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SUBMISSION ON THE HUME COAL PROJECT (SSD 7172) and BERRIMA RAIL (SSD 7171) PROJECTS

Background and Disclosure

1. I am a resident of the Southern Highlands and a part time advisor to Hume Coal.

2. This submission is made in my personal capacity as a local resident, advocate for new jobs and investment, and to address the issues in a measured manner to balance some of the distortions in the current debate.

3. Since 1981, I have acted for proponents of major projects on four Continents, six Australian States and one Territory, creating extensive employment and economic wellbeing. Many of those projects were in the resources sector, including metalliferous and coal mines in NSW.

4. I have represented the resources sector as the Executive Director, NSW Chamber of Mines, Metals, and Extractive Industries (predecessor of the NSW Minerals Council) with coverage of the mining, steel, aluminium, and extractive industries.

5. The projects to which I have been attached, have created many thousands of jobs and delivered the orderly development of mineral resources in NSW for "*the purpose of promoting the social and economic welfare of the State* [Mining SEPP 2007 (1a)].

> ***The Hume Coal project is the most benign of any resource project to which I have been associated, both in terms of balancing the extraction of coal for the benefit of the State and dependent industries against impacts on environmental assets and directly impacted communities.***

6. This submission complements the technical findings in the project EIS(s) and addresses some broader public interest considerations and provides a commentary on some the issues of concern.

7. Where my experience and knowledge is outside my expertise, I rely on the scientific knowledge of competent experts in their respective fields, contained in the EIS.

8. The views in this submission are not necessarily those of Hume Coal.

Submission Structure **Page**

Submission in Support

9. This submission is in support of the proposal as outlined in the Hume Coal EIS and the interdependent Berrima Rail Project (SSD 7171).

10. The project, as designed, meets the requirements of the planning law; namely,

- *Part 4 Division 2 Section 79C of the Environmental Planning and Assessment Act (EP&A Act).*
- *State Environmental Planning Policy (Mining, Petroleum Production, and Extractive Industries) 2007 (Mining SEPP).*

Given the level of impact mitigation undertaken within the project design and inherent environmental protections, I support the project being approved, with appropriate conditions, to minimise "the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality" [s79C1(b)].

11. The project will be a substantial boost to the local economy, have negligible or immeasurable impact on the agriculture and tourism industries. Insignificant, negligible and/or manageable impacts on environment assets (water, air quality, noise) and, on balance, the project is in the public interest.

The Hume project provides a competitive supply of coking and industrial coal to the domestic cement, steel manufacturing, foundry, ethanol, and power industries. It meets the ACCC requirements of maintaining competition on the Southern Coalfields and the product is suitable for export to the wider international market.

Section 1:

Environmental Planning and Assessment Act 1979 Section 79C: 'Public Interest'

12. Aside from the normal environmental heads of consideration in s.79C (2) and (3) of the EP&A Act, the Consent Authority is also required to consider 'the public interest' [s.79C(1)(e)].

13. In addressing this head of consideration, the Consent Authority needs to apply a 'public interest' test that accounts for its obligations to all the NSW people, not just self-appointed activists.

14. The primary purpose of a planning approval is to limit or mitigate development impacts to those directly affected, balanced against the 'public interest'.

> ***It is contented that the 'public interest' obliges the State to grant access to explore for and exploit the mineral resources of NSW, being the property of the all the people of NSW. The regulatory framework is provided by the Mining SEPP, Environmental Planning and Assessment Act and Mining Act.***

15. The benefits accruing to the State through increased employment and GDP, as well as royalties and payroll taxes paid by Hume Coal, over the life of the project are identified in the EIS and addressed further in this submission.

16. Mining royalties are the fourth largest contributor to NSW Treasury revenue from State activities. Coal is the largest contributor to the mineral royalty income stream.

17. Denial of access to legally explore for, extract minerals and coal, and to apply mitigation measures to manage impacts is contrary to the 'public interest'. It denies benefits to be shared by all NSW residents from mining State owned resources.

18. Continued access to mine coal and minerals, in an environmentally appropriate manner, is a key consideration in applying the 'public interest' test under s.79(c).

> ***The Hume Coal project, if approved, will be the largest contributor to NSW government revenue of any business in the Wingecarribee LGA. It will be one of the largest single employers, providing employment and revenue for local mining related manufacturers and service entities and non-mining businesses in the LGA alike.***

19. Total Hume project revenue from royalties and payroll taxes will be $297 million (undiscounted) or an average of $16 million annually over the mine life.

> ***Should the Consent Authority not uphold the 'public interest', revenue forgone from resource projects, such as Hume Coal, must be sourced from other NSW taxpayers if government spending on essential health, education and other services is to be maintained.***

Section 2:

State Environmental Planning Policy (Mining, Petroleum Production, and Extractive Industries) 2007 (Mining SEPP).

20. Notwithstanding the general requirements of the EP&A Act for a Consent Authority in assessing mining applications, there are other important 'tests' to be applied.

21. Of relevance are the aims of the Mining SEPP; namely,

- *To provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State [2(a)].*
- *To facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources[2(b)].*
- *To promote the development of significant mineral resources [2(b1)].*
- *To establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive resources [2(c)].*
- *To establish a gateway assessment process for certain mining, petroleum (oil and gas) development …[2(d)].*[1]

22. No private landowner has an inherent right to prohibit access to minerals and coal, either at the exploration or development stage, without fettering the implementation of the Mining SEPP. To do otherwise, impacts upon the orderly development of the State's resources and the application of the Mining SEPP.

> ***The Consent Authority does have an obligation to ensure development is designed to minimise impacts on existing activities, landowners, and residents through appropriate conditions of consent and mitigation strategies, balanced against the 'public interest' and the Mining SEPP.***

23. From time to time, governments impose legislative requirements under other non-planning legislation for the way exploration and mining authorities are granted in certain circumstances. However, from a planning perspective, the Consent Authority is required to give pre-eminence to the EP&A Act and the Mining SEPP. Any subsequent Mining Lease may only be granted upon the prior grant of a planning approval.

24. The Mining SEPP also imposes an obligation (Clause 12A) on the Consent Authority to consider the Application of the *Voluntary Land Acquisition and Mitigation Policy (2014)* in deciding on noise and air quality impacts.

25. Management of mining development is conducted through legally enforceable conditions of consent and mining lease conditions. The purpose is to minimise impacts and, where possible, provide mitigation measures for noise, air quality and water impacts in accordance with government policy and practice.

[1] Not applicable as a Site Verification Certificate (SVC) was issued on 2 April 2016.

26. The Mining SEPP is pre-eminent over other environmental planning instruments such as Local Environment Plans and Development Control Plans (some exceptions no relevant to the Hume application) to the extent of any inconsistency.

27. The Consent Authority is urged to consider the Mining SEPP in applying the 'public interest' test under s.79C and to account for the wider significance of the resource.

Section 3:

Implications of ACCC Investigation into Competitive Coal Supply to the Australian Steel Industry

Strategic Significance of the Hume Coal Project

(a) The Hume Resource

28. The significance of the Hume Coal resource is outlined in the EIS. It will no doubt be addressed by the Division of Resources and Energy, Department of Trade and Investment in its submission.

29. The total mineable resource is estimated at 50Mt, comprising an estimated 55 percent washed, on average, 10% ash coking coal. The remaining 45 percent being a domestic quality industrial coal (22% ash) suitable for cement production, foundry use, electricity generation and the proposed POSCO Whyalla FINEX steel plant.

30. About 20 percent of the mined resource (11Mt), such as natural rock and shale will be returned underground rather than being deposited in above ground emplacements and tailings dams.

31. The strategy to protect the groundwater system results in a modest ratio of resource to reserve conversion. This strategy delivers minimal impact upon the water resource and minimises surface subsidence impacts to imperceptible levels

Hume Coal will mine around 33 percent of the available resource with the remainder left insitu to protect the surface from subsidence and protect groundwater.

32. The shallowness of the resource, absence of gas and resulting minimal geological stress reduces the costs of extraction compared with high gas and deep mines elsewhere in the Southern Coalfields. The mine plan maximises the resource extraction within the context of the environmental, legislative, and operational constraints.

Mine economics are dictated by initial capital, operational costs, and productivity per employee. Mine design and productivity allow for the project to make an economic return based on limited extraction and to ensure environmental integrity.

33. The Mining SEPP imposes, amongst other things, a requirement for the 'proper management and development of mineral resources'. Clause 2(b1) mandates a requirement for the consent authority 'to promote the development of 'significant' mineral resources'.

Traditionally, resource significance is narrowly defined failing to examine 'significance' in the macro-context of the market, the independency of other industries on a planning approval and long-term economic regional and national implications.

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(b) ACCC Findings on the Strategic Significance of the Southern Coalfields

34. On February 23, 2017, the Australian Competition and Consumer Commission (ACCC) released a statement of issues[2] on the proposed acquisition of Metropolitan Colliery by South 32. The ACCC issues paper explored the nature of the market, availability of suitable substitutable coal and costs likely to be imposed on local steel producers

35. The ACCC has determined the Southern Coal Field represents its own distinct market and essential for the supply of competitive coal to the Australian steel industry.

36. The acquisition did not proceed; however, the matters raised by the ACCC are critical in the application of the Mining SEPP Clause 2(b1). In this context, the Hume Coal resource is a 'significant mineral resource' in the broader market.

37. The ACCC reached a view the South 32 acquisition would have resulted in a 'substantial lessening of competition' in the supply of competitive coal to domestic steel producers, BlueScope Port Kembla) and Arrium (Whyalla).

38. Both these producers depend the availability of competitive priced coking coal from the NSW Southern Coalfields. BlueScope has the benefit of locally sourced blended coal from the Wongawilli and Bulli seams. Arrium also sources coal from the Southern Coalfields which is transported by rail to Whyalla.

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The ACCC determined that the cost of obtaining coal from another coking coal region, such as Queensland, is 5-10% higher than the current supply.

