. Caren West Swamp, Gang Gang West Swamp and Gang Gang East Swamp) catchments following the December 2019 fires. This process subsequently results in a loss of groundwater-dependent flora and fauna. These processes are likely to be compounded by a rapidly changing climate, with contractions in peat swamp habitat predicted[3]. These swamps then transition from being groundwater-dependent peat swamps to rainfall dependent drier communities on primarily mineral soils[4]. A significant proportion of the unique Endangered NPSS and NPHS have already been permanently destroyed by longwall mining by Centennial Coal.

- **Loss of populations of groundwater-dependent species which are restricted to these endangered peat swamp ecological communities.**

These include, most notably, the Endangered Blue Mountains Water Skink (*Eulamprus leuraensis*) (BMWS) (EPBC Act, BC Act) and the Endangered Giant Dragonfly (*Petalura gigantea*) (BC Act). The Newnes Plateau supports an important complex of distinctive swamp patches which provide habitat for these patchily distributed species[5,6]. Both species are reliant on groundwater seepage areas in these swamps for reproduction and maintenance of populations[7,8]. Loss of these seepage areas, associated with consistently high water tables, will result in extirpation of individual swamp populations of these and other obligate swamp-dwelling species. Other groundwater dependent swamp fauna of concern includes stygofauna[1] and the vulnerable Red-crowned Toadlet

[2] Centennial Coal. (2020). Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan LW 415 to 417 Annual Report. Springvale Mine - March 2020.

[3] Keith, D.A., Elith, J. & Simpson, C.C. (2014). Predicting distribution changes of a mire ecosystem under future climates. *Diversity and Distributions*, 20, 440-454. doi:10.1111/ddi.12173

[4] Baird, I.R.C. & Burgin, S. (2016). Conservation of a groundwater-dependent mire-dwelling dragonfly: implications of multiple threatening processes. *Journal of Insect Conservation*, 20, 165-178. doi:10.1007/s10841-016-9852-3
[5] Gorissen, S. (2016). Conservation biology of the endangered Blue Mountains Water Skink (*Eulamprus leuraensis*). PhD thesis. University of Sydney.
[6] Benson, D. & Baird, I.R.C. (2012). Vegetation, fauna and groundwater interrelations in low nutrient temperate montane peat swamps in the upper Blue Mountains, New South Wales. *Cunninghamia*, 12, 267-307.
[7] Baird, I.R.C. (2014). Larval burrow morphology and groundwater dependence in a mire-dwelling dragonfly, *Petalura gigantea* (Odonata: Petaluridae). *International Journal of Odonatology*, 17, 101-121. doi:10.1080/13887890.2014.932312
[8] Gorissen, S., Baird, I.R.C., Greenlees, M., Sherieff, A.N. & Shine, R. (2018). Predicting the occurrence of an endangered reptile based on habitat attributes. *Pacific Conservation Biology*, 24, 12-24. doi:https://doi.org/10.1071/PC17027

(*Pseudophryne australis*). The Newnes Plateau swamps also provide habitat for a number of noteworthy montane mire plant species, including the Endangered *Carex klaphakei*, Vulnerable *Boronia deanei*, Vulnerable *Xerochrysum palustre* and rare and recently recorded *Gentianella cunninghamii* (a northerly range extension).

Longwall mining by the Springvale Mine has resulted in recent years in the destruction of a series of NPSS in the upper Carne Creek Catchment[2], each of which had populations of *E. leuraensis* and *P. gigantea*, and several with populations of *Boronia deanei*. These swamps no longer provide suitable reproductive habitat for *Petalura* or suitable core habitat for persistence of *E. leuraensis*. Both species can be expected to be extirpated from these former peat swamps (I. Baird, pers. comm.). Loss of individual swamp populations or loss of groups of swamp populations can be expected to detrimentally affect long-term metapopulation dynamics of these species. *Eulamprus leuraensis* populations on the Newnes Plateau have been identified as genetically distinct from populations further east in the Blue Mountains Swamps, with evidence of genetic differentiation among populations or groups of populations on the Plateau. It has been recommended that individual swamp populations be treated as distinct conservation units[9,10]. In addition to the existing swamps which have been destroyed as a result of loss of groundwater, all swamps in the proposed mine area can be expected to be permanently and irreparably damaged as result of longwall mining-related subsidence and subsequent groundwater drawdown. Loss of these populations within and, potentially adjoining the mine project area as a result of far field impacts, may have a significant detrimental impact upon metapopulations of these species at a larger spatial scale (and in the case of *Eulamprus*, genetic diversity), including within the adjoining World Heritage Area.

