Director, Mining and Industry Projects,
Major Projects Assessment,
Department of Planning and Environment,
GPO Box 39,
Sydney NSW 2001

May 13 2014

Re: Project Application MP 10_0046 Modification 2

To Whom It May Concern,

This is to lodge an objection to Wollongong Coal's (WC's) proposal for a second 'modification' to the Preliminary Works Project MP 10_0046. The submission is made on behalf of the Save Our Water Catchment Areas (SOWCA) alliance of NGOs and community groups. The concerns are those previously raised with respect to the first modification and the expansion project proposal. Rather than repeat those concerns, previous submissions are attached as part of this submission. Also attached is the PAC report for the first 'modification'.

Key concerns include the following:

(i) SCT's advice that the subsidence characteristics of LW4 suggest failure of the bridging capacity of the overburden and consequential vertical 'block' collapse (see attached submission on the expansion project). Vertical block collapse will result in significant mine inflows and loss of rainfall runoff reaching storage.

(ii) Related to (i), increased strata permeability/hydraulic-conductivity with consequential loss of rainfall runoff reaching storage, As noted in the attached submission on the expansion project, the hydraulic conductivity of the Hawkesbury Sandstone in Wonga East domain is nearly two orders of magnitude greater than in Wonga West - apparently because of subsidence effects.

(iii) Misplaced confidence in the Bad Hill Claystone as an aquitard; see attached.

(iv) Impacts to swamps meeting the requirements for identification as being of Special Significance (see attached), for which the PAC and former OEH require negligible impact.

(v) Failure to adequately consider cumulative impacts (see attached)

(vi) Incremental implementation of the expansion project, for which an application was first lodged in 2009 and which has yet to be satisfactorily completed. The PAC has acknowledged that this piecemeal approach erodes confidence in the NSW assessment and regulatory system (see attached) .

(vii) Related to (v), abuse of the notion of a project modification - further lowering confidence in the NSW assessment and regulatory system; see attached.

In making this submission I recognise that the current incarnation of Planning will likely add to its track-record of setting aside best-practice science, the concerns of the SCA (OEH no

longer exists), the concept of Special Significance, the Precautionary Principle, the concerns of Wollongong Council and the concerns of the community, to approve Longwall 6 of Wollongong Coal's (ne Gujarat NRE's) expansion project.

Yours sincerely, Peter Turner.

I have not made a reportable political donation.

Some Comments on NRE No.1 Colliery Project
Application 09_0013

April 10 2013

From within this submission: Cataract Reservoir supplies water to Sydney - around 4.4 million people. The royalties from the expansion project will provide the equivalent of about $3.15 per person each year for the 18 year life of the project; each will pay far more each year in water rates.

The number of mining jobs is small in the context of the Illawarra regional labour force of 196,200 and employed work force of 131,454 (as of November 2012; http://lmip.gov.au). Mines have closed in the past without devastating the regional economy.

Can the DoPI and the PAC be confident that the residents of Sydney would be willing to accept a risk of a compromise to their water supply, and to the biodiversity and environment of its catchment area, for $3.15 per person a year in royalties and 409 mining jobs? Would the next generation?

The company's perspective is clear, Part D of the EA advises that any costs arising from subsidence are expected to be minimal as "*the mine is mostly located under the Sydney water catchment which has limited economic assets that could be damaged by subsidence*".

The Special Areas provide water to Greater Sydney and the Illawarra - more than 4.7 million people. As mentioned, royalties from the Southern Coalfields amount to around $141 million - in a good year for coal prices. That's equivalent to about $30 per person each year for the next twenty years. Or about 57 cents a week - not even the price of a bottle of water.

How can the DoPI and the PAC determine that the value of the coal beneath the Special Areas is greater than the inter-generational value of the catchment's water quality and quantity, ecosystems, communities, species and outstanding biodiversity? Does it really make sense to put these assets at risk for such small returns?

Note: As advised in the cover letter, this submission is to replace a preliminary version submitted on April 5.
Note: Time constraints have precluded adequate proof reading.

SOWCA is an alliance of the following community groups and organisations:

NATIONAL PARKS ASSOCIATION OF NSW
protecting nature through community action

LOCK THE GATE

RIVERS SOS

Rivers SOS

TOTAL ENVIRONMENT CENTRE

Botany Bay and Catchment Alliance

Georges River Environmental Alliance

Illawarra Escarpment Network

Otford Protection Society

Hawkesbury Environment Network Incorporated HEN

Hawkesbury Environment Network

nisa

Northern Illawarra Sustainability Alliance

IRRM
ILLAWARRA RESIDENTS FOR RESPONSIBLE MINING

Illawarra Residents for Responsible Mining

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STOP CSG SYDNEY

Stop CSG Sydney

Sutherland Shire Environment Centre

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Comments on the NRE No.1 Colliery Project Application 09_0013

General Comments

The OEH points out in their 2012 comments on Gujarat's modification proposal for their Preliminary Works project (MP 10_0046), that the NSW Government has invested heavily in time, resources and money to review mining proposals in the Southern Coalfields. This includes a number of major assessments such as:

- Dendrobium Commission of Inquiry
- Southern Coalfield Inquiry
- Metropolitan Colliery PAC assessment
- Bulli Seam Operations PAC assessment

In each case significant deficiencies have been identified in the information provided by Industry to Government on which to base decisions that balance the environmental, social and economic benefits and costs of these proposals. In each case**, the assessments have reflected an increased recognition of community concerns for the impacts of mining on the sensitive and highly valued environment of the Special Areas.**

The 2010 PAC Panel report for the Bulli Seam Operations (BSO) proposal defines the current benchmark for acceptable mining practice in the Special Areas. Community awareness has heightened since 2010.

The 2009 PAC Panel report on the Metropolitan Coal Project proposal makes the following comments on studies of subsidence impacts on swamps:

> "*These programs are funded by the Proponent, designed by the Proponent's consultants, and the information is usually collected, analysed and interpreted by the Proponent's consultants. Whilst there is Government agency oversight of this process and some scrutiny of reports, it does not amount to a rigorously designed and executed set of studies that could be published in the scientific literature or provide the basis for a meta analysis of the relationship between longwall mining and upland swamps*."

That is, studies funded by mining companies cannot be regarded as robust and independent assessments.

Commenting on proponent funded peer reviews, the PAC Panel for the BSO proposal makes the following recommendation:

> *"15.3.4. Recommendation*
> *The Panel recommends that the Department look at this issue with a view to determining whether independent selection and briefing of reviewers should be the norm, even if the cost were borne by the Proponent. As it currently stands the system appears to have little credibility*."

That is, the direct coupling between consultants and project proponents may induces bias in favour of the proponent. There is clearly a conflict of interest and a potential to corrupt the assessment process.

The Department has instead proposed accreditation of consultants. While a small step forward, this fails to address the core problem of the direct relationship between the proponent and the consultant. It's puzzling that the Department has not addressed the problem as recommended by the PAC. **Consultants should be selected at random from a pool with, for example, funding for costs provided along the lines of the Mine Subsidence Board**.

RECOMMENDATION 1: Accredited environmental impact assessment consultants for mining projects should be selected at random from a pool, with funds for assessment costs provided along the lines of the Mine Subsidence Board.

Inadequate Public Exhibition Period

The publication exhibition period allowed six weeks for members of the public to read, digest and comment upon more than 2000 pages of proposal documentation. The Department allowed only three weeks for the 1000 or so pages of the 2012 modification proposal of the Preliminary Works project. In effect, the same amount of time was allowed for comments to be made on each proposal - in spite of comments of concern from the public about the inadequacy of the public exhibition period. This disregard for public consultation by the Department of Planning and Infrastructure (DoPI) is underscored by the four years it's taken for Gujarat NRE to submit its proposal (a brief account is given below). The DoPI's evident disregard for public submissions is further highlighted by the tolerance it has shown towards the many compliance failures and deadlines missed by Gujarat NRE.

Net Benefit - how much for the Special Areas?

The PAC's approvals have been swayed by concerns of job losses should Gujarat operations be interrupted. The same consideration has effect in considering whether or not swamps, creeks or other surface features should be undermined. The EA indicates that 297 staff are employed at No. 4 shaft and 287 are employed at Russel Vale. These figures are dated and incorrect however, with only caretaker staff now employed at No. 4 shaft. The EA indicates 409 jobs, though no details are provided for this estimate and it may also be dated. **The number of mining jobs is small in the context of the Illawarra regional labour force of 196,200 and employed work force of 131,454 (as of November 2012;** http://lmip.gov.au**).** Mines have closed in the past without devastating the regional economy.

Part D provides an assessment of financial benefits that would appear not to have been independently verified. The Commonwealth taxes are substantial and are presumably primarily company tax. Assuming that those who would not be employed, should the mine close, would not be a source of payroll tax assumes they would not subsequently gain alternative employment. This seems an unreasonably pessimistic assumption.

Capital expenditure details are not provided, but it would seem a reasonable assumption that a significant component will be for equipment manufactured overseas.

The NSW levies provide partial compensation for services or impacts, are modest and most will likely be deductible. The project is predicted to deliver $250 million in State royalties over its 18 year life, from a total of 46 million tonnes of coal. This would be equivalent to an average of about $13.9 million each year from about 2.6 million tonnes of saleable coal each year.

Cataract Reservoir supplies water to Sydney - around 4.4 million people. **The royalties from the expansion project will provide the equivalent of about $3.15 per person each year for the 18 year life of the project; each will pay far more each year in water rates**. Can the DoPI and the PAC be confident that the residents of Sydney would be willing to accept a risk of a compromise to their water supply and to the biodiversity and environment of its catchment area for $13.9 million a year in royalties and 409 jobs? Would the next generation?

The Wongawilli seam is classed as a deep seam and would presumably then attract royalties of 6.2%. The price of coal on which the royalty estimate is made is not given. As a relevant aside, BHP-Billiton estimated royalty revenues totalling $521 million from 47Mt of ROM coal over a 9 year project period - an average of about $58 million from 5.2 Mt of ROM coal each year. Either Gujarat have underestimated the royalties or BHP-B have overestimated their royalty payments.