Key factors, amongst other things, are the cost of coastal shipping and port terminal costs.

It is generally conceded that lack of competitiveness of Australian coastal shipping limits the ability of easy substitute equivalent coal from one region to another.

***The ACCC determined that the Illawarra therefore constituted its own geographic market*.**

39. The ACCC made some key observations about the resource significance of coking coal from Southern Coalfields are:

- *'Australian customers of coking coal currently benefit from local competition between coal producers in the Illawarra region…..The proposed acquisition would remove competitive rivalry…….and following the expected closure of Glencore's Tahmoor mine[3], result in there being only one supplier of material volumes of coking coal from the Illawarra in the medium term.'*

[2] ACCC Statement of Issues: South 32 Proposed Acquisition of Metropolitan, 23 Feb 2017.

[3] Since the issue paper was released Glencore has announced the sale of the Tahmoor mine; however, current approvals limit available resources to be mined. Any further extension beyond 2021 would require additional approvals not yet applied for.

- *'The Illawarra region is not expected to have, in the medium to long term, other producers capable of supplying material volumes of technically substitutability coking coals.'*
- *'There is significant additional cost associated with mining transporting substitutable coking coals from alternative sources to the Australian steelmakers as well as potential capacity constraints limiting the ability of one steelmaker to import large volumes of coal by ship.'*

40. Steel producers are facing challenges, along with other manufacturers, of escalating energy and resource input costs. Over the medium to long term, uncompetitive input costs threaten their viability.

41. Manufacturers require pricing certainty over the medium to long term to justify major investments with long pay back periods.

The ACCC investigation demonstrates the strategic significance of the Hume resource within the Southern Coalfields to provide a potential supply of competitive coal to underpin viable input costs for the future of the Australian steel industry at Port Kembla and Whyalla.

(c) Hume Coal to Supply Open Market

It is understood Hume Coal has advised the ACCC that its commercial policy, endorsed by its parent company POSCO, is to make Hume production available on the open market, including domestic users, such as local cement, domestic steel industries and other regional customers on commercial terms.

42. In the event Hume production, or part thereof, is not sold to the open market on suitable commercial terms, it will be exported through the Port Kembla Coal Terminal. POSCO has agreed to provide Hume Coal with guaranteed offtake for that component of production not sold for domestic use.

43. It is a matter of public record, BlueScope will need to make critical investment decisions to reline its blast furnace in around 2026. One element underpinning such an investment decision is the availability of competitive coking coal to underpin the longevity of the Port Kembla steelworks.

(d) POSCO FINEX Technology for Arrium (Whyalla)

44. Since the release of the Hume Coal EIS for public comment, there has been a significant announcement regarding the future of Arrium. It has implications for the Hume Coal project.

45. On June 15, 2017, a Korean consortium (Newlake), supported by POSCO, had been selected as the exclusive preferred bidder for the sale of the remaining assets of the Arrium.

46. FINEX allows for steel to be made using industrial/thermal coal or a blended with coking coal using fluidised bed reactors and a non-blast furnace melter gasifier. Molten iron is produced directly using iron ore fines and a wider specification of coal types not able to be used in traditional blast furnaces. Gases produced by the process can be used to generate electricity (200 – 250 MW) with a substantial reduction in emissions.

The POSCO FINEX process can accept coal with up to 25 percent ash.

Accordingly, all of Hume Coal's production (coking 55% and thermal 45%) is suitable for use in the proposed Whyalla FINEX steel plant, using non-coking coal or a blend of industrial/thermal and coking coal.

Section 4:

Interdependency of the Hume Project with Non-Steel Industries.

47. The importance of supplying competitive coal to a range of other coal using industries (not just the steel industry) need to be a further consideration in the Hume planning period from 2021 to 2040.

The ACCC South 32/Metropolitan investigation was limited to impacts on the domestic steel industry. Nevertheless, the same ACCC competition logic is relevant to other industries such as the cement, foundry, ethanol, and power industries.

48. For example, there are some reasonable hypothetical assumptions that could apply to the Hume Coal project in the planning period:

- Boral owns and operates the Berrima Cement Works that is part of an integrated concrete and extractive industry in the region. The Berrima Works supplies 60 percent of NSW and ACT cement requirements. Integrated operations in the wider southern region makes Boral one of the major extractive material, cement, and concrete suppliers to the NSW market.

  Following the closure of the Berrima Colliery in 2013 Boral has been required to truck coal from other mines in the region. Hume Coal will be able to supply suitable industrial/thermal coal on a competitive basis through the planned life of the mine as its rail will join the Boral Berrima Branch line at the cement works, some one kilometre from the Hume project. Proximity means it is logical coal required for the cement kiln can be secured on more favourable terms than transporting coal from alternate sources.

- Projected high gas prices are now a major burden on the future viability of local manufacturing in the region. At least two regional major users of gas (confidential) are investigating the conversion of their energy sources from gas to industrial/thermal coal in the Hume planning period.

- Some of the Hume Coal production is suitable for use in thermal power production.

  Within the Hume planning timeframe, the Mt Piper Power Station near Lithgow (design life to 2043) will require additional coal to that currently approved. Environmental restrictions and declining coal quality is likely to impact on the total

coal needs Mt Piper currently supplying 15 percent of NSW requirements (projected to be 25 percent following the closure of Liddell).

Irrespective of renewables in the energy mix, Mt Piper is one of the youngest power plants (commissioned in 1993) and will continue to be an important part of the energy supply mix for NSW in the Hume planning period (2021 – 2040), although it would not meet all fuel needs.

49. Flexibility provided through the FINEX process, broadens the coal specifications used, increasing the overall market for Southern Coalfield coal and ensuring the increasingly rare coking fraction is being utilised in existing blast furnace steel production.

50. Manufacturers require pricing certainty over the medium to long term to justify major investments with long pay back periods.

51. The ACCC investigation puts beyond doubt that competitive coal resources for the Port Kembla and Whyalla steelworks is dependent on coal sources from the Southern Coalfields.

The strategic significance Southern Coal Field and the Hume resource, in maintaining international competitiveness for Australian steel production cannot be understated.

Until port terminal charges and coastal shipping costs are significantly reduced, there will be no viable alternative to coal transported by rail to the Australian steel industry from Hume and other region Southern Coalfield suppliers.

Section 5:

Critical Mass of Production Supporting Rail and Port Infrastructure

52. There are other factors that determine the ability of an industry to compete, either at a regional or macro market level.

53. Industry competitiveness requires the maintenance of a ‘critical mass’ of regional production to ensure the viability and costs necessary for a competitive supply to end users, either domestically or internationally.

54. Sufficient production to maintain a ‘critical mass’ of coal mining to support competitive coal supply, including:

- Amortising fixed port costs over a higher number of tonnes thereby maintaining the competitiveness of regional coal exports for all producers. Contraction of exports through Port Kembla will impact on the viability of the coal loader and reasonable usage charges to the Port Authority. Support for additional production from all sources is imperative.

  The current operating budget for Port Kembla Coal Terminal is around $56M per annum and amortised over total tonnes. In addition, the terminal is undertaking a $300 million ‘restoration and compliance’ capital works program. Recovery of this cost over many years is also necessary.

Traditionally, throughput for the coal terminal includes coal from South 32's Bulli Seam Operations, Springvale, Tahmoor, Metropolitan, Wongawilli and Russell Vale. Port Kembla Coal Terminal's tonnage has from approximately 17Mtpa to around or 8Mtpa, having an impact on access costs for all producers. However, some production is being diverted to Newcastle due to 'take or pay' contracts, thereby further threatening the viability of the Port Kembla Coal Terminal for the remaining producers.

- Better utilisation of the rail network (where applicable), the replacement of existing tonnage due to be retired, and maintaining volumes necessary to lower unit costs. ARTC requires revenue from rail usage charges to support rail line maintenance.

55. Rail revenue from the Moss Vale to Unanderra rail line includes coal from Springvale and Tahmoor, both of which have limited lives. Trains transporting steel from Port Kembla to former car manufacturers in Geelong have ceased along with the demise of the car manufacturing industry.

- Maintenance of skills and mining service industries in the local area., such contract mining companies, equipment manufacturers, equipment service centres, professional engineering services, and mining support contractors.

Coal from the Southern Coalfield mines is contributing to maintaining a 'critical mass' of export coal production from all mines, by reducing supply from any mine or stopping new entrants will impact e commercial viability of rail and port terminal infrastructure.

56. The Hume project is necessary to replace lost production from other mines and necessary to maintaining 'critical mass' for rail and port infrastructure critical for competitive coal supply and to avoid ACCC concerns of 'lessening competition'.

Section 6:

Structural Issues in the Southern Coalfields Affecting Future Coal Supply

57. Notwithstanding ACCC findings, there are some structural issues likely to affect Southern Coal Field terms coal supply from 2021 to 2040 Hume Coal planning period.

- Some of the existing approved mines are reaching the end of their viable life due to reserves being deeper, subject to high gas levels, beset by quality issues and increasing costs of production.
- Future mine extensions will have challenges of mine depth, geological stresses, and high gas level. Improving productivity and maintaining a competitive cost profile are significant challenges for existing market operators.
- Existing approved resources are not being replaced with new mines and/or additional mineable reserves and planning restrictions will impact availability.

  - Glencore had announced the closure of the Tahmoor by 2019, but recently advised it would remain open until existing approvals are exhausted (est. 2021) or the sale of the mine. No further planning extensions have been approved or sought as of this date.

- South 32 Dendrobium mine has recently applied for additional approvals in the 'Special Areas' of the Sydney Water Catchment. Those people who oppose the Hume Coal project also oppose mining within the water 'Special Areas'.

- High gas levels at the Appin mine resulted in a suspension and reduced production which is likely to have a flow on to overall production from the Southern Coalfields.

- Analysts are projecting significantly lower forecasts for production from existing mines in the Southern Coalfields for FY 2017 and FY2018. Without Hume Coal's contribution to the market, the long-term projections from the Southern Coalfields are unlikely to be met.