- **Reduced stream flow from the Newnes Plateau into the World Heritage Area.**

Groundwater modelling suggests a significant impact on groundwater levels in mapped swamps in and around the mine project area[1]. Groundwater drawdown resulting from fracturing of aquitards following subsidence and other ground movements, associated with the longwall mining operation, can be expected to result in potentially significantly reduced inputs to streams which are fed by water from the mining area, including from groundwater dependent peat swamps in and adjoining the mine project area. These swamps function as important slow release water storages which maintain base flows to receiving watercourses (Carne Creek and Wolgan River) and their associated aquatic and riparian communities in the World Heritage Area. Additional loss of base flows as a result of loss of surface waters, groundwater drawdown and loss of groundwater into the mine voids can be expected. Residual groundwater modelling at 38 years post mining suggests significant drawdown in the Lithgow Coal Seam extending well into the World Heritage Area, including in Gardens of Stone and Wollemi National Parks[1]. In addition to the ecosystems themselves, the maintenance of base flows is likely to be important to various aquatic and riparian species associated with these stream environments in the World Heritage Area, particularly in the context of uncertainty around predicted climate change impacts.

[9] Dubey, S. & Shine, R. (2010). Plio-Pleistocene diversification and genetic structure of an endangered lizard (the Blue Mountains water skink, *Eulamprus leuraensis*) in south-eastern Australia. *Journal of Biogeography*, 37, 902-914. doi:10.1111/j.1365-2699.2009.02266.x

[10] Dubey, S. & Shine, R. (2010). Restricted dispersal and genetic diversity in populations of an endangered montane lizard (*Eulamprus leuraensis*, Scincidae). *Molecular Ecology*, 19, 886-897. doi:10.1111/j.1365-294X.2010.04539.x

- **Damage to geological features in and adjoining the World Heritage Area.**

The potential for damage to the dramatic cliff-faces and pagodas, including in the adjoining World Heritage Area, particularly along the Carne Creek gorge, as a result of mining related subsidence, is of serious concern. Longwall panel design and mine layout must ensure that risk of subsidence related impacts is avoided. Past longwall mining in the region has resulted in significant and well documented damage to cliff-faces and pagodas. The proposed longwall panel width of 360 m is excessive and must be reduced significantly so as to avoid the risk of damaging subsidence.

Pagoda Landscape

The Pagoda landscape that occurs in this area has been designated as being internationally and nationally significant[11]. The 2012 Planning Assessment Commission's [PAC's] Review of the Coalpac Consolidation Project, which was proposed for part of Ben Bullen State Forest, found that the pagodas are "a unique landform on a world scale..."; have limited distribution, "provide critical habitat for some flora species and key habitat features for threatened fauna" and "the pagoda landform should be afforded *special significance status* and the highest possible protection"[12]. The 'pagoda landform' was given scope beyond being individual rock formations, the determination finding "pagodas cannot be considered as structures in isolation. ... they are part of a landform"[13].

Pagodas of the western escarpment Photo: Henry Gold

The DPIE in 2013 **agreed** that "classification of the pagoda landform as a natural feature of *special significance* is appropriate and agrees that these features warrant the highest level of protection". The assignation of international and national significance for Pagoda rocks and connected ecosystems must be considered in the APMEP assessment, which it has not.

[11] Washington, H. G. and Wray, R. A. L. (2011). The geoheritage and geomorphology of the sandstone pagodas of the North-western Blue Mountains Region (NSW). Proceedings of the Linnean Society of New South Wales, 132 131-143

[12] PAC Review Coalpac Consolidation Project, p.76

[13] NSW Planning Assessment Commission Determination Report Invincible Colliery (07_0127 MOD 4) and Cullen Valley Mine (200-5-2003 MOD 2) Expansion modifications , p.14

As with previous assessments that rock pagodas near to the site form an internationally significant landscape, these sites in APMEP also warrant the highest level of protection from mining**.** It is important for the DPIE to be consistent and apply:

- An appropriate definition for the pagoda landform complex found within APMEP area; and
- The Commission's previous recommendations that prevent mining impacts on the full suite of pagoda landscapes.

PAC recommended that "…pagodas and associated escarpments be considered natural features of special significance and that they be fully protected from any mine-induced impacts"[14]. Pagoda landforms associated with nationally endangered swamps and wet gully forests should also be afforded special significance, particularly those with iconic stands of Blue Mountains Ash.