Currently annual State revenue is about $60,000 million, **so the $13.9 million royalties from the project each year would contribute approximately 0.02% of annual State revenues**.

A 2010 Auditor General's review shows that in 2008-9 coal provided $1,200 million in royalties (a peak coal price year) to the NSW Government, with $141 million (11%) of that being from the Southern Coalfields. **State Government revenues in 2008-9 were just under $50,000 million, with the Southern Coalfield then contributing 0.26% of that revenue**. The percentage may have declined with the recent fall of coal prices.

The SCA expects 91% of the Special Areas to be undermined over the next 20 years or so. The swamps will be lost along with other habitats and species, water contamination and sediment arising from the leaching of metal ions will continue to accumulate and the quality of surface water will be further reduced on mixing with ground water brought to the surface as the abandoned mines eventually fill. The legacy of coal mining in the Special Areas will be a broken and degraded landscape, and lost biodiversity of international standing.

The Special Areas provide water to Greater Sydney and the Illawarra - more than 4.7 million people. As mentioned, royalties from the Southern Coalfields amount to around $141 million - in a good year for coal prices. That's equivalent to about $30 per person each year for the next twenty years. Or about 57 cents a week - not even the price of a bottle of water.

How can the DoPI and the PAC determine that the value of the coal beneath the Special Areas is greater than the inter-generational value of the catchments water quality and quantity, ecosystems, communities, species and outstanding biodiversity? **Does it really make sense to put these assets at risk for such small returns?**

The company's perspective is clear, Part D of the EA advises that any costs arising from subsidence are expected to be minimal as "*the mine is mostly located under the Sydney water catchment which has limited economic assets that could be damaged by subsidence*"

Reflecting this, the longwalls plans were revised at some point such that plans to mine beneath Mt Ousley Rd were abandoned to avoid the risk of damage. Likewise, mining under swamps and creeks should not proceed. While a road may be repaired, swamps and creeks cannot.

The Precautionary Principle

The 2010 BSO PAC Panel report provides a detailed account of the Precautionary Principle and its application in a mining context. The importance of the need to consider the Precautionary Principle has recently been reaffirmed in the Land and Environment Court hearing of SHCAG Pty Ltd v Minister for Planning and Infrastructure and Boral Cement Limited. The current proposal from Gujarat fails to adequately apply the Precautionary Principle.

The PAC Panel advises that where there is a "*significant threat and a substantial level of uncertainty the principle requires the application of a significant degree of precaution, with the safety margin falling on the side of the environment*"

Unreliable Subsidence Predictions

To emphasize the uncertainty in predicting subsidence as a consequence of triple seam mining, Pells Consulting list some examples of inaccurate prediction for single seam mining subsidence, in Annex N Pells cites the following examples:

- Appin Colliery LW703 – 33% to 52% over prediction.
- Westcliff Colliery LW34 – 10% under prediction.
- Tahmoor Colliery LW24A – 290% under prediction.
- Tahmoor Colliery LW26 – 100% under prediction

The dramatic damage to the Waratah Rivulet provides another example of significantly underestimated subsidence. The longwalls used at Metropolitan Colliery are very similar to those of Area 2, being 163m wide with 55m pillars. Modelling for the longwalls impacts was undertaken by MSEC using the Incremental Profile Method (IPM) that Pells otherwise describes as "excellent". The Waratah Rivulet suffered dramatic and unpredicted impacts from subsidence of approximately 1.3 metres and upsidence of approximately 150 mm.

The difficulties and risks in predicting single seam mining are compounded in attempting to predict subsidence from multi-seam mining.

Seedsman admit that SDPS is inferior to IPM and its clear **SDPS does not provide a sound basis for the assessment of subsidence risk and impacts from multiple seam mining**. As Seedsman readily admit, the use of four variables and one constant in the commercial software package SDPS is unable to reliably predict subsidence above three mined seams.

Further underscoring the uncertainty of subsidence prediction, the PAC observes in its 2009 report on the Metropolitan Coal Project proposal that "*strains are not necessarily uniformly distributed in accordance with theoretical predictions. For example, a predicted tensile strain of 1mm/m may eventuate in the field as a 5mm wide crack every 5m, or a 10mm wide crack every 10m*."

Prior to the extraction of longwall 4 (LW4), Seedsman predicted maximum vertical subsidence of 0.9 +/- 0.1 metres, this being concentrated in a small region on the centre of the longwall's surface footprint (see Fig. 1). The subsidence measured above LW4 in June 2012, when the longwall was still in progress, was 1.1 metre; in October, a month after completion, it was 1.38 metres. Subsidence over LW4 will continue as subsequent longwalls progress. That is, **the extent of the subsidence over longwall 4 is not yet known**. **Based on the October 2012 figures, the Seedsman's modelling has underestimated the subsidence of this individual longwall by 0.48 metres, or 34.8%.**

Before the LW4 extraction, Seedsman's modelling predicted subsidence of 1.1 metres for LW5 and 1.2 metres overall for Area 2. **The subsidence over LW4 has already exceeded the maximum Seedsman predicted for all of Area 2**.

The longwalls 4 layout was curtailed to prevent impacts to Mt Ousley Rd. **Nonetheless longwall 4 did cause cracking on Mt Ousley Rd, even though it was some 300 metres away and outside the 35 degree angle of draw boundary**. Though the cracking was minor, this further demonstrates the uncertainty of subsidence prediction and the uncertainty of triple seam mining.

In a July 2012 Seedsman reported a revision of the predicted maximum subsidence for LW4 to 1.2 metres, with parameters adjusted in accordance with the observed subsidence to October 2012. This revision was made publically available as part of the EA documentation for the current project proposal and is used to provide new 'visualisations' of the SPDS modelling for remaining longwalls in the Wongawilli East domain.

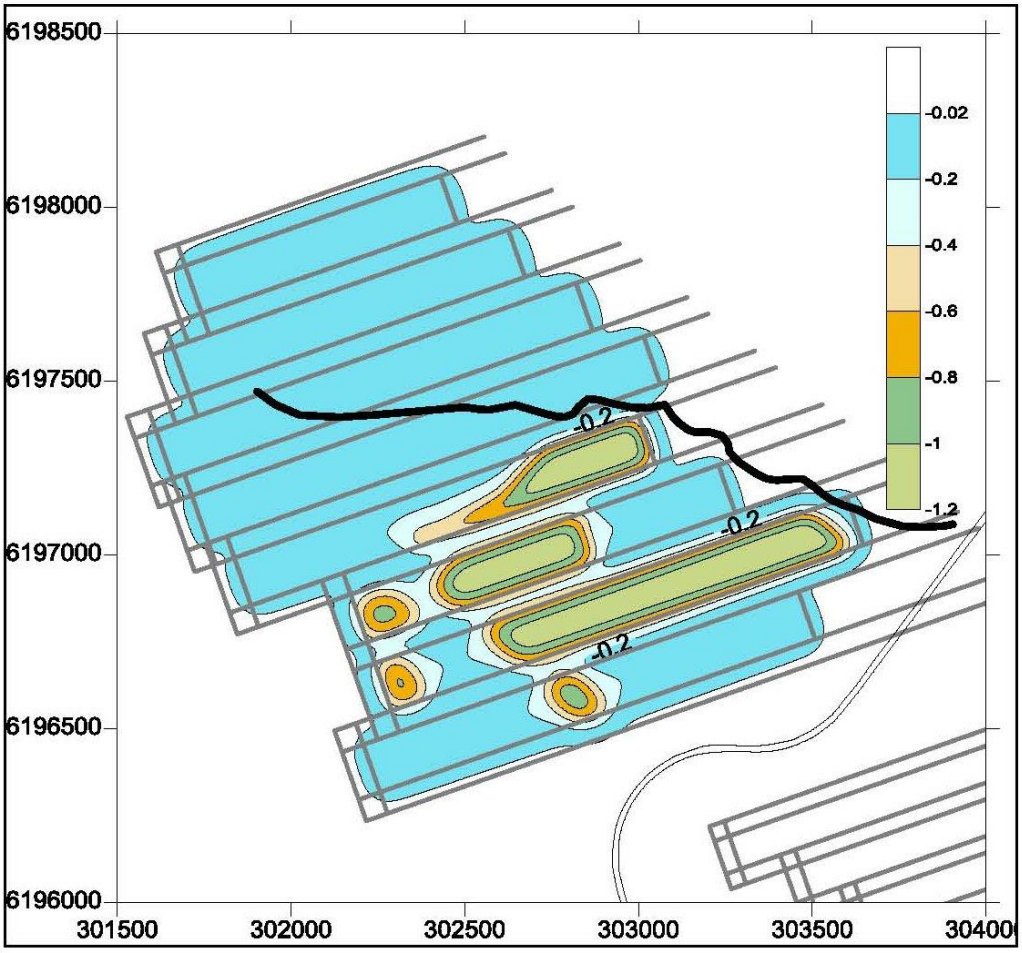

Figure 1. Seedsman pre-longwall 4 predictions for subsidence in Area 2. Taken from Appendix A of the EA for the 2012 modification proposal for the Preliminary Works Project. Subsidence over longwall 4 was predicted to be 0.9 +/-1 0.1 metres. As of October 2012, subsidence was 1.38 metres, in addition to that of the seams above, and will likely increase.

Longwalls that follow the first of a series behave differently to the first and will reactivate the subsidence of preceding longwalls. **There is no reason to assume that the post-LW4 revised SPDS modelling will be any more accurate than the pre-mining modelling for LW4 in predicting the extent of vertical subsidence arising from the new longwalls.**

Likewise there is no reason to conclude that that the extent of subsidence with increasing distance from the longwall can be reliably modelled by SPDS, with or without the data from LW4. That is, **SPDS cannot be assumed to reliably predict the lateral extent of the subsidence footprint defined by a 20mm vertical subsidence contour**. Further, the assumption that the footprint of subsequent longwalls will match that of LW4 is not justified.

RECOMMENDATION 2: Given the uncertainty and the consequences, and consideration of the Precautionary Principle, the 20mm subsidence impact zone must be assumed to be no closer than defined by the 35 degree angle of draw boundary accepted for the Southern Coalfields.