- Available resources are being increasingly quarantined by planning refusals (Russell Vale), pressure on government to eliminate or restrict mining in Sydney Water 'Special Areas' and other sensitive natural environments.

- Increasing urban development over known coal reserves in the Tahmoor, Bargo and Wilton areas will reduce coal availability to the market. Rezoning of rural land for urban settlement by State and local authorities has accelerated in areas with known coal resources.

Section 7:

Further Considerations of Resource Significance of the Hume Coal Project

(a) Significance to POSCO and the Republic of Korea

58. Hume Coal POSCO's first wholly owned project in Australia but POSCO has been part of the growth of the Australian economy for almost 40 years.

> ***POSCO has invested $2.2 billion in Australian resource joint ventures.***
>
> ***Returns from those investments have been reinvested in Australia in coal and iron ore joint ventures, including the Roy Hill iron ore mine.***
>
> ***Funding for the Hume Coal project has come from revenue generated by POSCO Australia from its many investments and local taxes paid.***

59. POSCO is the world's fifth largest steel producer and the supplying of the latest steel making technology to the Arrium 'rescue' plan. The company purchases between $ 5-7 billion in Australian resources ($900 million from NSW) and the largest private purchaser of Australian exports.

60. The Republic of Korea is the fourth largest trading partner with the State of NSW and recognised as such in the *NSW Korea Strategy*, announced by the NSW Government in October 2015 that, amongst other things, targets halving approval times for resource projects.

61. Nationally, the importance of the Korea relationship is enshrined in the *Australia Korea Free Trade Agreement (KAFTA).*

(b) Coal Marketing

62. The Wongawilli Seam is well known and has been mined from the local Berrima Mine and from mines in the Illawarra including current operations at the Dendrobium Mine and the neighbouring Wongawilli Colliery.

63. Wongawilli coking coal is typically blended with the local Bulli seam and has been used locally for steel manufacture and for export to other steel producers.

Mine economics are dictated by initial capital, operational costs, and productivity per employee. Mine design and productivity allow for the project to make an economic return based on limited extraction and to ensure environmental integrity.

64. High quality coking coal found in the Hume project area, is rare within the coalfields of New South Wales which typically produce thermal coal or semi-soft coking coal.

65. Hume Coal will have a targeted production of 3.0Mtpa, making it comparable with the other underground mines in NSW. Product coal will be available for open purchase on the domestic and international market.

66. Annual volume of up to 2Mt of coking coal and will be delivered to market annually, subject to yield and further 1Mt to the industrial/thermal (5500lcal) coal market. POSCO has agreement with Hume Coal to underwrite purchase of this coal in the event it is not sold to other customers, on commercial terms, to both domestic and international customers.

(c) Proximity to Existing Infrastructure: Port Kembla Coal Terminal and Rail Network

67. The project utilises existing infrastructure with a connecting rail loop to be built at the mine on land owned by Hume Coal with a 1 km connection under the Hume Highway to link with the Berrima Branch line at the Boral Cement works.

68. Existing capacity is available to utilise the Moss Vale to Port Kembla rail line for the full complement of the proposed production levels. Part of the existing network, under the control of the Australian Rail Track Corporation (ARTC), is underutilised.

69. Projected rail demand dictates future track upgrades and removal of level crossings. Static usage militates against road/rail upgrades.

Very few mines in NSW and Australia enjoy the advantages of such proximity to existing export coal loading facilities and relatively short rail distances from the mine using existing rail infrastructure.

70. Hume Coal is to cover its rail wagons to avoid any potential fugitive dust emissions (Australian coal industry first). New rolling stock will be acquired using latest technology locomotive systems with best available emissions technology and electro-pneumatic brakes to improve safety and reduce noise impacts for the benefit of residents on the existing Moss Vale to Unanderra line.

(d) Relationship of the resource to any existing mine, petroleum production facility or extractive industry

71. The Berrima Colliery, which ceased operation in 2013, is to the north and adjacent to the proposed Hume Coal Mine.

72. Part of the mine's rail spur runs through Boral's ML1723, which is a mining lease for the shale quarry that feeds the Berrima Cement works. The rail line hugs the southern boundary of the property in an area where there are no current plans to extract shale, and no plans within the foreseeable life of the Hume project.

73. Other parts of the current and planned rail spur coincide with CCL748, which is the mining lease for Berrima Colliery and the associated MPLs 603 and 604. Berrima Colliery was closed in 2013 requiring the Berrima Cement Works to source coal from elsewhere.

Section 8:

Should POSCO Acquire Tahmoor Mine and Not Proceed with Hume Coal: Planning Constraints

74. It has been mooted by Hume Coal's opponents, and some parliamentary representatives, POSCO should acquire the Tahmoor Mine from Glencore as an alternative to the Hume project.

75. Current urban development around Tahmoor and Bargo effectively precludes a reasonable extension of the Tahmoor mine for a further 12 years.

76. It is also understood the company is required to negotiate 'subsidence agreements' with land developers over areas zoned for future housing. These are unlikely to be forthcoming.

77. Administrative arrangements limiting the responsibility of the Mine Subsidence Board for future developments place the onus on the mining company to negotiate direct compensation and rectification of subsidence impacts with land developers.

78. A cursory comparison between the proposed Tahmoor South extension (lodged with the Department of Planning in 2012 and withdrawn in 2014) and the Hume Coal project in Table 1 is instructive.

Tahmoor mine a good case study on where land use conflict, past planning decisions and unrealistic obligations on mine developers has sterilised critical resources.

Maintaining operations at the Tahmoor mine past the limited life of existing approvals (2021) is problematic, irrespective of the mine being placed on the market after being nominated for closure by 2019.

79. The high level of impacts in Tahmoor South proposal contrasts with the Hume Coal project. The latter, being a 'greenfield' project, is planning to use a non-longwall mining system, resulting in imperceptible surface subsidence impacts, extracting a shallow resource that is 'gas free', and not subject to risks and difficulties associated operating deeper mines

The Hume Coal project is in an area with the limited land use conflict, compared to most other areas in the region.

Much of the land is either State Forest or private land in the project area zoned for agriculture, limiting above ground activities to agricultural pursuits not impacted by underground mining.

Businesses, other than agriculture, are restricted by the zoning.

The area is not subdividable for urban expansion.

Hume surface infrastructure is remote from most immediate towns and villages and the environmental impacts are limited in scope and area.

80. Land use conflicts are a factor in assessing 'significance' but so are the dependence of other industries (other than the steel industry), together with maintaining a 'critical mass' of coal production in the Southern Coalfields.

81. Replacing resources from other mines, and/or substituting resources subject to environmental and planning restrictions, must be part of the Consent Authority's consideration.

Table 1

Item	Hume Coal	Tahmoor South (2012 Proposal)
Subsidence Impacts		
Number of houses with transient and/or permanent subsidence impacts	0	More than 300 established houses. Areas rezoned for residential development - significant impact.
Large Scale Chicken Sheds/Greenhouses	0	More than 10
Number of Aboriginal rock shelters with art impacted	0	19
Hume highway impacted by subsidence?	No	Yes
Gas pipeline impacted by subsidence?	No	Yes
Main Southern Railway impacted by subsidence?	No	Yes
Coal wash reject material	Underground emplacement	Surface emplacement
Heritage		
Local heritage items impacted	1	~30
State significant heritage items impacted	0	4
Bores impacted	93	More than 80 within LW drawdown zone.
Sydney catchment	Outside 'Special Areas'	Some panels are inside the Metropolitan 'Special Area'
Vegetation impacts	63 individual trees	1 square km of trees cleared including potential core koala habitat
Air quality	Stacker and reclaimers Covered rail wagons Underground reject emplacement	Dozers Uncovered wagons Surface reject emplacement
Jobs	300	450

Section 9:

Economic Importance of the Hume Project

(a) Overall Economic Contribution of the Hume Project

82. What is the actual contribution that the Hume Coal project in real terms?

- Around $500 million in upfront capital expenditure. Additional sustaining capital will be required over the mine life.
- Employment of some 400 FTE people in construction and 300 FTE people in mine operation.
- Around $2.4 billion in operating expenditures over the mine life, including for goods and services; comprising:
  - Royalties and Payroll taxes to the NSW government of $297 million
  - Wages and Salaries of $600 million.
  - Other expenditure in the economy of $1,475 million, including local expenditure on contractors, consumables and general goods and services)

83. In a typical year (2024), the project will generate operating expenditure of $139 million, comprised of:

- Royalties and payroll taxes of $16 million to the NSW government
- Wages and Salaries of about $33 million
- Other expenditure in the local economy of $90 million on contractors, goods, and services.

84. The cash contribution to government also includes NSW share of company tax revenue, GST, and local council rates.

85. Additional community contributions need to include payments made through the Hume Charitable Foundation, Apprenticeship/Scholarship programme and/or any Voluntary Planning Agreement with the Consent Authority.

(b) Employment Characteristics of the Local Economy

86. The overall characteristics of the local economy are defined in the Economic Impact Assessment prepared by BAEconomics (Appendix Q) of the Hume Coal EIS.

87. Governments use the internationally classification of unemployment in compiling unemployment statistics. To be classified as unemployed a person needs to be not working more than one hour in a week. This definition leads to an understatement of the real level of unemployment and fails to account for the dramatic increase in underemployment.

Underemployment is the highest it has been in 40 years.

88. Regional employment has undergone significant change. This reflects, in part, what is happening in the Australia wide economy. Between 2000 and 2016 nationwide employment in manufacturing jobs has declined by 130,000, closely followed by agriculture with 120,000.

89. Employment in the region fell most in the Agriculture, Forestry, and Fishing sectors in the Regional Development Australia Southern Inland (RDASI) region from 2001 to 2011[4]. This also occurred within the Wingecarribee LG

90. The Brotherhood of St Laurence has reported that youth unemployment in the Southern Highlands region is 18.4 percent, the 8th highest region in Australia[5].