Aeolian sand dunes, found on Newnes Plateau, are another unique geological feature that add to the spectacular geodiversity present in the region. These dunes include the Sunnyside, Carnes, Pine and Deanes dunes. They provide critical insight into Australia's past climate conditions and the shift over time. Ensuring the protection of this geological history and the landscapes they support is essential[15].

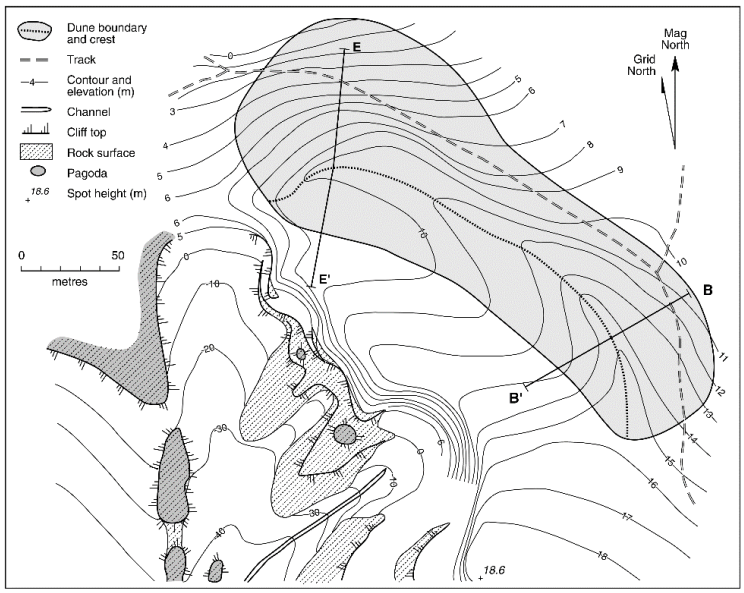

Fig. 1 Sunnyside dune: Contours of elevation relative to an arbitrary datum. Location of samples for dating and transects shown in Fig. 4 indicated. Pagoda is a widely used local name for tower-shaped bare sandstone outcrops.

Assessments by Centennial Coal and its consultants have failed to properly record all significant geomorphological features within the proposed APMEP area and the 600m buffer zone. Numerous pagodas have not been considered in the EIS and 2020 environmental assessment for APMEP, which gives an inaccurate understanding of the scenic values of the impacted area. For example, Pagodas were dismissed in the assessment process if they were isolated, which is poor justification for non-

[14] PAC RR at pp.iii and 73-4

[15] Hesse et al., (2003) Late Quaternary aeolian dunes on the presently humid Blue Mountains, Eastern Australia, Quatenary International 108, pp. 13-32

assessment. The damage that APMEP is likely to cause this internationally significant landscape must be considered and addressed for mitigation.

Preventing damage to Pagoda landforms

Protection options include *avoidance*, by removal, splitting or shortening of certain longwalls which have the highest risk for damaging Pagoda landscapes, including those associated with swamps and dramatic Bald Rock lookout.

Protection of pagoda landscapes was not addressed in the EIS or the amendment reports. Longwalls in the north-east section (LW1014, 1013, 1012) of the area to be mined, and those of the south-east section (LW 1002) face the highest likelihood of causing damage to pagoda landforms. LW1008 also has pagoda landforms directly above the proposed longwall, which will almost certainly cause significant damage.

To mitigate the above risks, we recommend the following amendments to the proposed mine layout:

1. Significantly reducing longwall widths to avoid surface to seam fracturing;
2. Avoiding direct undermining of Twin Gully Swamp;
3. Avoiding undermining the Type 2 lineament under Tri Star Swamp that is connected to the Type 1 Wolgan River lineament zone;
4. Shortening LW1014 so that it does not undermine the Burralow aquifer that feeds Trail 6 swamp; and
5. Reducing the proximity of longwalls to Crocodile Swamp and Birds Rock Swamp so as to maintain the Burralow formation aquifers that supply these two swamps.

- **Exclusions in offset calculations**

Flora: Table 8-13 Species Credit Liabilities only identifies one Threatened Flora Species (*Boronia deanei*) as requiring an Offset Liability of 844. It notes that the calculations in the Swamp Offset Strategy do not currently include *Xerochrysum palustre* and *Carex klaphakei*, the final offset calculations will be revised following development approval and all impacted species will be included.

There are ~40 Threatened Species that were missed in previous EAs, some of which are listed in this submission. Those threatened flora that have been missed must be accounted for in offset calculations. Similarly, it shows key concerns regarding the thoroughness and lack of oversight from government regarding proponent's assessments in regard to offset matters.