The subsidence impact zone for the proposed longwalls would then be as follows:

- **Area 1** comprises three, 105m wide panels with 40m wide pillars with a depth of cover to the Wongawilli seam of approximately 237m to 255m. The 35 degree angle of draw defined subsidence impact zone on the surface would extend up to **180 metres** from the longwalls.

- **Area 2** comprises eight panels 145 to 150m wide with 60m wide pillars with a depth of cover to the Wongawilli seam of approximately 267m to 320m. The 35 degree angle of draw defined subsidence impact zone on the surface would extend up to **220 metres** from the longwalls.

- **Area 3** comprises five panels with panels 390m wide and separated by 65m and depth of cover to the Wongawilli Seam ranges from approximately 455m to 510m. The 35 degree angle of draw defined subsidence impact zone on the surface would extend up to **360 metres** from the longwalls.

- **Area 4** comprises two panels each 155m wide with 65m pillars with depth of cover to the Wongawilli seam ranges from approximately 460 to 495m. The 35 degree angle of draw defined subsidence impact zone on the surface would extend up to **350 metres** from the longwalls.

Seedsman have revised their modelling for Area 2 to better reflect the observed LW4 subsidence. It is however inappropriate to model the subsidence of a series of longwalls on the basis of the behaviour of the first of that series. That is, **there are no grounds for confidence in revised modelling based on LW4.**

The current cumulative subsidence above LW4 reaches up to 3.7 metres, comprised of about 1m from mining the Bulli Seam, 1.4m from mining in the Balgownie Seam and 1.3m from mining in the Wongawilli Seam. The total subsidence in Area 3 may exceed 4m.

Currently it would appear that only 2D monitoring is being undertaken by Gujarat. A commitment to 3D monitoring to assess far field impacts is needed.

The EA misleadingly suggests the subsidence methodology has been peer reviewed, with statements such as "*the subsidence prediction methodology has been peer reviewed by MSEC and SCT*". This is an indirect reference to meetings of mining company consultants to agree on their judgement of likely subsidence impact risks. Notwithstanding the PAC's caution with respect to peer reviews, this does in constitute a peer review of subsidence prediction methodology as envisaged by the Southern Coalfields Inquiry. The closest the EA gets to assessing the subsidence methodology is the admission that SDPS is inadequate.

The Height of the 'Free Draining' Collapsed Zone

Seedsman's subsidence modelling does not assess the likely height of the 'free-draining' collapsed-zone (caved zone and fractured zone) above the mined seams. There is a brief discussion in GeoTerra's ground water impact modelling report for Gujarat (Annex P), which states "*In the model, it was assumed that the hydraulic conductivity after extraction of the proposed longwalls could enable free drainage within the goaf, with vertical connective fracturing to the mid / Upper Bulgo Sandstone*" **This assumption is made irrespective of the longwall width.**

Appendix C of the 2008 Southern Coalfields Inquiry (SCI) report.[1] discusses the height of the 'free-draining' collapsed-zone (caved zone and fractured zone) above mined coal seams. The discussion refers to detailed investigations by Byrnes into groundwater hydrology undertaken by South Bulli Colliery (now NRE No. 1) for longwall mining under Cataract Reservoir in the mid to late 1990s.[1] Byrnes identified an upper bound in concluding that the collapsed-zone did not extend beyond 1.7 times the panel width.

The SCI report notes that MSEC (2007) undertook a review of literature regarding the likely heights of the caved, fractured and constrained zones and found that:

- generally, the height of the caved zone has been indicated to fall within the range of 1.5 to 14 times the extraction height, with the majority of cases in the range of 5 to 10 times the extraction height;
- the height of the fractured zone has been reported to lie within the range of 10 to 105 times the extracted height; and
- the height to the base of the constrained zone has also been reported in terms of extraction width and found to vary between 0.16 and 1.4 times this width.

As consultants to BHP-Billiton (BHP-B) for the 2010 Bulli Seam Operations (BSO) project proposal, MSEC state "*The height that mining related fractures may form has been established from monitoring and computational studies as being 1 – 1.5 times the panel width. However, the creation of these fractures alone does not necessarily imply that a direct hydraulic connection exists over this zone".* **A direct connection however, isn't the necessary requirement for a significant increase in vertical water flow; vertical flow will increase the further disconnected fracturing extends towards the surface.**

The 2010 BSO project proposed 310 metre wide longwalls for BHP-B's Appin-West Cliff mine. In assessing the MSEC modelling, the PAC Panel concludes:

- *When the MSEC model is applied to conditions similar to the calibration data, it could produce reasonable predictions of the height of fracturing even though it has mechanistic shortcomings for that purpose, with the maximum height being 1.37 times panel width;*
- *Based on other studies including Gale (2008), a potentially worst case outcome appears to be fracturing extending up to a height of 1.5 times panel width but with increasing disconnection of fracturing;*

- *It is unlikely that the highly connected and freely drainable fractured zone will extend upwards into and beyond the Bald Hill Claystone for longwall panel widths up to 310 m. This is suggested by a range of field measurements and observations, the most recent being extensometer measurements conducted over LW32 (310 m width) at West Cliff Area 541 where more than 90% of fracture displacements seem to have occurred at or below the claystone;*

With respect to the last point, the average depth of cover for the domains of the BSO project ranged from 400 m to 600 m, so the Bald Hill Claystone layer would in general have been just beyond the fracture 'horizon' expected at 1 to 1.5 times the panel width. The Panel comments "*In the opinion of the Panel there is substantial uncertainty about the magnitude of the subsidence-related impacts, particularly in areas where the depth of cover is approaching the predicted height of fracturing (i.e. 385 m) for 310 m longwalls*." That is, **the predicted height of fracturing is 1.25 times the panel width**.

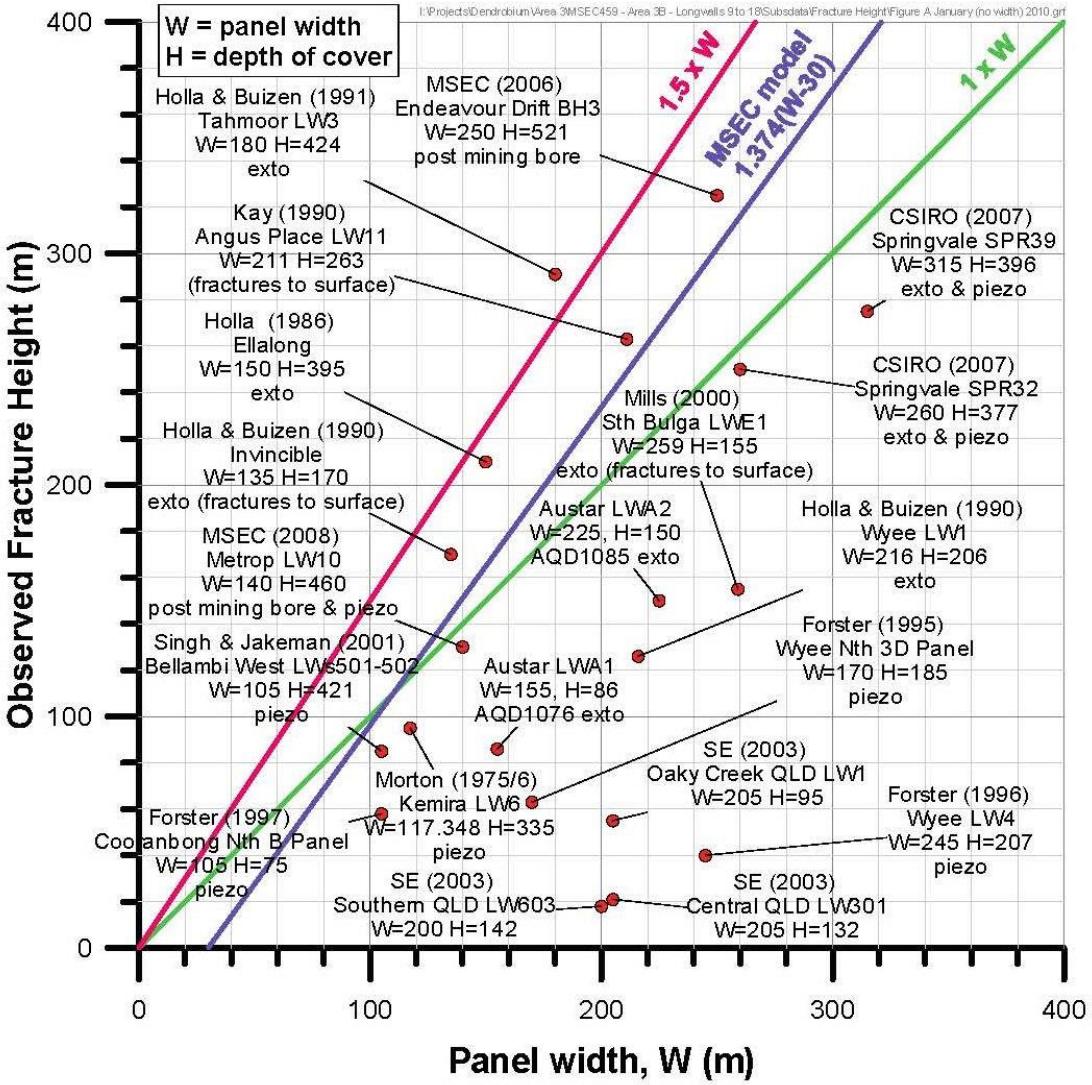

Figure 2. MSEC[2] depiction of fracture zone height with respect to panel width from Attachment A to the BHP-Billiton Dendrobium Area 3B SMP documentation.

The expectation is then that, depending on the local geology, **the collapsed zone may extend between 1 to 1.5 times the longwall panel width**. MSEC reaffirm this assessment in their 2012

subsidence prediction report for BHP-B's Subsidence Management Plan for Dendrobium Area 3B (see Fig. 2). This is also reflected in Coffey Geotechnic's groundwater modelling for BHP-B's Subsidence Management Plan for Dendrobium Area 3B (e.g. Figs. 3 and 4). Both MSEC[2] and Coffey[3] indicate that in some locations the collapsed zone above the 310 metre wide longwalls will reach into the Bald Hill Claystone and may extend to the surface. MSEC conservatively comment "*The depth of cover directly above the proposed longwalls varies between 310 metres and 450 metres and, therefore, it is possible that the fractured zone could extend up to the surface, where the depths of cover are the shallowest*."