91. Overall employment in the Wingecarribee LGA has been problematic and erratic.

> ***In the 2010/11 to 2014/15 period, the number of locally available jobs declined across the whole RDASI Region.***
>
> ***The decline in the Wingecarribee LGA (down 372) was the highest of all LGA's in the RDASI Region.[4]***

92. This is consistent with anecdotal evidence of many people commuting to the Sydney region for employment and concern by many locals of being underemployed, working more than one job or commuting long distances to the Sydney region due to the lack of local full-time jobs.

93. Nationally, the unemployment rate has fallen to 5.5 percent in May 2017; however, the more worrying trend is the stubborn level of underemployment of 8.8 percent, leading to an overall unemployment and underemployment rate of 14.3 percent. Nationally this means over 1.1 million Australians are underemployed.

94. Hours worked, although improving slowly, are at levels not seen since the mid-1990's characterised by a substantial growth in part-time, casual employment. This is reflected in the Southern Highlands and is of concern to the 450 people lodging expressions of interest for employment with Hume Coal.

95. In May 2017, the unemployment rate in the Wingecarribee Shire was 3.1 percent. This is grossly understated when taking account of the 'one hour work' test, and the part-time casualisation of the workforce in industries such as accommodation, retail and tourism, being promoted by the coal activists as the mainstay of future employment.

> ***Wingecarribee Shire Council has estimated that 8,000 – 10,000 jobs will require replacement or maintenance in the next 15 years. It has no concrete benchmarks or a business plan, except vague references to various industry sectors in its Community Strategic Plan (2031).***

96. Opportunities identified in the Wingecarribee Council's Economic Summit (2015), such as Food and Wine Clusters are sporadic, casual, part-time and limited in aggregation and scale.

97. There have been no State Significant Development (SSD) projects in the Wingecarribee Shire other than the mining, extractive industry and related cement industries, or for that matter, any large scale renewable energy projects, being the 'catch cry' of those opposed to coal.

98. From 2001 to 2011, in the Wingecarribee LGA, there was an increase in employment in accommodation, food services, real estate, administration support services, professional and technical, education, construction, health care and public administration.

[4] Regional Development Australia Southern Inland (RDASI) Strategic Plan (2017-2020)

[5] Brotherhood of St Laurence, Australia's Youth Unemployment Hotspots, March 2016

99. Notably, from 2011 to 2015, the number of businesses in the accommodation and food sector remained stable, contrasting with the growth 2001-2011, suggesting a stagnation in growth or market saturation.

> ***The total number of businesses in the agriculture sector in the Wingecarribee LGA, between 2011 and 2015, fell by nearly 9 percent.***
>
> ***Working agriculture has been gradually replaced by lifestyle farms and smaller acreages.***

(c) Local Demographics and Employment

100. Demographics in the Wingecarribee are skewed towards the over 65 cohort and a 'hollowing out' of the post school population leaving the area for education and employment.

101. The Wingecarribee LGA has the highest proportion of people over 65 (33 percent) – the highest of any LGA in the RDASI Region[6].

102. Wingacarribee LGA also has a high level of residents with suitable education attainment necessary for employment at Hume Coal – certificate, bachelor degree, graduate diploma levels, supporting the Hume EIS assertion that 70 percent of positions will be filled by existing residents within the 45-minute employment capture zone.

103. One worrying trend is the level of young people resident in the area and unable to obtain suitable employment in area of their birth, education, and family connection. Notwithstanding this, the area still has one of the highest levels of youth unemployment.

> ***The Brotherhood of St Laurence has reported the Southern Highlands region has the eighth (8^{th}) highest level of youth unemployment of all regions in Australia[5].***

104. Hume Coal is currently the only private entity prepared to spend $500 million to establish a business employing 300 full time employees in the Wingecarribee Shire. It is one of the few businesses to offer support for local apprenticeships and scholarships. It will supplement growth in other sectors by providing opportunities for SME's to supply goods and services to, increasing employment and local expenditure.

105. The lack of focus on local full-time job creation commits the Southern Highland's becoming a just another commuter centre for the Sydney region for those of working age, and a retirement centre for the remaining population.

(d) Contribution to NSW Government Revenue: Royalties and Payroll Taxes

106. The economic contribution of the Hume Coal project is assessed in the EIS in accordance with the NSW Government Cost Benefit Analysis Guidelines. This provides an NPV assessment based on contributions and costs based on 2016 dollars adjusted for inflation. It accounts for the benefits as well as the external costs applicable to the project. It has been prepared by expert economists in accordance with established guidelines and economic practice.

107. However, Hume economic assessment has been misinterpreted or mischievously portrayed by those opposed to the Hume project. For example, opponents of the Hume Coal project

[6] RDASI Strategic Plan 2017-20 p.13.

have subsequently divided NPV by project years to arrive at a per annum figure. This is an economic and accounting fiction. It is claimed the Hume project will contribute only $6 million per annum on average ($114NPV over mine life) in royalties to the NSW Government.

108. If Hume Coal adopted an NPV calculation for making actual royalty payments, it would mean it could reduce its royalty payments to Treasury to around 50 percent in Year 10 and down to 26 percent in Year 20. This is also a nonsense, but highlights the level of misunderstanding of NPV based cost benefit analysis.

109. In actual cash terms, Hume will pay $266 million in royalties ($14 million averaged annually) during operation. When combined with payroll tax the direct cash contribution to the NSW Government is $297 million or $16 million annually.

> ***Hume will be the largest contributor to NSW government revenue of any local business and possibly more than all other businesses in the Southern Highlands combined***.

110. What does this mean in comparative terms?

- Total cash royalties and payroll taxes from the Hume project to the NSW Government $297 million is equivalent to nearly six (6) times the government's capital contribution of $50 million to the Bowral hospital upgrade.

- Annual cash royalty payment alone (average $14m per year) is equivalent to:

  - 62% the Shire's capital works expenditure in 2015/16;
  - 25% of the total annual rates and charges collected by the Wingecarribee Council in 2015/16;
  - 60% of the Net Operating Result for the Wingecarribee Shire in 2015/16

Section 10:

Analysis of Some Community Concerns

(a) Impact on Agriculture

111. The Hume project underground footprint covers an area of 3,400 ha. It is an underground mine with virtually no surface expression (ventilation shaft on Hume owned land excepted). Existing agricultural productivity will remain unaffected.

112. The Hume EIS predicts that 93 bores (15 irrigation and 78 stock and domestic) belonging to 71 landowners will experience changes in water table drawdown and de-pressurisation greater than the 'minimal harm' threshold in the NSW Government Aquifer Interference Policy (AIP) requiring Hume Coal to provide 'make good' water supply.

113. No landowner will be left without water with recognised 'Make Good' mitigation and enshrined standard conditions of consent like other resource approvals. These are offered in advance of predicted impacts. This is further addressed in 'Impact on Water Resources'.

114. The subject area does not contain Biophysical Strategic Agricultural Land (BSAL) and a Site Verification Certificate was issued on 2 April 2016. Soil analysis and the Wingecarribee land classification confirms it is Class 3 agricultural land.

115. Hume Coal is the largest landowner over the mine footprint, including the surface infrastructure area (117 ha). Since Hume licenced agricultural production to an independent company, Princess Pastoral, agricultural production has significantly improved with a 10-fold increase in sheep and 3-fold increase in cattle production annually. Last year, 250 tonnes of

canola were harvested from a crop grown in the Southern Highlands for the first time. This production profile has been achieved without utilising groundwater for irrigation.

116. Gross agricultural production in the Southern Highland SA2 statistical area in 2011 was $44 .8[7] million. $8.6 million in agricultural production was attributed to the Moss Vale/Berrima area.

117. Total people employed was 635 in 609 businesses. Average production per business was $73,500 per business and $70,551 per employee. By comparison, Hume Coal is estimated to achieve $800,000 of production per employee annually from one business.

Agriculture will continue to be an important contributor to the local economy undiminished by the Hume project. Even before its approval and construction, the Hume project, alongside it's farming partner, has achieved a dramatic improvement in agricultural productivity.

There is no evidence to support claims that existing agricultural pursuits will be adversely impacted.

118. The agricultural impacts of the Hume project and the Berrima rail project are directly due to the displacement of agriculture during mine construction and operation, including any soil impacts on soil productivity from the surface infrastructure site. Bore drawdowns and the 'make good' mitigation and external costs have been factored into project costs evaluated in the EIS economic assessment.

Forgone value of agriculture is estimated to be $2 million in NPV terms. Forgone income for NSW and the Southern Highlands SA3 Region (assuming agriculture labour is sourced locally) is $260,000 NPV. Converted to an annual amortised value over the mine life, this is $22,000 per annum. Using an average regional wage of $46,000, this corresponds to a loss of FTE jobs of less than 0.5 jobs per annum in agriculture.

(b) Impact on Tourism

119. Tourism is an important industry in the Southern Highlands. However, will the existence of the Hume project impact negatively on tourism?

From 2011 to 2015, the number of businesses in the accommodation and food sector remained stable, contrasting with the growth 2001-2011 suggesting a stagnation in growth or market saturation.

120. This correlates with a decline in the number of total businesses in the Wingecarribee LGA of 3% between 2009 and 2013, compared to an increase in total number of NSW businesses of 1% in the same period(ABS2015).

121. In the year ending June 2016, there were 1.7 million visitors to the Wingecarribee LGA with 98% of those being domestic visitors.

122. According to the ABS 2011 Census, employment in accommodation and food services in the Southern Highlands SA3 Region totalled 1,263 or 8% of total employment. Destination Southern Highlands claims that tourism supports 2,500 jobs. The higher figure appears to equate all jobs in accommodation and retail sectors as being wholly attributed to tourism,

[7] ABS Southern Highlands SA2 area agricultural production.

without accounting for existing jobs servicing the local resident population purchasing from local retail, entertainment, food, beverage, and service businesses.

Local tourism has co-existed with the mining, quarrying and cement industry for over a century.