Geodiversity & scenic values: Damage to internationally significant pagoda landforms and other unique geomorphological features are not been factored into offset calculations. Further the area's overall scenic values, which are derived from the vista's found from various viewpoints across this area of pagoda formations, bush and swamps, are enjoyed by a large group of diverse recreational users. Their enjoyment of the region will be increasingly compromised as longwall operations cause cliff falls, cracking, pagoda collapses and ecosystem die back. Already, this damage has occurred extensively in previous Angus Place longwalls, particularly Longwalls 1-10 in the mining lease. In a 1991 report by Professor Philip Pells, mine subsidence expert, stated "about sixteen rock falls

occurred during mining of the first eight longwall panels. Ten rock falls were observed in the vicinity of longwall 9. These ranged in volume from 20 to 3300 cubic metres."[16]

Cliff fall in Angus Place Colliery Longwall 9 from Ben Bullen State Forest Photo: Chris Jonkers

Swamps: Prior to damage from mining, nationally endangered swamps only made up 650 hectares on Newnes Plateau. Decades of destructive mining practices throughout this area have left only ~350 hectares remaining in-tact, with 300 hectares ruined or seriously degraded. Subsequently, further swamp offsets are no longer a mitigation process as they are delivering an unacceptable result and do not support continued viability of this endangered ecological community.

Indigenous Cultural Heritage: See confidential submission by Yuri Bolotin outlining non-assessed Aboriginal Cultural Heritage sites within the Angus Place mining lease. Sites that have been identified but not considered by Centennial or its consultants require detailed surveying and consultation with local Indigenous stakeholders.

- **Note on offsets**

The GOS Alliance does not support offsets as an effective mechanism to protect threatened species, communities or ecosystems. Offset mechanisms allow for an emphasis to be placed on calculating compensation for damage committed to places with natural or cultural heritage, rather than focussing on mitigation or avoidance of damage. Given that Australia (and the world) is in the midst of an extinction crisis, this system is no longer effective or appropriate, with far more stringent approaches needed to be employed for the protection of threatened species and the natural world.

Under the EPBC Act, the Environmental Offsets Policy must deliver "overall conservation outcomes that *improves or maintains the viability of the protected matter".* Continuing longwall mining adjacent to or under NPHS and NPSS swamps, for example, is incongruent with this legislative requirement. The remaining half of this endangered ecological community must be protected from its main threat, coal mining. Given that this endangered ecological community is so small in

[16] Pells, P.J.N (1991) A Note on Escarpment Instability Associated with Mining Subsidence, Proceedings of the Second Triennial Conference on Buildings and Structures subject to Mine Subsidence, Mine Subsidence Technological Society Maitland

distribution, the damage cannot be effectively offset. In this setting, financial compensation leads to poor conservation outcomes contrary to the purpose of the offset policy.

- **Climate impacts**

Centennial's assessment has under-reported the greenhouse gas pollution that will result from their mine. The impacts that these emissions will have on their contribution to climate change have not adequately addressed at all. The coal from Angus Place is mined in order to be burned at Mount Piper Power Station (MPPS). As the burning of coal is the number one driver of global warming the approval of additional coal mining jeopardises the safety of the global climate, creating a catastrophic generational inequity.

In Appendix K of the Amendment report, the majority of emissions come as result of downstream emissions or "scope3 emissions".

Centennial coal reported their scope 3 emissions as 364,500 t, or 0.368% of NSW emissions (table 8-22 of the Amendment Report, p102). The actual scope 3 emissions are 10.96 million tonnes CO2e, or 8.5% of NSW emissions. This represents a misreporting of 'scope 3' emissions as being 30 times smaller than reality.

Calculation of scope 3 emissions from proposed coal mining caused by the downstream burning of produced coal:

Salable coal: 4.5 Mtpa
Energy content: 27 GJ/t (table 1, NGAF 2019) [2]
Emissions factor: 90.23 kg CO2e/GJ (table 1, NGAF 2019)
Total emissions from downstream burning of produced coal:
= 4.5 Mt × 27 GJ/t × 0.09023 t CO2e/GJ = 10.96 Mt CO2e per year

NSW total emissions in calendar year 2017 was 129 Mt CO2e, meaning that the AMEP would be responsible for 8.5% of NSW emissions if approved. The climate impacts caused by such a large emissions source are quantifiable, with reference to the best available climate science, and devastating. This alone should be significant grounds for rejection of the project.