GeoTerra indicate the 501 to 509 panels in the Wonga West domain were 110 metres wide and that interconnected fracturing extended to 153 metres, with increased permeability extending into the middle Bulgo of the Bulgo sandstone as a result of delamination. These narrow longwalls also lowered the Hawkesbury Sandstone water level by some 10 to 15 metres. GeoTerra report that a piezometer (P5) installed in the Bulgo Sandstone, 226 metres below the surface, showed a drop of 15 to 20 metres following the passage of the longwall below. The piezometer shows a response to rain that GeoTerra explain as a response to "*recharge and infiltration into the cracked overburden*". That is, **the response is consistent with increased permeability reaching the surface as a result of subsidence**.

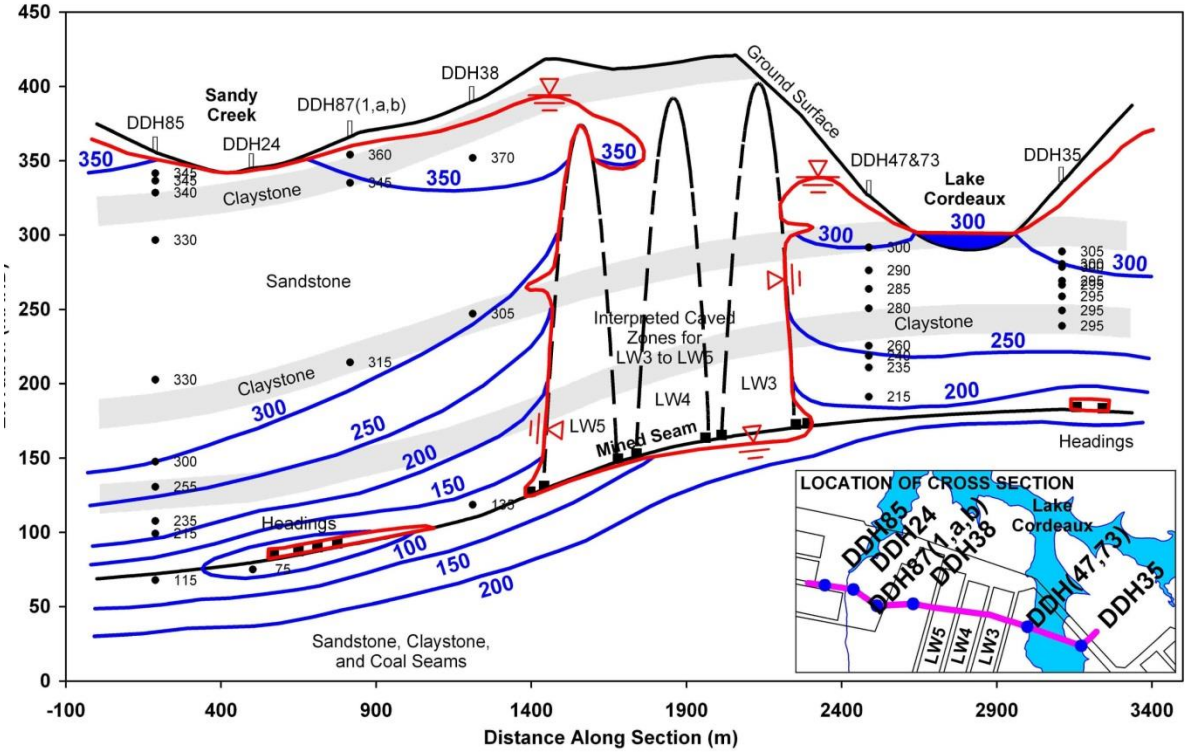

Figure 3. Coffey depiction of collapsed zone above Dendrobium Longwalls 3, 4 and 5; from Attachment C to the BHP-Billiton Dendrobium Area 3B SMP documentation.[3]

GeoTerra also report that 80 to 86 metre longwalls with 67 metre pillars in the Bulli seam in Wonga West caused a pronounced response in the lower Bulgo Sandstone and a slower response in the upper Bulgo Sandstone and Bald Hill Claystone. That is, longwalls less than 100 metres wide may still effect near surface aquifers.

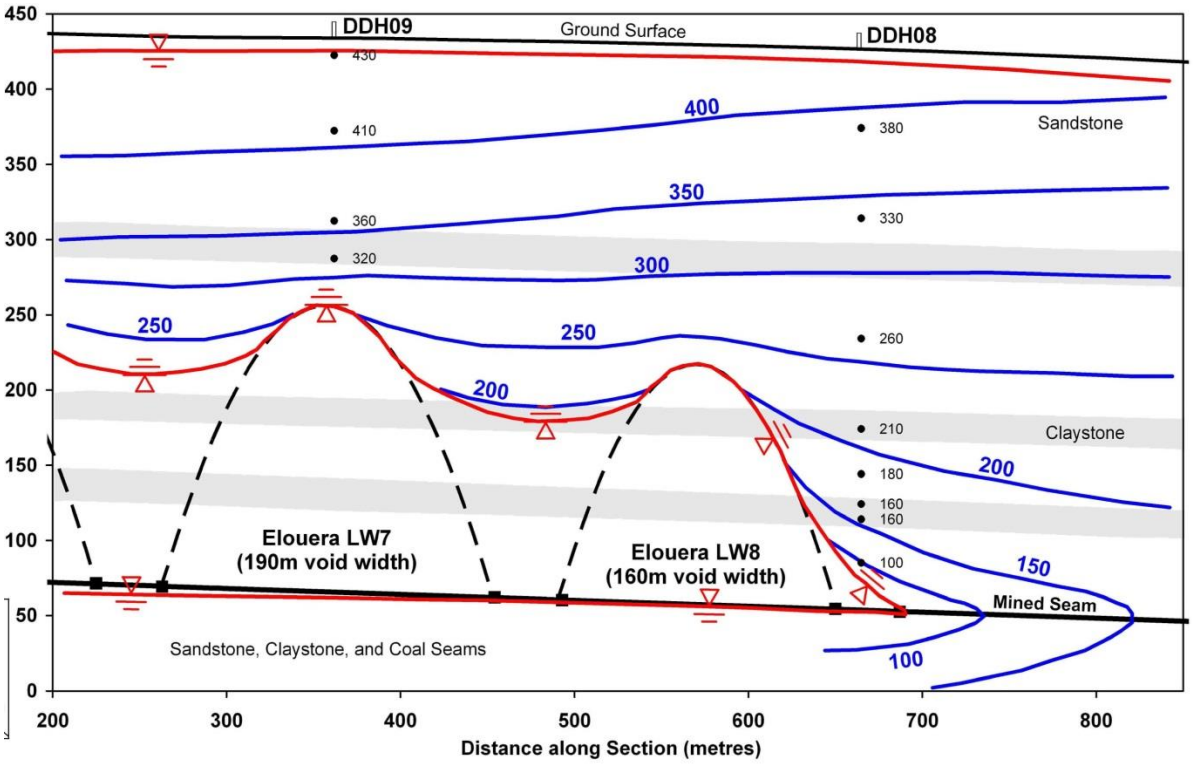

Figure 4. Coffey depiction of collapsed zone above Elouera Longwalls 7 and 8; from Attachment C to the BHP-Billiton Dendrobium Area 3B SMP documentation.[3]

The proposed 390 metre longwalls may reasonably be expected to have a collapsed-zone of 390 to 585 metres above the mined seam, where the depth of cover ranges from 455m to 510m. Even if the collapsed-zone extends no further than the Bald Hill Claystone, this has significant implications for groundwater flows and water loss from the local area catchment.

A continuously connected fracture network is not a necessary condition for a significant increase in vertical water flow. The higher the 'disconnected' fracture zone rises, the greater the overall permeability of the subsurface strata.

The piezometer data for the Wong East domain, given by GeoTerra in Annex P, suggests fracture penetration into the Hawkesbury sandstone from past mining.

The monitoring data reported by GeoTerra point to the prudence of the Reynolds recommendation that panel widths should not exceed one third of the cover depth and pillar widths should not be less than one fifth of the cover depth. The Reynolds recommendations are often described by mining companies as conservative, however it's important to note that they were made in the context of bord and pillar and partial pillar operations.[4]

RECOMMENDATION 3: Given the sensitivity of the Special Areas single seam longwall and pillar widths should be within the limits of the Reynolds recommendations. Multi-seam layouts should be more conservative.

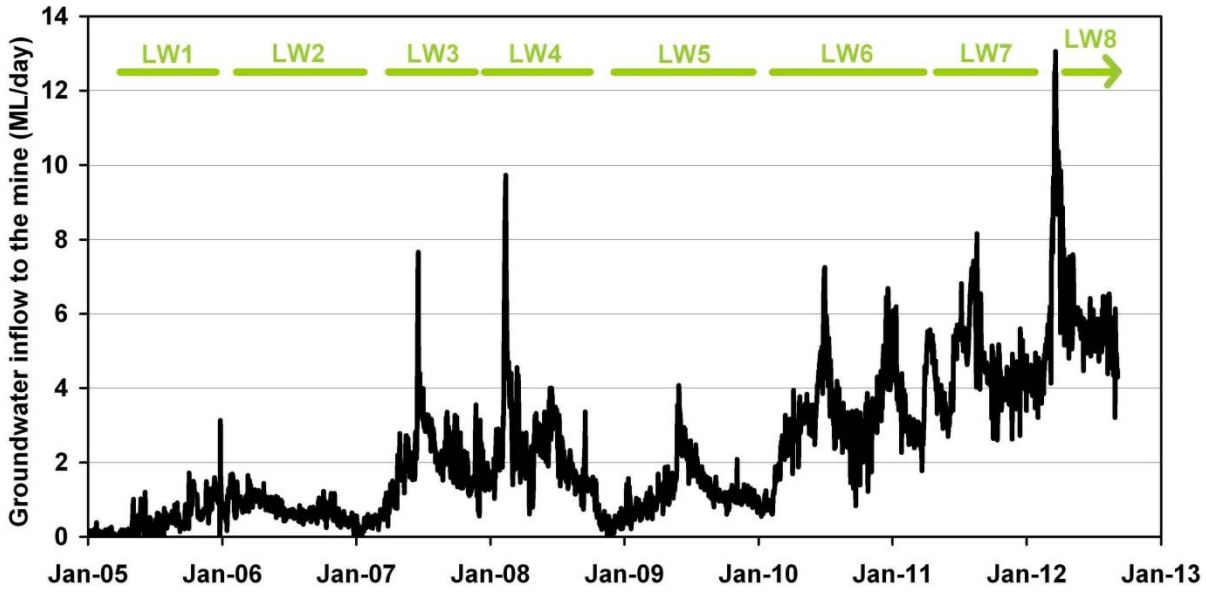

Figure 5. Record of water inflow to the Dendrobium Mine to June 2012 (from Attachment C of the Dendrobium Area 3B SMP documentation).