Local mines, quarries and ironworks worked together from the earliest day of tourism from Sydney in the 19th century

The influx of lifestyle residents has co-existed with the Moss Vale Enterprise Zone, Berrima Cement Works, Bowral Brickworks, and associated quarries for decades.

123. The villages of Berrima and Medway have co-existed with many coal mines, commencing in 1854 and the Berrima Colliery between 1927 and 2013. Mining has been part of the Berrima's heritage for 160 of the 185 years of Berrima's existence.

124. There have been many exaggerated claims regarding the impact of the Hume project on existing tourism establishments and future visitations.

As of June 2015, there were three (3) tourist accommodation establishments in the Southern Highlands SA2 Region (where the mine is proposed) or 15 percent of all establishments in the Wingecarribee LGA. In 2014-15, revenues from tourist accommodation in the Southern Highlands SA2 Region accounted for 2 percent of the total for the Shire.

125. The Southern Highlands SA2 Region, where the mine is proposed, accounts for a small number of tourist establishments and revenue generated in the wider area. They will not be impacted as the proposed mine is underground, surface infrastructure located away from areas of major tourism development and the visual impact is negligible to limited from the main areas of visitation.

The Hume project is not a significant factor in impacting upon the character, amenity, and tourism values of the wider Southern Highlands.

Anecdotal evidence suggests the existence of inappropriate protest signage is a greater factor influencing the destination experience of visitors.

126. According to Destination NSW, occupancy rates for short stay accommodation for the year ending June 2015 was an average 51% that, by comparative levels for tourism occupancy rates, is very low.

127. Evidence suggest that proximity to major population centres of Sydney and Canberra is a factor in achieving saturation occupancy rates on weekends and public holidays, when it is difficult to find vacancies.

128. Low occupancy rates during the week are a significant constraint on obtaining a suitable return on investment and is an impediment to new investment, so important in providing new visitor experiences.

129. Some proposals for new tourism and retail investment have met with considerable opposition that, along with zoning restrictions, limits the growth potential of the sector. It also denies the opportunities from achieving a critical mass required to grow the tourism sector. None of these factors can reasonably be attributed to the Hume project.

130. Proximity to Sydney and Canberra attracts most domestic short stay or no-stay day visitors. That proximity is also a disincentive to longer stay occupancy unless the visit is attached to other attractions, such as conferences and weddings.

131. Time spent in a tourist location is also influenced by the time available to inbound visitors as well as distance from major centres. This is reflected in the demographics of the domestic visitor profile – 55+ (53%), 35-54(25%) and <35(22%). Primary activities are, eating out, sightseeing, and shopping, being short duration activities. Recently, the area has focussed on the wedding market to increase the duration of visitor stays.

132. The evidence that mining can co-exist and be mutually beneficial is shown by an examination of mining and tourism statistics in other mining provinces in NSW, particularly in the Hunter Valley and Mudgee. Visitation growth and multi day stays have grown at a rate greater than the Southern Highlands, despite record increases in mine approvals and production, mostly from open cut mines. The Hunter Valley has also developed a well-established wedding celebration industry of greater scale, unaffected by mining.

133. Hume Coal's underground mine will have significantly lower production than the average open cut mine and total annual production is less than ten percent of Hunter Valley production.

> ***The area of economically recoverable coal in the Southern Highlands is constrained.***
>
> ***Surface infrastructure is visually obscure and remote from the main tourist areas and the impact is negligible to limited, depending on distance from the mine.***
>
> ***Surface infrastructure is not visible from the main tourist areas or limited or negligible from the main access roads being the Hume Highway (old and new).***

134. Trains from the Hume project will be visible from the new one kilometre extension of the Berrima Branch line and along parts of the existing rail line to Port Kembla. However, it will traverse under the Hume expressway (existing underpass), over the old Hume Highway and under/over the Berrima Road diversion. Removal of the Berrima cement rail crossing, either by Council or Hume Coal, will enhance visitor access to Berrima, Moss Vale and beyond.

135. Disposable income is a major driven in the time spent in tourist locations, spend per visitor, and return frequency. Existing retail and food businesses are also sustained by local resident as well as visitor populations.

136. Domestic visitors, according to Destination Southern Highlands, in the year ending June 2016, spent some $261m[8], including;

- $70m on restaurants and take away meals

[8]Destination Southern Highlands Tourism Snapshot, June 2016.

- $14m on groceries for self-contained accommodation
- $30m on shopping (other than food and drink)
- $15m on alcohol and drinks.

137. The Hume Coal project by comparison will be making a $500 million capital upfront capital investment with total operating expenditure over the mine life of $2.4 billion. Of that, $600 million will be paid in wages and salaries.

138. In a typical year (2024), Hume will spend $139 million on operating expenditure. Of that $33 million in wages and salaries and $90 million on contractors and goods and services.

A significant proportion of Hume Coal attributed wages, salaries, goods, and services expenditure will be spent locally, including local businesses that also service the tourist market – restaurants, cafes, grocery stores, newsagents, health care providers (medical and pharmacy) and general retail outlets.

139. Hume Coal's payroll will be a major stimulus to the many businesses also serving the tourist sector.

140. In 2016 dollars, the median average income in the Southern Highlands SA3 Region was $46,296, significantly below the expected average median incomes attributed to the mining industry and to the Hume project.

141. The Hume project will make the largest contribution to the local economy of any 'greenfield' business, currently being proposed in the Southern Highlands.

Impact on Surface and Groundwater Resources

(a) Impact on Sydney Water Catchment

142. It is claimed Hume Coal will have a deleterious impact on the Sydney Water Catchment and therefore the quality and quantity of water available for town water supply through WaterNSW storages.

143. The Sydney Water Catchment is 16,000 Km2 and extends from near Lithgow to almost Cooma. It comprises major catchments for storages, including 'Special Areas', where surface activities and human access is prohibited or restricted.

144. The project area is located mostly within the catchment of the Wingecarribee River which is part of the Upper Nepean and Upstream Warragamba Water Source.

145. The area of the Hume surface infrastructure is 117 ha or 0.01 percent of the Sydney Water Catchment.

146. There will be a minimal reduction, of approximately 94.2 ha, of the total catchment of Medway Rivulet (including Oldbury Creek) in which the surface infrastructure area will be located. This reduction in catchment area will have negligible impact on the contribution to catchment inflows (0.8% in wet times and 1.4%) in dry times).

The project's impacts on surface water resources will be negligible, and the Hume project will comply with NorBE requirements, as is the case for all developments in the Sydney Water Catchment thereby complying with the Drinking Water SEPP.

All potential impacts to surface water users and stream environments have been assessed as insignificant in accordance with the Significant impact

147. Hume Coal's surface impacts are downstream of the main catchment areas for local storages used to supply drinking water to the local communities.

148. Groundwater, in the project area, does not meet drinking water standards without treatment. Other groundwater areas outside the project area, not affected by mining, has higher water quality suitable for natural mineral water production

149. Groundwater from the Sydney Basin Nepean Groundwater source is not extracted for town water supply. In any case, the sustainable yield (LTAAEL) allocates an insignificant 11ML (4.5 Olympic pools) for town water supply and is not used for that purpose.

(b) Medway Dam

150. Those opposing Hume Coal claim the Hume Coal project will also impact on the drinking water supplies from the Medway Dam, 'used to supply 8200 people with drinking water'.

That claim is complete fabrication, created undue anxiety and is still being perpetuated by anti-coal activists to promote their distorted view of the Hume project.

151. In 2010, a report to Wingecarribee Council, described water from Medway and the associated treatment plant (WTP), as follows:

> *"Combined with the poor performance of the water treatment plant, it is likely that health risk associated with water borne pathogens discharged from the Moss Vale STP…….is between 100 and 1000 times greater than is considered acceptable where indirect potable use is planned."*[9]

152. For some years, Medway Dam and the WTP have not been used to supply potable drinking water to the surrounding villages.

153. Notwithstanding the above, the product stockpiles are outside the watershed of the Medway Dam and the project will have no impact on surface water entering the Wingecarribee River.

(c) Impact on Ground Water Resources

154. Groundwater impacts are addressed in detail in the water assessment contained in the EIS and peer reviewed by some of Australia's leading groundwater experts.

155. In accordance with the NSW Government Aquifer Interference Policy 2012 (AIP), Hume Coal will licence the total amount of water intercepted as assessed by the numerical groundwater model predictions for the Hume Coal project.

[9] Medway Dam WTP Viability Study, Prepared for Wingecarribee Shire Council, Beca Pty Ltd, 9 August 2010.

156. Water Access Licences (WAL) are currently held for all water extracted from the active mine area and for use in mine operations, including water contained in reject material to be backfilled underground. Currently, 71 percent of all licences required have been obtained on the open market.

157. Hume Coal will acquire WAL's for water flowing into the mined-out void and sealed panel areas even though this water is not extracted (except for mine usage where required). This water remains in the groundwater system, available to all other users even though Hume Coal will own the licences for that water.

158. Hume Coal is required to hold water licences for 2291ML in all water sources. Ninety-nine percent of the licences (2235ML in Year 15) will be sourced from the Sydney Basin Nepean Groundwater Source (Zone 1).

159. Hume Coal has acquired 71 percent of all water licences (maximum in Year 15) required for the life of the project.

Hume Coal has acquired all licences for extracted water and has a clear pathway to secure all required licences through water trading.

Experience to date has indicated both market depth and a willingness of sellers to sell water rights independently of land.