Life of mine and MPPS

The amended APMEP proposes to undertake mining operations up to 31 December 2053, which is said to align with the current projected life of the Mount Piper Power Station.

The MPPS was commissioned in 1992-1993, with a technical life of 50 years giving it an expected closure date at 2042. **This date does not consider domestic and global efforts to avoid dangerous climate change.** As such, there is serious need to reconsider a 32-year consent period, for a coal mine which won't have an active power station to provide coal to (which is its main purpose) and will contribute significantly to Australia's greenhouse gas emissions in contravention of its commitments under the Paris Agreement, and NSW Government's net-zero emissions target.

Furthermore, other coal mines in the region could better supply coal to Mount Piper Power Station for the remainder of its life, without causing an additional, significant, emissions source to be added in NSW. The construction of a coal unloader at MPPS in recent years makes this far more feasible.

- **Adverse socio-economic impacts**

Since the 19th century, the economy of the Lithgow region has been reliant upon extractive industries, specifically coal. Lithgow now faces a tumultuous few decades, given the significant shifts that are increasingly seeing the phasing out of coal this century. The world shall continue to move towards more renewable energy, the uptake of clean energy will occur quicker as technology improves. Communities that depend on coal mining, in Australia and elsewhere, have responded through increased production and creation of new mines putting further downward pressure on export prices. Capital investment in mining is increasingly moving elsewhere, particularly as the decreasing cost and efficiencies of renewables increases. Furthermore, global divestment campaigns are forcing major investors in coal to withdraw their assets and halt support for an environmentally-destructive and climate change inducing industry. Companies from all sectors are increasingly hesitant of engaging with the coal industry due to a growing reputational risk.

The planned intensive expansion at Angus Place is acting at odds with the regional medium-term future of Lithgow and with global energy production trends. Communities like Lithgow will be hardest hit as the world accelerates its necessary transition to a low-carbon emissions future, especially if caught unprepared. It must diversify its economy now. One of its best opportunities is tourism, and for that reason the region should adopt *Destination Pagoda*, and work toward becoming a new tourist hub showcasing the scenic and natural wonders surrounding the town. It has the potential to become the next Katoomba and to successfully diversify its economy, replacing the lost economic opportunities from a contracting coal industry with tourism and its affiliated services.

Providing a 32-year consent for Angus Place will lock Lithgow into reliance on a very destructive coal mining proposal whilst also generating a mind-set reluctant to change. The mine proposal creates a further barrier to a transition for Lithgow's regional economy and its workforce. The grandfathering of this mine is in contravention of the fact that "the Lithgow City Council (LCC) has recognised [the] need for diversification of industries away from mining, to support the town in the long term"[17].

Centennial Coal has claimed that "the APMEP project life presents a realistic timeframe for LCC to target for economic diversification"[18]. This is a misleading ambit claim out of kilter with current trends. Renewables contribution to the electrical grid has grown exponentially for the last decade, whilst coal's contribution to power generation (globally and in Australia), has seen a steady decline.

Table 2.2: Australian energy consumption, by fuel type

	2017–18		*Average annual growth*	
	PJ	share (per cent)	2017–18 (per cent)	10 years (per cent)
Oil	2,387.8	38.7	3.2	2.0
Coal	1,847.2	29.9	-4.3	-2.6
Gas	1,554.6	25.2	3.8	2.4
Renewables	382.1	6.2	0.9	5.3
Total	**6,171.7**	**100.0**	**0.9**	**0.6**

Source: Department of the Environment and Energy (2019) *Australian Energy Statistics*, Table C

[17] ERM Amendment Report APMEP p.144
[18] Ibid, 144

The current price of coal and demand for it does not reflect accurately the general trajectory and trends regarding this energy source as it is being propped up by interventionist world leaders, who support the industry because they are a major employer and exporter. Its price is inflated and does not accurately reflect the major shift in focus to renewables, the global movement to mitigate climate change or of the science surrounding the economic havoc that will be caused by the unfolding climate catastrophe. As a result of this inflation, price shocks for coal are likely over the coming years, which will leave hundreds of workers in mines like Angus Place exposed.

In a report by the World Bank on commodity prices, they state "coal consumption has fallen rapidly in advanced economies, as part of an ongoing shift to reduce emissions… Price forecasts for [have] been revised down for 2020… coal prices will decline"[19]. A separate World Bank report highlights that in the last 50 years "across Europe, and more recently in the United States and China, 4 million coal workers [have lost] their job"[20].