Of relevance, the Dendrobium mine has a history of high water inflows (Figure 5), with notably large inflows into Area 2 in June 2007 (peaking at 7.5 Ml/day) and February 2008 (peaking at 9.5 ML/day), and into Area 3A in June 2010 (7.2 ML/day) and December 2010 (6.7 ML/day).[5] **A particularly large inflow event occurred in Area 3A in 2012, peaking at 13 ML/day and this would appear to be associated with the 305 metre wide longwall 8**.

Spanning Capacity of the Bulgo Sandstone

Seedsman notes that the Bulgo Sandstone is known to be a spanning unit over Bulli Seam longwall panels with widths of at least 200m to 250m. Seedsman does not however assess the capacity of the overburden to span 390 metre longwalls. **Failure of the overburden would bring the collapsed-zone to the surface.**

Given the uncertainty and the significance of the consequences, the Precautionary Principle advises that the impact assessment must assume that the overburden will not be able to span a 390 metre wide longwall void.

RECOMMENDATION 4: Given the uncertainty and the consequences, 390 metre longwalls must not be permitted in the Special Areas. Prudence dictates that the longwalls should be no wider than recommended by the Reynolds Inquiry.

In their response on behalf of Gujarat to subsidence related comments on Gujarat's 2012 Preliminary Works Modification (MP 10_0046) application, SCT Operations discuss the subsidence over LW4 and conclude that

> "*the initial Bulli Seam mining and the subsequent Balgownie Seam mining have reduced the bridging characteristics of the overburden strata*".[6]

That is, the subsidence data for longwall 4 in Area 2 of the NRE1 mine suggests the bridging capacity of the overburden has been compromised by the mining in the seams above the Wongawilli seam. Perhaps this is not surprising, with approximately 2.5, 1.2 and 3 metres of coal having been removed from the Bulli, Balgownie and Wongawilli seams respectively **- a total extraction height of some 6.7 metres.** If there were sufficient cover, the fractured zone might extend 700 metres above the longwall.

Implications of Reduced Bridging Capacity of the Overburden

In commenting on the subsidence airing from LW4, SCT state[6]:

> "*A characteristic of the reduced bridging capacity of the overburden strata and the increased subsidence that is observed above multi-seam mining operations such as Longwall 4 is increased disturbance of the subsided overburden strata and increased potential for overall increased hydraulic conductivity between the surface and the mining horizons. Such increased hydraulic conductivity is not necessary a significant issue if the main source of recharge is rainfall because, in general, only a very small percentage of total rainfall is lost into mining induced fractures in a typical bushland environment.*
>
> *However, this increased vertical hydraulic conductivity may be an issue if the recharge source is a reservoir, a major creek or river, or a swamp whose flora and fauna are sensitive to the natural balance between inflow from rainfall or surface runoff and losses to the bedrock so that longer term storage of water within the swamp is affected*."

The validity of the assumption that the redirection of rainfall runoff into cracks will be comparatively minor depends on the extent of fracturing from the mine to the surface. Seedsman suggest that the subsidence over LW4 is "*more related to vertical block collapse than to simple bending of the overburden*". **That is, the overburden has effectively failed**; **failure of the overburden across Area 2 could result in significant runoff, stream and swamp losses.**

The Bald Hill Claystone

Consultants to companies mining in the Southern Coalfield invariably invoke the Bald Hill Claystone (BHC) as an aquitard, or even aquiclude, that prevents loss of surface waters - either towards the mine or into the broader regional groundwater system. For instance, SCT state: "*The Bald Hill Claystone is recognised and accepted to have relatively low matrix permeability compared to other stratigraphic units because of its fine grained nature*." GeoTerra state in Annex P that following subsidence the "*Bald Hill Claystone is interpreted to maintain its semi confining status*".

Yet GeoTerra also sate in the same report (Annex P) that:

> "*As shown in Table 6, the average packer test hydraulic conductivity of the Hawkesbury Sandstone varies from 0.0131m/day in the upper section to 0.0003m/day in the mid section and 0.0008m/day in the lower horizon. The Bald Hill Claystone averages 0.0298m/day whilst the upper Bulgo Sandstone averages 0.0066m/day and the mid Bulgo Sandstone averages 0.0004m/day*."

Clearly the BHC does not act as an aquitard, relative to the adjacent strata - its average hydraulic conductivity is in fact higher than that of the Hawkesbury Sandstone above and the Bulgo Sandstone below. According to GeoTerra's Table 6, the BHC conductivity ranges from 0.00005 to 0.12960 m/day, while the Hawkesbury Sandstone ranges from 0.000079 to 0.05875 m/day and the Bulgo Sandstone from 0.00002 to 0.04061 m/day.

These overlapping ranges are consistent with data published by Pells in 2012[7]. Pells provides an insightful account of the origins of the myth of the Bald Hill Claystone aquiclude/aquitard and further observes that, as the tabulated conductivities suggest, the historical notion of confined aquifers is a simplistic convenience not matched by the reality of a continuum of varying conductivities. Pells advises that the Bald Hill Claystone contains as many as eight soil profiles, is fissured and jointed, and is transgressed in places by faults and igneous intrusions. It is not safe to assume the Bald Hill Claystone insulates surface waters from dewatering impacts. Senior technical staff at the Metropolitan Colliery comment that the BHC above the mine is coarse in character and would not act as a significant aquitard.

The evidence advises that the Bald Hill Claystone provides no more resistance to vertical water flow than adjacent strata.

Protecting the Swamps

It is commendable that the proponents state

> "*NRE has provided an undertaking that the mining operations will be modified as required through adaptive management measures informed through monitoring of actual subsidence impacts, to reduce negative outcomes. An adaptive management plan will be developed to use the monitoring program to detect the need for adjustment to the mining operations so that the*

subsidence predictions are not exceeded and subsidence impacts creating a risk of negative environmental consequences do not occur in upland swamps."

However, in contributing to Gujarat's response to submissions on the 2012 proposal to add longwalls 4 and 5 and gate-roads 6,7 and 8 to the NRE1 Preliminary Works Project, consultants SCT state[6]:

"*It should be recognised that any impacts to swamps are unlikely to become apparent until well after mining is complete and well after there is any capacity for the mine to make any significant change to the mining process.* ***The concept of a Trigger Action Response Plan (TARP) as a method of protecting swamps is not credible*** *because many of the impacts are likely to be long term and difficult to detect without extended monitoring*." Bold text emphasis added here.

This statement is consistent with the 2010 PAC Panel report for the BSO proposal and with the long standing position of the OEH (formerly DECC/DECWW). For instance, the BSO PAC Panel observes " *information has been emerging to suggest that a number of upland swamps in the Southern Coalfield are being impacted by subsidence-induced changes to hydrology.*"

While Gujarat make a commitment to an effective adaptive management programme, they provide only general indications of its character - no details are provided. NRE state

"*Recommendations provided by Biosis (2012a) in their assessment of upland swamps will be considered in development of the adaptive management plan and future mining plans*."

The lack of details precludes any judgement of viability. **It would be highly irresponsible to approve the current proposal in the absence of the necessary detail.** There is no reason such detail could not be provided as part of the EA documentation; the provision of such information should be an EA requirement.

Gujarat evidently accept the advice of the OEH in stating "*Drawdown of water levels is one of the first parameters that can be detected following the fracture of rock strata (OEH 2012). Negative environmental outcomes have occurred if there is a statistically significant decrease in water levels within the swamp that is directly attributable to subsidence.*" This observation would not however provide a basis for a TARP that was both effective and affordable in preventing negative environmental outcomes.

It would take several weeks, perhaps months, to establish and reach agreement that a logged decrease in water levels was statistically significant and directly attributable to subsidence. Mining companies are very reluctant to concede that piezometer changes are anything other than weather related and/or temporary**. <u>By the time there is agreement, with the longwall progressing in the interim, the impacted swamp will have suffered further harm.</u>**

SCT correctly advise "*a high level of protection is provided if the swamps are not directly mined under. Higher protection is provided with increased distance between the swamp and the edge of the nearest longwall panel.*"

RECOMMENDATION 6: The subsidence impact zone must not be allowed within reach of a swamp identified as being of special significance and accordingly required to be protected from negative environmental consequences. The subsidence impact zone should not be allowed within reach of any swamp.

In effect, the current proposal offers no realistic protection for the swamps. **The EA states the following with respect to swamps of special significance:**

> "*Commitments to ongoing monitoring and the preparation and implementation of adaptive management measures for these swamps have been made to reduce as far as economically viable the impacts on these swamps*." Emphasis added here.

Clearly this is not in accord with the expectations of the BSO PAC Panel, SCA and the OEH - and is not acceptable to the concerned community. **The swamps are too important to sacrifice to coal**.

The EA provides no insight into the adaptive management strategy that NRE assure will protect the swamps. Some insight is however provided by the Subsidence Management Plan (SMP) for LW5 in Area 2.