Other water licence holders have indicated a desire to sell water licences together with land

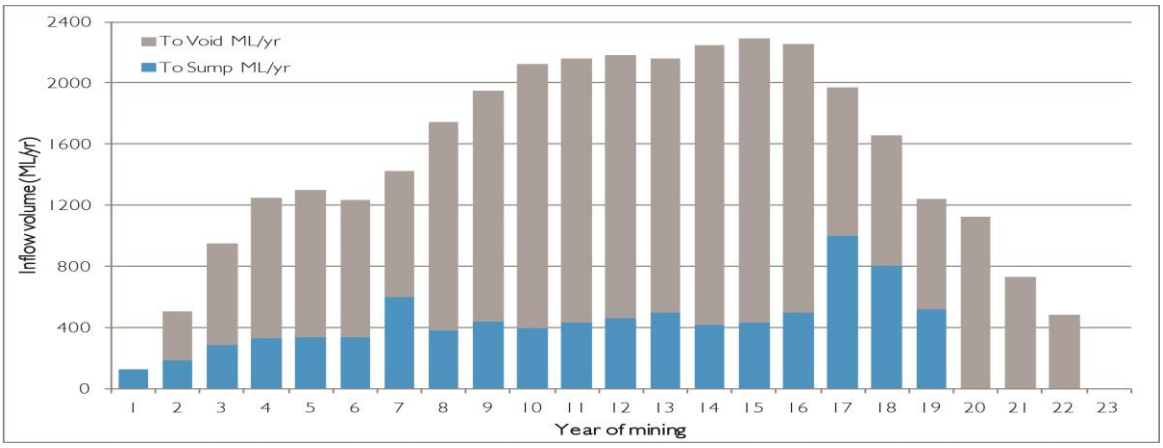
160. The average amount of groundwater intercepted annually is 1,597 ML, of which, 440 ML annually will be extracted from the active mine area with the remaining 1,157 ML being stored behind sealed bulkheads. Water extracted is used in mine operations, including being used to mix with reject rock being emplaced back from where it originally came.

161. The maximum extraction of water for mine use 954ML occurs in Year 17 for which water licences are required.

162. Graph 1 below shows:

- Inflows to the mine void will occur throughout the mine life, ceasing two years after mining concludes (22 years).
- Two-thirds of the water volume (grey shaded area) remains in the ground, not extracted, remains for use by other users but is still licenced by Hume Coal.

Graph 1: Expected Inflow Volumes to sealed panels (void) and active mine workings (sump) over mine life:



Maximum interception of the Nepean groundwater source is 2235ML in Year 15 and requires water licences.

Of the Nepean Groundwater Source, this is:

- ***0.004% of total water volume***
- ***1% of the total annual recharge***
- ***2.2% of the sustainable diversion limit (Long Term Annual Average Extraction Limit [LTAAEL]).***
- ***9.1% of the tradeable access licences (13% of tradable water licences in Management Zone 1)***

163. In addition to the Nepean Groundwater Source, Hume will also need to hold licences for water interception or induced leakage from other water sources:

- 8ML/year for Years 14 to 16 from the Sydney Basin Groundwater Source
- 36.5ML/year from the Medway Rivulet (Upper Nepean Unregulated River Water Source) as induced flow into the mine workings.

164. The NSW government allocates 99,568 ML/year from the Sydney Basin Nepean Groundwater Source for sustainable diversion, known as the Long-Term Annual Average Extraction Limit [LTAAEL]. Of the LTAAEL:

- 76percent (75,398 ML/year) remains unassigned.
- Only 0.01% (11ML/year) is allocated to Local Water Utilities. (not used)
- Less than 6% (5,591ML/year) is allocated to Stock and Domestic (basic landholder rights)
- 25percent (24,564 ML/year) is allocated to tradable access licences

- Hume Coal water licence requirements represents an insignificant 2.3 % of the LTAAEL.

165. The average annual volume of ground water used directly in mine operations is 853 ML. Of that, 274ML/year will be returned underground with the reject (natural rock and shale) material as water based slurry, avoiding the need for permanent above ground emplacements and tailings dams[10].

(d) Impact on Licenced Water Bores

166. Impact on water bores is addressed in *Hume Coal EIS: Volume 4B Appendix O: Drawdown Impacts in Landholder Bores – Proposed Make Good Provisions*.

167. Groundwater inflows to the mine will occur during its operational life and for three years after coal extraction ceases (i.e., for approximately 22 years' duration in total). This will lower the groundwater level called a 'drawdown'. 'Drawdown' occurs through normal use of bores and influenced by amount of recharge and will be influenced by underground mining at varying times. The impact on individual bores are assessed in the Hume EIS.

(e) "Make Good' Groundwater Mitigation

168. Hume Coal operations will directly influence 93 bores belonging to 71 landowners above and adjacent to mine operations to beyond the 'minimal impact criteria' (i.e., a drawdown of >2m) provided for in *the NSW Government Aquifer Interference Policy* (AIP) for highly productive porous rock groundwater sources. See Graph 2.

169. Of the impacted water bores, 15 are licenced for irrigation use and 78 are for basic landholder use (stock and domestic). Some bores are higher yielding irrigation bores, whilst others, used for periodic stock and domestic use, have generally lower yields. The mitigation 'Make Good' mitigation will vary according to the purpose for which the bore is licenced.

170. Drawdown on the bores greater than the 'minimal impact' criteria may impair the capacity of the bore to function for the purpose for which it is licenced, depending where its pump is in the strata.

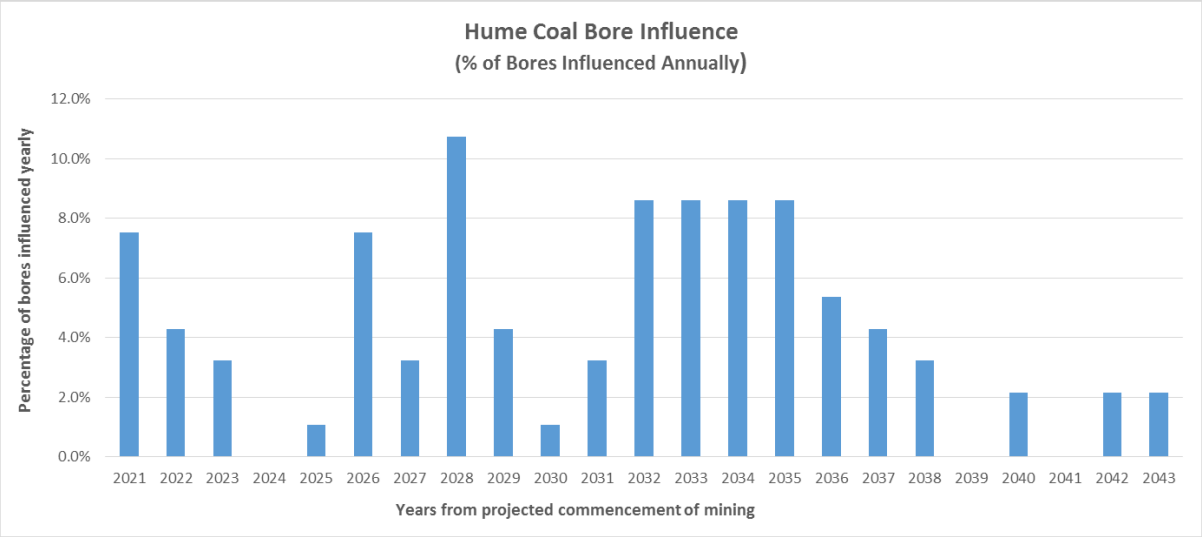
171. The identified bores are likely to suffer 'impaired capacity' at various times over the mine life. Not all bores will be impacted in the same way and most will recover over the life of the mine. 75 percent of the recovery will occur within the 23 years of mining commencing or 3 years after mining concludes.

172. Drawdown or impaired capacity impacts are temporary, manageable, and recoverable over a short time frame compared with open cut mining (groundwater source removed) and longwall mining (impact over hundreds of years). However, more importantly, no landowner will be without bores use for which it is licenced.

173. Graph 2 shows the percentage of bores directly affected by the Hume Coal project in each year over the life of the mine.

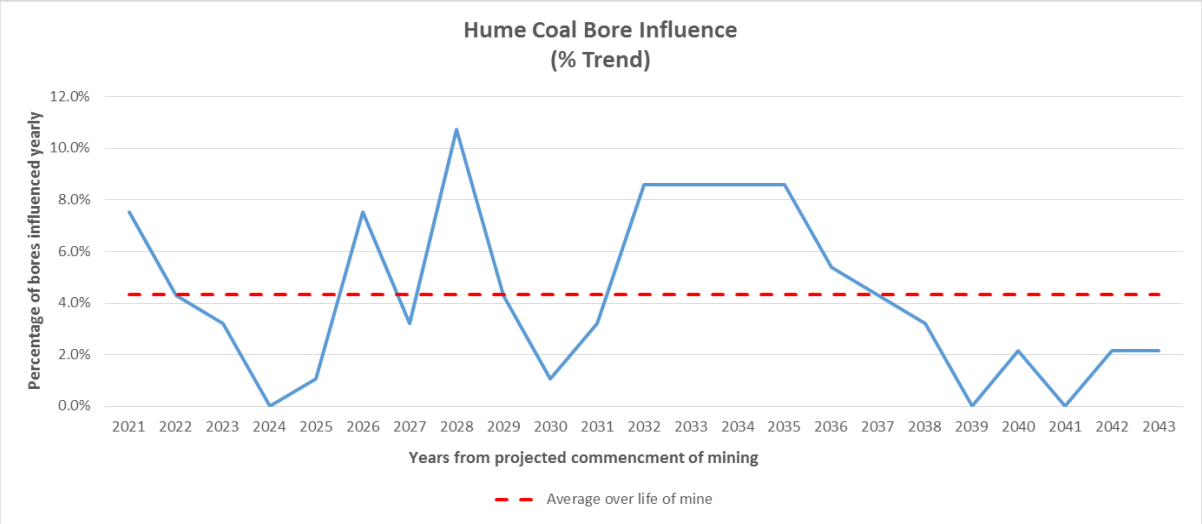
[10] Figure 8.2 of the Hume EIS Volume 4A Appendix E

Graph 2:



174. Graph 3 shows that just over 4% of the impacted bores require rectification or 'make good' measures annually over the mine life or between 4 to 5 water bores on average each year.