Decisive action must be taken to future-proof Lithgow's economic future, immediately rather than following a crisis. The impacts of ignoring the future reality of the coal industry means that "decades later after a mine has shut down, many coal-dependent regions [can] continue to lag socially and economically... planning and preparing for coal mine closure are essential to lessen the shock to coal-dependent communities and facilitate new employment possibilities for redundant workers"[21].

Similarly, doubts should be cast on Centennials claims regarding the on-going increased staffing arrangements proposed for APMEP to absorb current workers from the Springvale mine. Innovations regarding mechanisation and automation of the coal mine workforce will continue to impact upon the socio-economic benefits that this mine could provide to the local Lithgow community. The 450 full-time positions it claims will be generated for the duration of the mine's life will likely be automated before 2050's. Additionally, collapse in demand and price, and potential policies (e.g. future implementation of a carbon tax) will further erode profitability for this mine. Subsequently, the long-term benefits slated for the Lithgow community from this proposal cannot be guaranteed for thirty years.

Ultimately the economic uncertainty that clouds the coal industry reaffirms that the consent period for this mine must be overhauled. A three-decade approval for a coal mine in today's radically shifting commodity environment is unwise. Instead of maintaining Lithgow's economic stability/health going into the future, as claimed by Centennial, it will instead restrict urgent diversification of their regional economy by maintaining their reliance on the dying coal industry. Centennial Coal and LCC have a responsibility to future-proof this community which has given so much to this company and industry. As this proposed extension amendment stands, it is not occurring.

[19] Commodity Markets Outlook: The Role of Substitution in Commodity Demand (2019), World Bank Group,, P.24

[20] Managing Coal Mine Closure: Achieving a Just Transition for All (2018), World Bank Group

[21] Ibid, p.6

Coal commodity price over time and predicted future, not considering regulatory actions to phase out carbon-intensive forms of energy (https://tradingeconomics.com/commodity/coal)

There are a number of examples of traditional 'mining towns' engaging with the transition to a low-carbon future. These provide a framework for Lithgow to follow. In the 'coal belt' of America, the Appalachian region of Virginia has seen a number of towns undergo a transformation to shift away from coal. St. Paul, Virginia is a historic coal mining community which has recently made the intentional shift out of the dying coal industry. The shift has been towards tourism, specifically utilising the towns natural scenic beauty and capacity to become a tourist destination. Local government have built upon this and are successfully transforming and diversifying the towns economy. Some of the focus has been on outdoor recreation such as fly-fishing, and increasing the services the town can provide to tourists, like boutique hotels, restaurants and breweries[22].

The APMEP could have adverse impacts on the community it purportedly is serving. By furthering linking Lithgow's economic fate to the coal industry, the region is condemned to future economic hardship as coal is progressively phased out. A 5-year consent period must be implemented for APMEP, to ensure that long-term promises of economic stability for Lithgow being made by Centennial, are assessed periodically.

[22] https://www.greenbiz.com/article/across-appalachia-historic-coal-towns-are-looking-outdoor-economy-their-next-act

Recommendations

- Abandonment of a 32-year consent period. APMEP's consent should face review every 5 years.

- All Aboriginal heritage must be properly assessed and protected, including sites not referred to in Centennials assessments and described in Yuri Bolotin's confidential submission.

- To mitigate and avoid damage to swamps and pagodas, use of mini-longwall panels and the shortening, or withdrawing of the most high-risk panels must be applied in a revised mine plant so as to protect the natural and cultural heritage of the proposal area.

- Targeted flora and fauna surveys are required post fire to find threatened species and species not identified on BioNet but known to the area from NSW Herbarium AVH database, and the Atlas of Living Australia, and iNaturalist databases.

- Recalculation of offsets to incorporate appropriate assets and values which were initially omitted.

- Immediate, effective protection of remaining endangered ecological community NPSS and NPHS. These endangered plant communities cannot be considered for offsets given they cannot be protected 'like-for-like' and the proposed alternative of a financial offset will increase risk of extinction risk.

- Previous decisions regarding the international significance of the regions Pagoda landforms must be upheld. These unique geological formations must be granted the highest possible protection.

- Support the transition of the Lithgow-region away from economic-dependence on coal mining by reserving a Gardens of Stone State Conservation Area and requiring that Centennial develops a realistic mine plan, including an adequately funded mine closure plan.

Signed on behalf of the Gardens of Stone Alliance,

Wilson Harris
Natural Areas Campaigner
Colong Foundation for Wilderness Ltd