Gujarat's Subsidence Management Plan (SMP) level 3, or 'red-alert', TARP swamp hydrology trigger for LW5 is as follows; "*Piezometer becomes, or stays, dry where it has not done so previously*"; and the response is

(i) Immediately inform:
- *DRE Director Environmental Sustainability and Land Use;*
- *Principal Subsidence Engineer – DRE*

(ii) Within 1 week of trigger exceedance being noted instigate investigation including:
- *Engaging a hydrogeologist to investigate and report on the cause of trigger exceedances where the cause may not be directly related to lack of rainfall recharge;*
- *Investigation of possible mitigation measures in consultation with SCA / NOW*
- *Prepare and implement a site mitigation/action plan in consultation with SCA / NOW if necessary*

(iii) Within 1 week of investigation provide investigation results to:
- *SCA*
- *DP & I*
- *OEH; and*
- *DRE*

(iv) Report in End of Panel Report, AEMR & Annual Review as required.

The level 3 trigger does not warn that unacceptable changes in hydrology have begun - it advises that serious damage has already been inflicted. A piezometer falling to 'dryness' signals cracking in the base of the swamp - an impact likely detectable by visual inspection. An example of a piezometer that "*becomes, or stays, dry where it has not done so previously*" is located in

Swamp 1 over longwall 5 of BHP-Billiton's Dendrobium Mine. Figure 6 shows the piezometer trace and Figure 7 and 8 show the associated swamp damage.

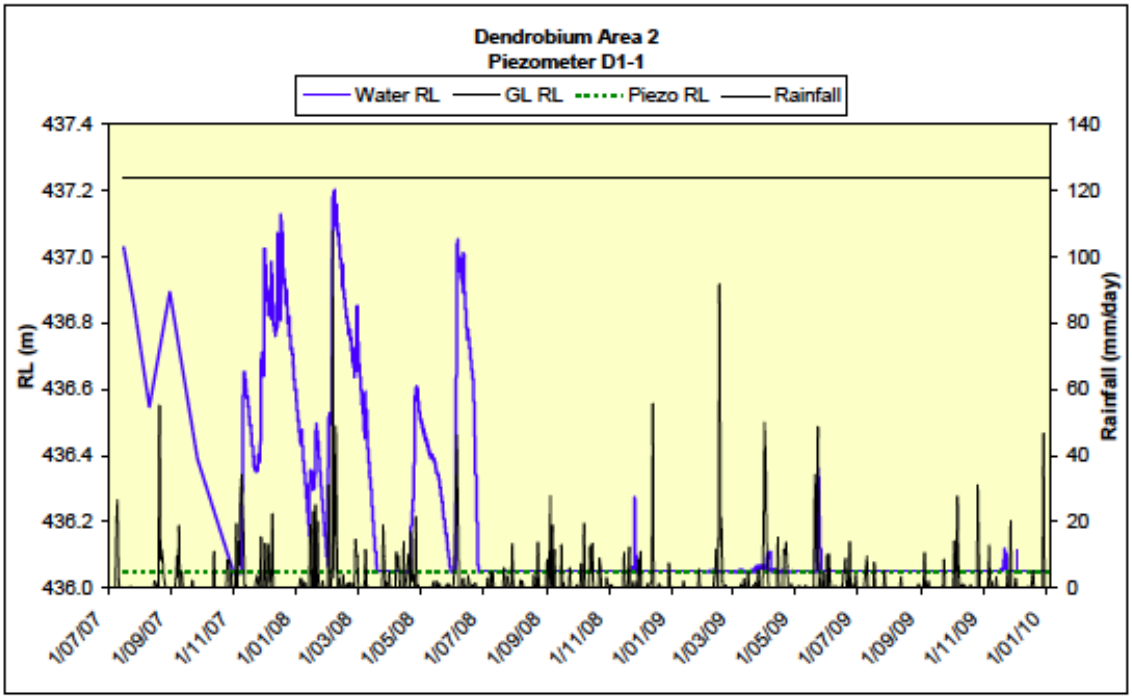

Figure 6. Shallow groundwater piezometer (blue line) readings before during and after mining of longwall 5 in Dendrobium Area 2. The piezometer stops responding to rain as a result of mining, with the water level dropping**.**

There is a **very significant difference** between the level 3 hydrology trigger for LW5 and the determination that a negative environmental outcome has occurred when *there is a significant decrease in water levels within the swamp that is directly attributable to subsidence*." The LW5 level 3 trigger does not, in any sense, provide a warning that would allow a timely response that would prevent negative outcomes. **That is, the LW5 trigger is inadequate.**

As noted above, a more sensitive trigger based on detecting a "*statistically significant decrease in water levels within the swamp that is directly attributable to subsidence*" would also fail to protect the swamp from negative outcomes. Determining that the cause is "*directly attributable to subsidence*" or "*directly related to lack of rainfall recharge*" would take time and may take much more time to be agreed by all of the stakeholders. **Mining companies are very reluctant to accept that subsidence damage is the cause of falling piezometer levels**.

Preparing and implementing mitigation measures in accord with the TARP response will take more time. It's not then hard to envisage that it would take at least two weeks before a response plan is agreed and put into action - and all the while the longwall will be steadily progressing and compounding the harm that has already been detected. Of significance, there is no commitment to halt the longwall machine. **The LW5 response is ineffective.**

Figure 7. Cracked swamp sediment (left) and bedrock (right) in Dendrobium Area 2

Figure 8. Desiccated swamp vegetation in Dendrobium Area 2

While the LW5 TARP is inconsistent with the need to ensure no more than negligible harm, it is consistent with Gujarat's otherwise vague commitment to develop and implement adaptive management measures for swamps of special significance:

> "*Commitments to ongoing monitoring and the preparation and implementation of adaptive management measures for these swamps have been made to reduce as far as economically viable the impacts on these swamps*."

That is, the LW5 SMP will not hinder operations or otherwise impact on the projects economic viability.

While the attempt to identify of swamps of special significance at risk of negative environmental consequences is commendable, the assignment of risk level by Biosis is inadequately justified,

puzzling and, given the accumulating evidence, optimistic. For instance the risk level is ascribed as low for CCUS4, CCUS10 and LCUS8, yet **the criteria set by the BSO PAC Panel are significantly exceeded for these swamps.** The exceedance is greater for CCUS4 than CCUS1, yet CCUS4 is assessed as being at moderate risk while CCUS1 is determined to be at significant risk. The puzzling assessment may reflect an over-emphasis on the modelled flow accumulation changes relative to the consequences of subsurface hydrology changes (fracturing, strata permeability changes).

Further, **it's not clear if the subsidence tilts being used by Biosis to assess modelled flow accumulation changes are accumulated tilts (proposed and past mining) or the tilts predicted by Seedsman for the current proposal.**

In commenting on the risk to all of the swamp in the project area, GeoTerra state**:**

> *Subsidence could affect shallow swamp aquifer water levels due to increased secondary porosity and / or underlying strata fracture permeability through the development of subsidence cracks over the proposed workings. If cracking occurs, the change to swamp water level variability through subsidence depressurisation is not anticipated to be greater than the current variability resulting from climatic influences.*
>
> *Hydraulically connected vertical cracking to the deeper strata is not predicted due to maintenance of the Bald Hill Claystone semi confining layer and the presence of a "constrained" vertical flow zone in the upper Bulgo Sandstone, therefore the swamps and creeks are not predicted to lose water by free drainage into the proposed workings.*

The blanket assumption that cracking will not result in water level variability above climatic influences is at best optimistic. The experience at Dendrobium and Metropolitan mines suggests the assumption is unrealistic.

As discussed above, GeoTerra's data and that of Pells and others show that the Bald Hill Claystone is no more confining than the adjacent strata. **Diverted water will be able to join deeper regional flows via fractures, joints and increased bed-separation**. Water may then be lost from the local catchment, whether or not some reaches the mine.

.

Approving mining beneath swamps amounts to a determination that they are not worth protecting, relative to the perceived value of the coal beneath. It trivialises the recognition of the swamps as Endangered Ecological Communities and their pending recognition under the EPBC Act.

Approving longwall mining under swamps, with or without assurances of adaptive management, places a higher value on the coal beneath than on the environmental and water catchment significance of the swamps - without attempting to objectively quantify the value of the swamps, now and into the future, to the communities of Greater Sydney, the Illawarra and Southern Higjlands.

Harming the Swamps

The EA relays mixed messages about the impact of coal mining on swamps, on the one had evidently accepting the perspective of the OEH, while on the other equivocating about the impact of mining.

Biosis comment (Annex Q):

> "*Although hypothesised to be a contributing factor, subsidence has not been determined to be a sole reason for any observed impacts to upland swamps; however subsidence effects are believed to be a contributing factor*."

Though implicit in their carefully worded summary, what Biosis don't explicitly state is that the **cracking and draining of a swamp alone, in the absence of other factors, may reasonably be expected to be capable of resulting in change of species composition and distribution, desiccation, erosion and, through any of these impacts, the loss of the swamp**. Fire or the onset of drought would accelerate that demise - or might ensure that mining damage that might otherwise have been tolerated, becomes terminal. The converse is of course also true. **We have no control (other than reducing greenhouse gas emissions) over fire and drought, but we can protect the swamps from mining impacts**.

Biosis strain credibility in their equivocating account (Annex Q) of Swamp 1 above the Dendrobium workings:

> "*At Swamp 1 in Dendrobium Area 2 a reduction if groundwater levels in piezometers located in proximity to Swamp 1 coincides with observations of surface fracturing within this upland swamp (Biosis 2011). Despite these observable subsidence effects, no erosion of Swamp 1 has been observed. Changes in flora species composition within Swamp 1 appears to be changing at a faster rate than control swamps, with species richness and diversity declining since this area was undermined (Biosis 2012). However, this decline in species richness and diversity is to be expected following fire, with obligate seeding shrubs out-competing other species and curtailing their growth (Keith et al. 2006*)."

Sidestepping the significant observation that compositional change in Swamp 1 is occurring at an unusually rapid rate, Biosis imply that the large bushfires that occurred across the area at the end of 2001 are primarily responsible for the compositional and biodiversity changes. Both fire and mining will likely have contributed to the demise of Swamp 1. Given the sharp collapse of the water level and the nature of the cracking, mining impacts would seem most likely to have been the key driver of change. This judgement would be consistent with the observation that "*species composition within Swamp 1 appears to be changing at a faster rate than control swamps*". **The swamps of the Woronora Plateau have suffered and recovered from repeated fire events for thousands of years; mining is a recent imposition that can deprive them of water for decades** - until the abandoned mine below fills.