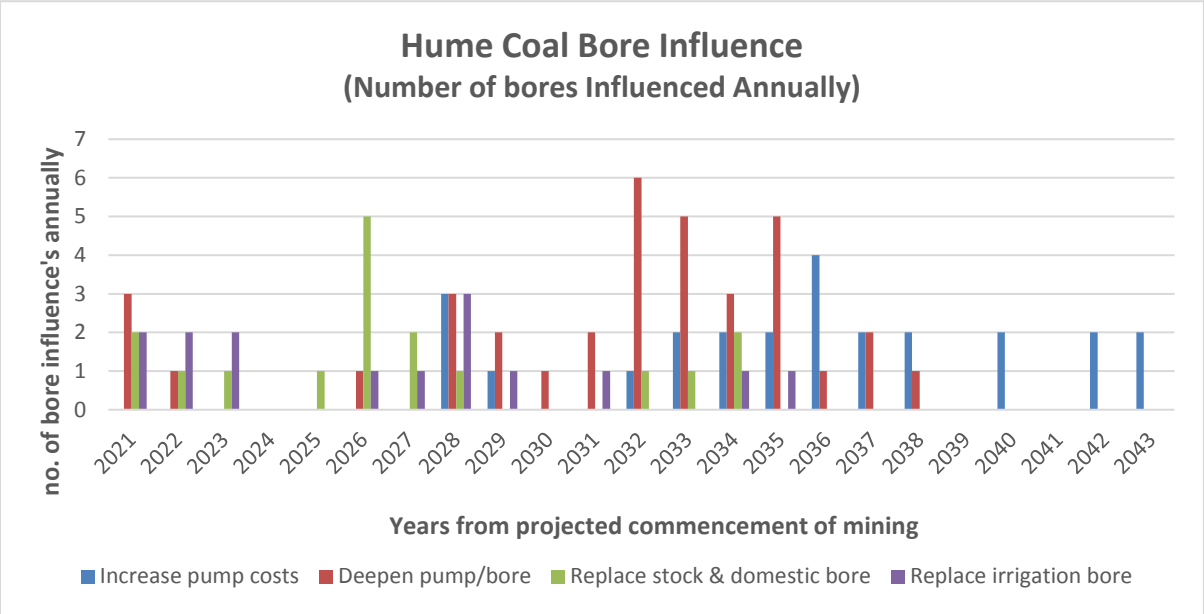
Graph 3:



175. Of the 1954 registered bores in the Wingecarribee LGA, the 93 bores likely to have 'impaired capacity' represent <5% of all licenced water bores in the Shire.

176. Graph 4 shows the type of 'Make Good' mitigation measures required and sequenced over the life of the mine.

Graph 4



177. In summary, 'Make Good' mitigation means:

- No landholder will be materially disadvantaged as they will be eligible for "make good" arrangements, to be provided by Hume Coal before impaired capacity constraints for bores occur.
- 'Make Good' or alternative water supply arrangements, referenced in the NSW Government's 'Aquifer Interference Policy' (2012), have been incorporated in standard conditions of consent for many mining developments since 2012.
- All bores drawn down by more than 2 m due to the project will be eligible for 'Make Good" arrangements.
- Around a third of the affected bores will experience increased pumping costs but no other capital works or supplementary measures are expected to be necessary to maintain their proper functioning.
- Another third of the bores have been assessed as potentially needing their submersible pump intake depths repositioned for certain periods of time.
- The final third may need redrilling, or repositioning to maintain water supply; typically, these bores are either shallow, or screened in, or below the coal seam itself, or within proximity to the top of the seam.
- Of the 4 to 5 bores affected each year <2 require replacement.
- Hume Coal is responsible for all costs to maintain water supplies through 'Make Good' mitigation, including baseline bore assessments prior to mining and throughout mine life.

178. The average duration of drawdown on the affected bores is predicted to be 36 years, with the maximum duration being 65 years. However, most of the recovery (75%) will occur within 23 years after mining commences.

179. Predicted impacts to other groundwater users, including groundwater dependant ecosystems, watercourses, drainage lines, and swamps that receive baseflow, have been assessed as insignificant.

180 The project will not reduce the beneficial use category of the groundwater source as referenced in the AIP, including cumulative water impacts.

(f) Existing NSW Government AIP 'Make Good' Policy and Practice

181. The Aquifer Interference Policy (2012) (AIP) provides the framework for assessing the impacts of mining developments on groundwater systems; however, it is 'silent' on 'Make Good' mitigation arrangements. No guidelines have been issued to assist Consent Authorities.

182. Nevertheless, there have been many mining developments approved since the AIP came into effect in 2012. These approvals contain standard conditions of consent requiring 'compensatory water supplies. These standard conditions are applicable to the Hume project and provides the necessary legal framework for 'Make Good' water supply arrangements.

'Make Good' mitigations need to be:

- *proportionate to the predicted impact;*
- *applicable to the licenced use of the water bore;*
- *available for the duration of the predicted exceedance of the AIP 'minimal harm' criteria;*
- *reasonable and feasible;*
- *directed towards reducing the impacts of the development;*
- *agreed to by both the Applicant and the water bore owner; or*
- *where a dispute occurs, determined to the satisfaction of the Secretary of the Department of Planning as mirrored in other mine approval conditions.*

(g) Overall Impact on Water Resources

183. The Hume project has been assessed against:

- *NSW Aquifer Interference Policy (2012)*
- *Commonwealth Department of Environment Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources (DoE 2013)*
- *Information Guidelines for Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals (IESC 2015).*
- *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*
- *The principles of Neutral or Beneficial (NorBE) impact on water quality.*

184. The other predicted impacts on water resources and management are:

- Flow and yield changes for users and the environment — Insignificant
- Stream bank erosion and geomorphology changes — Insignificant
- Surface water changes — Insignificant
- Flooding — Insignificant
- Effects on ecosystems that potentially use groundwater — Insignificant
- Reductions to baseflow — Insignificant
- Water quality changes for private landholder bores — Insignificant
- Predicted impacts for GDEs — No impact

Impacts on Air Quality

185. Air quality impacts have been appropriately addressed in the Hume Coal and Berrima EIS using relevant experts to address community concerns about dust generation and health impacts.

186. However, there are some in the community who seek to portray the Hume project as being analogous to a larger scale open cut mine of the type found in the Hunter Valley.

187. It is important that the Consent Authority examines the scientific evidence in reaching a conclusion on the reality of the any air quality impacts from the project.

(a) Air Quality Mitigation through Mine Design

188. The Hume project(s) employ several important measures that will significantly remove coal dust as an issue.

- Disposal of reject material (natural rock and shale) underground
- Use of a Stacker Reclaimer rather than bulldozers and wheeled loaders for the product stockpile.
- Use of water sprays on stockpiles and/or veneering where required
- Partially covered conveyors and fully covered transfer points.
- Use of covered coal wagons to mitigate against fugitive dust from transporting coal by rail to Port Kembla
- Hume is an underground mine

(b) Major Sources of Dust from Coal Mining

189. In an EPA commissioned study of all 57 NSW operating mines, Katestone Study 2011[11], some 22 mining activities were identified as likely to cause generation of PM_{10} particles. Of those, three were responsible for 83% of large sources of dust:

- Wheel generated dust (49%)
- Handling overburden (25%)
- Wind erosion of overburden (9%)

These activities are not a feature of the Hume Coal underground mine.

[11] NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions for Particulate Matter from Coal Mining

Of the 22-major dust generating activities only six apply to the Hume project such as loading and unloading from stockpiles, train loading, wind erosion of stockpiles and coal crushing. All these activities are, by comparison with the other dust sources, listed by Katestone, minor contributors to PM_{10}.

(c) What is Meant by Air Quality

190. There appears to be a great deal of misunderstanding about the nature of dust from mining and the impacts on communities. Dust is the common expression for the particulate matter (PM) in the atmosphere and is generated from a wide range of natural and human related activities. In the case of mining, there are three size fractions including in a comprehensive air quality assessment:

- Total Suspended Particulates (TSP) refers to particles less than 100 microns in diameter (one micron is one-millionth of a metre);
- PM_{10} refers to particulate matter less than 10 micron in diameter;
- $PM_{2.5}$ refers to particulate matter less than 2.5 micron in diameter.

191. To provide some context, fine beach sand is about 90 microns in diameter, the average human hair is 70 microns wide so the small particle pollution ($PM_{2.5}$), of most health concern, is 30 times smaller is diameter than the average human hair.

192. Larger particles (TSP and PM_{10}) are generated from activities such as wind erosion and wheel generated dust from agriculture, unpaved roads, and other industrial sources. Smaller particles ($PM_{2.5}$) are emitted from combustion sources such as diesel-powered vehicles, petrol, wood burning fires etc.

193. PM in any form is always present in the atmosphere and are both natural and human related.

Natural sources in the Southern Highlands include:

- Wind erosion from exposed ground
- Vegetation fires
- Regional scale events such as bushfires and dust storms
- Sea aerosols (a major PM component) transported from the coast.

Human related sources in the Southern Highlands include:

- Fugitive dust from agricultural activities
- Existing industrial and commercial activities
- Wood burning fires
- Truck and motor vehicle movements on sealed and unsealed roads.

194. Concentrations of PM fluctuates daily and are seasonal. In the Southern Highlands in winter the major source of $PM_{2.5}$ and below, and of greatest concern to health, is the burning of wood inside residences. This is exacerbated by a concentration of wood burning sources in close urban areas with micro-air sheds such as topographically constrained Berrima. Other events, such as bushfires, cause very high levels of PM concentrations.

195. Mining, unlike many other dust sources like agriculture, faces rigorous assessment of TSP and PM in accordance with NSW EPA criteria and the National Environmental Protection Council (NEPC) standards for $PM_{2.5}$.

(d) Air Quality Assessment and Mitigation

196. Detailed air quality assessment was undertaken and included:

- recorded wind speeds from calm conditions to wind gusts greater than 100 km/hour
- PM assessed under all conditions to determine the 'worst case' impact on the surrounding environment;
- Predictions made across a 15 km^2 area centred over the project with individual predictions made at residences, schools, and urban areas.

Air quality modelling has assessed the existing air quality (no mining) as a benchmark for the Hume project.

It shows that project generated PM_{10} dust (including $PM_{2.5}$ as a component) reduces with distance from the proposed surface infrastructure area and are very low at the site boundary, compared with existing background air quality and the regulatory criteria.

197. Coal stockpiles are managed to minimise dust erosion, in the most difficult of climatic conditions, by use of water sprays and potentially 'veneering' with biodegradable surface treatments made from natural starch polymers.

198. Coal dust generally contributes a small proportion (10-15 percent) of the larger particle faction (PM_{10}) for open cut mines and significantly less for underground mines. As stated, the main activities shown to produce dust, surface waste rock emplacements, bulldozing, surface haul trucks on unsealed roads etc are not proposed for the Hume project.

199. Nevertheless, coal dust emissions, predominately comprising course dust particles in the range of 50 and 200 microns in size, can affect amenity and is regarded as 'nuisance' dust. Reducing the point sources of any potential dust (PM_{10} and above) will protect the surrounding environment and residential amenity.

200. Most of dust in a rural environment is associated with agricultural pursuits and is the main contributor to background levels of PM_{10} in the Southern Highlands. Where underground mining co-exists with agriculture, proper surface mine design can limit the point sources of dust generation in ways not able to be applied to broadacre agriculture.

201. The EIS air quality assessment found that dust generated from the Hume project will be negligible when compared with background levels.

202. Operation of the Hume mine is predicted to generate a small increase in PM_{10} and an even smaller increase in $PM_{2.5}$ in the immediate mine vicinity. Maximum concentrations predicted in a 24-hour period of PM_{10} and $PM_{2.5}$ are 4.7 micrograms/m^3 (compared with the regulatory criterion of 50) and 0.2 micrograms/m^3 (compared with the regularly criterion of 8).

Dust impacts on the closest communities of Berrima, New Berrima and Medway will be negligible compared with existing pre-mining background levels. Those communities further afield, Moss Vale, Burradoo and Bowral will have no measurable adverse air quality impacts.

(e) Small Particle Pollution ($PM_{2.5}$)

203. Small particle pollution ($PM_{2.5}$), mainly from vehicle and equipment emissions, account for 5-10 percent of all particles emitted during the mining and transport process for open cut mines and considerably less for underground mines. The Hume project will have limited sources of $PM_{2.5}$ on the surface (trains) and exhaust filters for any underground diesel sources (vehicles).

The predicted levels of $PM_{2.5}$ from mining are lower than those in Australian cities that are very low by world standards.

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204. The health impacts of relative dust levels are dealt with by a leading medical Authority, Associate Professor and Respiratory Physician, Dr David Mackenzie in the Hume EIS.

205. Studies of coal dust in the Hunter valley provide useful input into the impact of coal dust on air quality. Two major studies[12] found:

- Coal could only contribute 5-10% of $PM_{2.5\text{-}10}$ particles, with no coal specifically identified in the $PM_{2.5}$ samples.
- Annual dust depositions rates ranged between 0.5 and 1.1 grams per m^2 per month, with coal contributing 10% on average to the total level of deposited dust.

A previous study[13] in the Upper Hunter at Muswellbrook and Singleton analysed all sources of $PM_{2.5}$. It found that all soil dust, including agriculture and mining, contributed 11-12% of $PM_{2.5}$. This is an interesting result, considering the number of large scale open cut mines using bulldozers and haul trucks on surface emplacements in the immediate locality of the two centres.

206. Other key outcomes of the Upper Hunter Study relevant to the Hume project are;

- Wood smoke during the cooler months contributed up to 30% of $PM_{2.5}$ at Muswellbrook
- The bulk of coal dust emissions are courser than $PM_{2.5}$
- The amount of black carbon found in the soil factor samples (assumed to be coal) was only 1% of total $PM_{2.5}$ at Singleton and 4% at Muswellbrook. This is relatively low when compared to the major sources of $PM_{2.5}$.

[12] Lower Hunter Particle Characterisation Study (CSIRO and ANSTO) 2016
Lower Hunter Dust Deposition Study (AECOM) 2016

[13] Upper Hunter Particle Characterisation Study, Dept. of Health, OEH and undertaken by CSIRO and ANSTO, 2013

207. Wood smoke is likely to be dominant source of $PM_{2.5}$ which can often be a brown atmospheric haze during the winter months in the Southern Highland. In the Sydney region, domestic solid fuel combustion contributes 47% of annual $PM_{2.5}$ particle pollution. The contribution of wood smoke is highest in July, contributing up to 75% of monthly$PM_{2.5}$.

208. Colder rural areas, where people rely on wood as major heating source in winter, have the highest rates of $PM_{2.5}$ from wood stoves and fires. For example, In Armidale it accounts for >85% of $PM_{2.5}$, Tasmania up to 97% (Tamar Valley 73%).

209. Evidence from the US shows that residential wood burning is the source of 50% of airborne Polynuclear Organic Material (POM) in the U.S. POM's contain a group of compounds Polycyclic Aromatic Hydrocarbons (PAH) which include many Class A carcinogens. The U.S. EPA estimates that the cancer risk from wood smoke is twelve times greater than from equal amounts of tobacco smoke.

210. Based on evidence from other cold climate areas, it is expected that wood smoke in the Southern Highlands would be the dominant contributor to total $PM_{2.5}$, particularly in places such as in all urban villages. Berrima would experience high levels of $PM_{2.5}$ from wood smoke, due to its location, surrounded by hills concentrating wood smoke in the urban area.

It is important put some perspective around $PM_{2.5}$ and composition from all sources.

This needs to be balance against emotive and alarmist claims about coal dust and its impact on health, particularly, as the Hume project is an underground mine with limited sources of both $PM_{2.5}$ and PM_{10}.

211. Notwithstanding the above, the fact is air quality in the Southern Highlands is high and the Hume project will not result in a deterioration of that air quality.

Section 11

Final Rehabilitation: Underground Water Storage and Managed Aquifer Recharge

212. During my career, I have sought to improve the design and operation of projects where I have been involved.

213. Having assisted in several water investment and savings projects from the Murray Darling, Western Australia and North Queensland, benefits to Australia of progressing underground water storages that can be accessed during dry times are self-evident.

214. Many underground water storage concepts have been examined, including the Pratt Water Study on the Murrumbidgee and projects examining known aquifers suitable for storage beneath Perth, Adelaide, and Melbourne.

215. Some projects have demonstrated that underground water storages are viable. From 45GL of water being reinjected in the Burdekin every year for agriculture and horticulture to a 300GL ‘water bank’ in Orange County, California to name but two.

Most Australian States have a Managed Aquifer Recharge (MAR) policy to inject water underground during wetter periods for balancing out water needs over dry periods.

NSW does not have an MAR policy and lags decades behind other States.

Other nations have far more advanced underground storage schemes, despite Australia being the driest

216. Water 'banking' augments natural processes of water storage. Together with MAR, the recovery of groundwater systems is accelerated by taking surplus surface water during wet periods and reinjecting it into the groundwater system.

217. Locally, during the Millennium drought, authorities hastily built an emergency pipeline to Goulburn to connect with water storages in the Southern Highlands. That pipeline passes close to the Hume Coal underground mine so the synergies are obvious. Well at least to some.

218. Additional surface water storages require extensive land, not available in the immediate region with proximity to potential users.

219. Surface storage are constantly depleted by evaporation. For example, annual evaporation from the Wingecarribee Reservoir is around 700ML and the tiny Medway Dam 100ML. Total annual evaporation from all dams and weirs servicing the Sydney region is 100GL or about 20 percent of annual usage.

220. These losses are forgotten during wetter periods but critical in droughts, reducing the options for water authorities to guarantee supply.

221. As part of the final rehabilitation of the Hume project, consideration should be given to the benefits of using the final underground void as a long-term water storage, available to overlying landowners with water licences and for the wider public good.

222. As the Southern Highlands is blessed with higher than average consistent rainfall, it is just common sense to harness excess water, where practicable, to reinject some of that to underground storage.

223. Having studied the design of the Hume mine, with no unsealed adits to the outside world, the final void will decline from around 80 metres in the Belanglo State Forest to around 180 metres towards the Illawarra Highway, making it ideal for an underground storage.

224. The bulkheads used to seal each panel progressively could be designed to allow the valve release of water in a homogeneous system upon final closure. A pumping void could be designed at the end of mine life, at the lowest depth, with surface pump access as part of the rehabilitation closure plan.

225. Post mining, the available void space will accommodate 20GL of water, or about 77 percent of the existing capacity of the Wingecarribee Reservoir (post peat swamp collapse). This calculation includes water placed back underground as part of Hume's water recovery and progressive reject emplacement, so to avoid surface emplacements and tailings dams.

226. During mining, there will be constant monitoring of water recovery and quality against the Conditions of Consent, allowing for a proper assessment of the potential for a post-mining storage, generate the necessary scientific data to support Hume's post closure mine as a major new water storage.

227. Combined with a pilot MAR, the Hume project would deliver several benefits:

- MAR would accelerate the recover the groundwater system.
- Hume would continue to hold 2.2GL of water licences allowing for sustainable extraction.
- Local landholders with licences would have access to a water storage where water is easier to extract than relying on bores.
- Agricultural investment would be attracted to a ready source of water to underpin investment in higher value agriculture close to major markets than is currently the case.
- Underground storage would be free of water evaporation as is the case with surface storages. For example, it would store the equivalent of 20 percent of the annual evaporation from all Sydney water storages.
- During times of emergency the water can be treated for drinking purposes (if necessary).

228. To build a surface storage of 20GL capacity, assuming the land availability, would cost around $200 million.

229. NSW Government and Hume Coal should scope a pilot project to examine development of an underground water storage and MAR as a component of the mine closure and rehabilitation plan.

To ignore innovative uses of post-mining underground voids for the Hume project, in an era of unpredictable climatic changes, would be a lost opportunity to protect and provide deliverable water resources in the most cost-efficient means for the greater public good to provide authorities with more flexible options during dry periods.

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