Biosis state that they have "*identified through literature review of locations beyond the Study Area boundaries, that impacts to a very small number of upland swamps, located above mining areas, have been observed*." Biosis conclude "*To date there is little evidence as to whether this drying of upland swamps results in changes to the size of, or species composition within,*

upland swamps. Additional data is required to determine the impacts of reductions in groundwater on upland swamps."

Biosis implicitly suggest that mining under swamps be allowed to proceed until there is a sufficient accumulation of visible evidence of unacceptable harm to swamps. The OEH however recommends that negative environmental outcomes for all swamps need to be defined in terms of a statistically significant decrease in water levels within the swamp that is directly attributable to subsidence. This recommendation sensibly recognises that highly water dependent communities will be stressed by a decline in available water. The recommendation is a prudent response to limited evidence reflecting the absence of a long term, independent and comprehensive study of swamps.

The BSO PAC Panel notes two problems with concluding that a lack of evidence of visible impacts reflects minimal or no risk of harm; (i) *no long term robust scientific information showing before and after mining outcomes for swamps*; (ii) "*most of the swamps that have been undermined previously were undermined by either bord and pillar techniques or much narrower longwall panels*"

The Panel also comments "*This Panel and previous Panels[143] have sought examples of dessicated swamps that have not been undermined but none have been forthcoming to date. The limited monitoring data that is available is not adequate to preclude mining induced subsidence as the root cause of changes in the hydrology of at least some, if not all, of the swamps noted above. At this point in time, neither conventional nor unconventional subsidence effects, singly or in unison, can be eliminated as the source of changes in swamp hydrology.*"

That there have been no long term, robust, independent, peer reviewed studies to examine the relationship between longwall mining and swamp health and character does not justify an assumption that undermining may cause no more than incidental harm, if at all. On the contrary, **the scientific uncertainty, the importance of the swamps and the Precautionary Principle require the assumption that mining under swamps will cause more than negligible impacts** - as suggested by SCT Operations.

Prof. Pells points out in Annex N of the current EA, Sections 5 and 6 of the BSO PAC Panel's report provide a detailed and, currently, definitive account of the mechanisms and nature of subsidence impacts on swamps - which the PAC panel describes as fragile. Oddly, Biosis make no reference to the BSO account of swamp impact mechanisms. Under the heading 'Other Reports' Biosis provide a brief mention of some of the observed impacts discussed in the 2010 BSO report.

The visible evidence of harm may not be as sparse as Biosis and other consultants suggest. Seedsman state in Annex M that:

> *"Contiguous networks of intact upland swamps, including the Wollandoola Creek swamp cluster are present in both the Wongawilli East and Wongawilli West areas. The swamps were noted to be in good condition in the upper regions of Wollandoola Creek and Lizard Creek, and were observed to provide habitat for a number of threatened species listed under the TSC Act.* ***In some parts of the study area sections of swamps were observed to be very***

***dry, with evidence of scouring and erosion in some areas as a result of decreased water availability for reasons that were not determined*.”** Emphasis added here.

Unfortunately Seedsman don’t identify the swamps and their observations don’t seem to be reflected in the Biosis report provided as Annex Q. In considering mine impacts, it may be significant that Biosis report that the swamps in the Wonga West area are generally larger and more spatially continuous, whilst those in the Wonga East area are generally drier, shallower and less spatially continuous.

No explanation is offered, but GeoTerra observe in Annex P that “*The average hydraulic conductivity for the upper Hawkesbury Sandstone pump out tests (excluding NRE-E) is 0.023m/day. The elevated conductivity in NRE E of 2.07m/day could result from subsidence cracking of the surficial sandstone*”. **That is, the hydraulic conductivity of the Hawkesbury Sandstone in Wonga East is nearly two orders of magnitude greater than in Wonga West - apparently because of subsidence effects.**

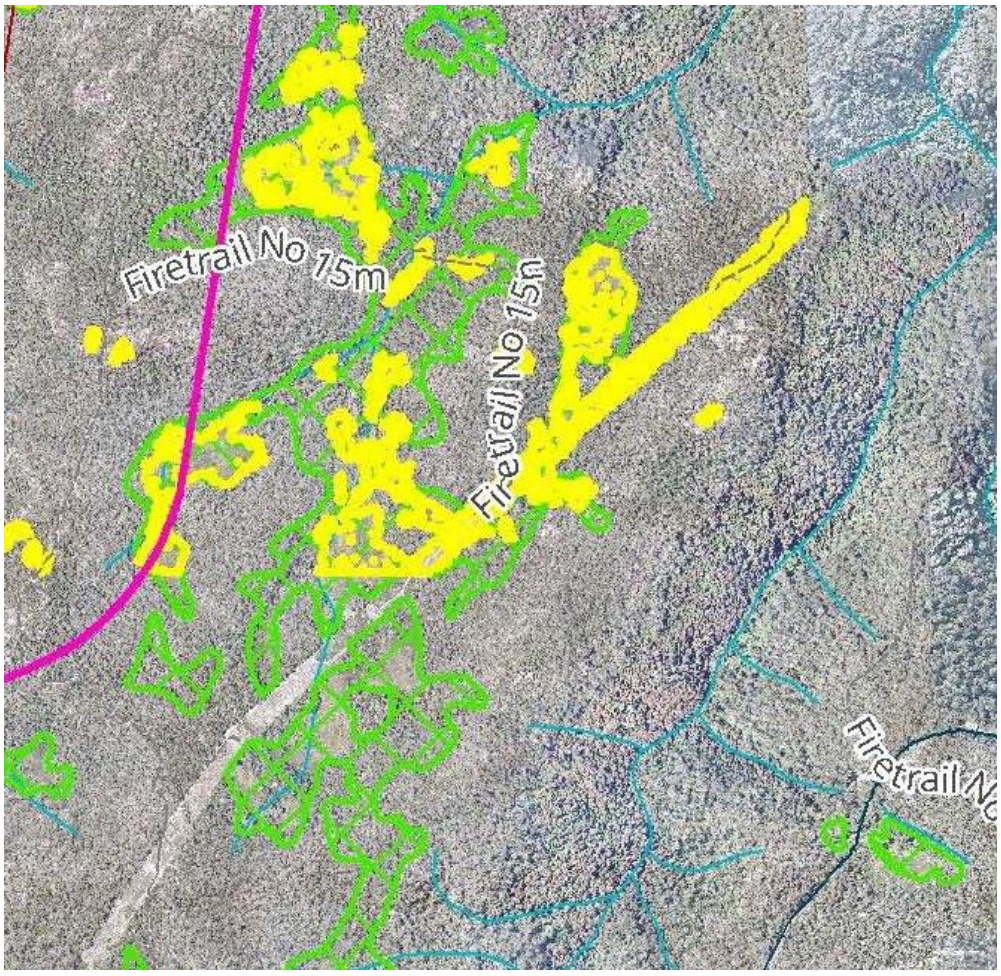

Figure 9. Swamp boundary differences as mapped by NPWS in 2003 (green) and Biosis (yellow) for Gujarat NRE in 2012. Elouera mine workings are below the swamps. The differences may reflect the different mapping techniques and climate effects, but may also reflect real boundary changes in response to the mine below.

A comparison of Table 4 and Table 5 in Annex Q shows that the area of the swamps in Wonga East as mapped by NPWS in 2003 is 68.04 ha, in contrast to 49.06 ha mapped by Biosis in 2012. This may reflect the different mapping techniques and climate effects, but may also **reflect real boundary changes in response to the mine below**. As Fig. 9 shows, there are significant boundary differences for the swamps over the Elouera workings.

The 2010 BSO PAC Panel report includes Swamp 1 in Dendrobium Area 2 as an example of an impacted swamp. More recently monitoring of twenty seven shallow piezometers located within Swamps 12, 15a, 15b and 16 has shown impacts to swamps 12, 15b and 16 in Dendrobium Area 3A as a result of the passage of Longwall 7 earlier this year. The end-of-longwall report conservatively concludes "*Based on the available data obtained from the piezometers and nearby rainfall stations, it appears that shallow groundwaters in Dendrobium Area 3A, particularly those associated with Swamp 15b in sub-catchment (of Sandy Creek) SC10C have been impacted by subsidence resulting from the mining of Longwall 7*." In its submissions on the BSO proposal the then DECCW identified Dendrobium Area 3A as a reference area to monitor before approving further undermining of swamps. **The hydrology of the reference swamps identified by OEH has been impacted by subsidence. It's time to stop undermining swamps**

More recently the progress of longwall 8 has triggered a level 2 TARP alert for swamp 15b[8], which has been cracked. Longwall 8 has a width of 305 metres.

The 2012 Metropolitan annual environmental review (AEMR) indicates subsidence induced hydrology changes to swamps 16, 17 and 20 in the Woronora Special Area arising from the recently completed longwalls 20 and 21. The longwalls used at Metropolitan Colliery were 163m wide with 55m pillars - only slightly wider than the 145 -150 metre longwalls and 60 metre pillars of NRE 1 Area 2. Importantly, the depth of cover for the Metropolitan Colliery longwalls is 400 to 560m - much greater than the 267m to 320m for Area 2.

That is, **the recent impacts to swamps at the Metropolitan Colliery have occurred with similar longwall parameters to those of Area 2 - but with a much greater depth of cover than that over the swamps of Area 2**. The 455m to 510m depth of cover in Area 3 is similar to that over the Metropolitan Colliery longwalls - but the longwalls of Area 3 are some 2.5 times wider. If approved, the proposed mining will have adverse impacts on the swamps above.

RECOMMENDATION 7: An estimate be made of the number of the swamps in the Special Areas that have been undermined, by longwall and bord and pillar methods, and are to be undermined by current approvals. This should then be expressed as a percentage of the total number of swamps and as a percentage of swamp areas.

Undermining the swamps over the proposed longwalls will add to the long list of swamps set to be undermined by the other mines in the Special Areas. Gujarat are required to provide an assessment of cumulative impacts - this should include a tally of the swamps in the Special Areas that have

been undermined, and are to be undermined by current approvals. This should then be expressed as a percentage of the total number of swamps and as a percentage of swamp areas.

The Not So Special Swamps

The classification of swamps as being of special significance undervalues the 'other' swamps, the 'ordinary' swamps, that by number make up 84% of the swamps. This second class status essentially guarantees they will not be protected from harm should a mine propose a longwall beneath them.

The PAC states for the other swamps that "*a presumption of protection from significant negative environmental consequences will exist for all other swamps unless the Proponent can demonstrate for an individual swamp that costs of avoidance would be prohibitive and mitigation or remediation options are not reasonable or feasible. Under circumstances where the decision is to allow significant negative environmental consequences to occur and remediation is not feasible offsets may be considered appropriate*." **Mining companies will inevitably argue the costs of avoidance risk mine closure. 'Like for like' swamp offsets in the Special Areas are not realistic and financial compensation does not replace the lost swamp.**

While the other swamps make up 84% of the total number of swamps, they make up only 34% of the area covered by swamps - but can we really afford to sacrifice 34% of these valuable natural assets? Do we know how many have already been undermined?

Protecting the Streams - Water Quantity

The BSO PAC Panel advises;

> "*All those streams located within Special Areas declared under the Sydney Water Catchment Management Act are significant for their water supply function*."

They PAC also makes it clear that they are vitally important for their dependent biota. Reflecting long standing concerns, the BSO PAC Panel states;

> "*The Panel is of the view that it is no longer a viable proposition for mining to cause more than negligible damage to pristine or near-pristine waterways in drinking water catchments or where these waterways are elements of significant conservation areas or significant river systems*".

As Pells points out in Annex N, the current proposal will result in more than negligible harm to the watercourses within the project area.

No confidence can be held for statements such as "*Only stream reaches within the predicted Wongawilli seam workings 20mm subsidence zone were considered in this assessment*." The subsidence modelling is unable to reliably predict the 20 mm subsidence impact boundary, consequently the modelling cannot be used to judge the limit of subsidence impacts on

watercourses. In the absence of other information, the boundary should be no closer than that of the 35 degree angle of draw. The boundary should be extended for multi-seam mining.

The impact boundary provides no more than a guide. Significant damage was caused to Wongawilli Creek when BHP-Billiton owned the Elouera colliery, with cracks occurring up to 500m from the mining activity.[9] Impacts included loss of flow and altered water chemistry, including high levels of dissolved zinc.

Figure 10. Loss of flow in Lizard Creek and Waratah Rivulet following longwall mining. Other examples include Cataract River, Georges River, Native Dog Creek and Wongawilli Creek

Similar impacts arising from the Elouera colliery occurred at Native Dog Creek, with subsidence in the order of a metre and fracturing occurring up to 500m from the mining activity, loss of flow from the creek and altered water chemistry with toxic levels of aluminium, zinc and nickel detected along with lowered pH at one site.[9]

The 2010 PAC Panel report for the BSO proposal relates mining induced diversions with complete loss of flow over stream lengths over many hundreds of metres have occurred in Lizard Creek and over shorter distances along a 2 km stretch in the upper reaches of the Waratah Rivulet, and in numerous other channels (e.g. Figs 10 and 11). The Waratah Rivulet suffered dramatic impacts that have been well documented and reported in the media.

Mining companies and their consultants contend that any diverted surface water will re-emerge downstream. As OEH point out, this assumption has not been scientifically established or supported by any scientific evidence in any mining company report or peer reviewed study. **Given the uncertainty and the consequences, the Precautionary Principle requires the converse assumption - that diverted water will not return to the surface**.

The SCA believes water is being lost from the Woronora Reservoir catchment as a result of subsidence impacts to the Waratah Rivulet, with water is being diverted to groundwater flows that take it away from the local catchment and into regional flows.

Figure 11. Subsidence related loss of flow in Wongawilli Creek.

RECOMMENDATION 8: Given scientific uncertainty and significant consequence, the Precautionary Principle requires the assumption that diverted stream water will not re-emerge downstream.

This applies to streams of all orders**.** The Planning Assessment Commission expects that for any third order or larger stream of special significance status, or otherwise qualifying for special protection, an assessment is undertaken of all of its tributaries to determine whether subsidence-induced impacts could compromise the protection status of the stream itself. The EA does not provide any evidence or basis for its assumption that undermining the 1st and 2nd order tributaries will not significantly reduce the volume or quality of the water they supply. **Any water lost from 1st and 2nd order streams is water lost from the dependent higher order streams and inconsistent with the requirement of no more than negligible harm. Ferruginous seeps in 1st and 2nd order tributaries will lower the quality of the streams they supply.**

The use of 390 metre longwalls would be reckless, with the free-draining zone reaching up towards the surface and possibly reaching the surface, risking water loss from the Cataract catchment. The further the free-draining and fracture zone extends above the mine, the more quickly will water be drawn away from the surface. Water may then be lost from the local catchment to the mine or to the broader regional groundwater flows. This drainage mechanism has greatest impact below bodies of water - swamps, streams and reservoirs.

The Planning Assessment Commission has made it clear that Lizard Creek and Cataract Creek merit the same level as protection as water courses identified as being of special significance:

> "*Furthermore, despite not achieving special significance status because of previous impacts, Cataract Creek and Lizard Creek exhibit highly significant values and the consequences of further impact makes them worthy of protection*."

That is, Lizard Creek and Cataract Creek must not be subject to more than negligible impacts, where negligible means "*no diversion of flows, no change in the natural drainage behaviour of pools, minimal iron staining, minimal gas releases and continued maintenance of water quality at its pre-mining standard*". The same requirement applies to Wallandoola Creek. The current proposal will expose these creeks to more than negligible damage.

The main channel and tributaries of Lizard Creek and Wallandoola Creek are at grave risk of serious impacts from 390 metre longwalls proposed for Area 3.

RECOMMEDATION 9: The layout of the Area 3 longwalls must be revised in accord with the Reynolds Recommendations. The main channels Lizard Creek and Wallandoola Creek must be kept outside of the subsidence impact boundary defined by the 35 degree angle of draw. The tributaries Lizard Creek and Wallandoola Creek should be kept outside of the subsidence impact boundary defined by the 35 degree angle of draw.

Given the acknowledged inadequacy of SDPS, the uncertainty of double seam mining and the unprecedented 390 metre longwall width, there is no reasonable basis for confidence in the statement in Part C that:

> "*The proposed extraction in Wonga West is predicted to result in up to an additional 0.25m subsidence in the main channel of Lizard Creek and up to an additional 0.5m subsidence in the main channel of Wallandoola Creek. This will result in a cumulative subsidence effect with the subsidence caused through the previous Bulli workings, however no site specific, cumulative effect on the creek bed and bank stability or pool levels is anticipated due to the additional subsidence*."

Likewise, the following is at best a statement of optimistic hope lacking a credible scientific basis:

> "*A potential cumulative effect of subsidence on the stream flow from 1st and 2nd order streams, which may or may not also contain upland swamps, is possible if the subsurface*

transfer of the tributary / swamp water outflows does not report back into the lower reach of the tributary before it discharges into the main 3rd order channel of Lizard or Wallandoola Creek. However, it is anticipated that the upper tributaries / swamps will discharge the stream flow back into the 3rd order flow system of the main creeks at or near their confluence with the main stream, so that negligible volumes of tributary / swamp outflow will be 'lost' to the system."

The EA states that "*The Longwall Panels are positioned so that vertical subsidence under 3rd order or higher stream channels will be restricted to less than 250mm, except over Longwall Panel A2 LW8*." **The modelling is unable to reliably predict the vertical subsidence. The EA does not explain the basis for assuming that limiting subsidence to 250mm will ensure negligible impacts to watercourses - strains and cracks accumulate in unpredictable ways**. Peer reviews undertaken by consultants funded by the proponent do not constitute independent reviews. Negligible impact can only be ensured by not allowing mining beneath or near the feature to be protected.

Prof. Pells states in Annex N:

"*We are of the view that groundwater modelling cannot provide definitive answers as to impacts on creeks and swamps. We consider that the modelling completed to date for the NRE No 1 project does not properly consider the likely ranges of permeability and storativity parameters, but notwithstanding this limitation, does indicate that the existing workings, and the proposed mining will have negative impacts on the groundwater regime. We conclude that there will be additional negative impacts on Lizard and Wallandoola Creeks, and the tributaries of Lizard Creek that are located above the proposed Wongawilli longwalls. We also conclude that there will be negative impacts to the length of Cataract Creek that has probably already been impacted by prior mining*."

Negligible impact can only be ensured by not allowing mining beneath the feature that is to be protected.

Protecting the Streams - Water Quality

Commenting on ferruginous seeps GeoTerra state:

"*It should be noted that many Hawkesbury Sandstone aquifers in the Southern Coalfield already have significant iron hydroxide levels, and that ferruginous seeps can also be observed in previously un-subsided catchment areas*."

No references are provided, however the SCA reports that "*Dissolved iron is generally present in Hawkesbury Sandstone groundwater at variable concentrations. Water is normally suitable for raw water supply for medium to large-scale potable use*."[10] Figure 12 shows the impact of subsidence induced ferruginous seeps into the badly damaged Waratah Rivulet. The water is green with dissolved iron and other metals and the stream is lined with iron oxide deposits, and iron and manganese oxidising bacterial mats. The Waratah Rivulet is an important watercourse. In periods of

good rainfall the Rivulet supplies 30% of the inflow to Woronora Reservoir and up to 50% in dry periods.

Commenting in Annex C on ferruginous seeps in the proposed project area, the EA advises that "*due to the lack of pre-mining data, no comment can be made as to whether the seepage is mining induced or not* ". The BSO PAC Panel however attributes ferruginous seeps in O'Hares Creek and the Woronora River, some kilometres from mining activity, to mining induced far-field movements. That is, **ferruginous seeps are initiated by a disturbance and on the Woronora Plateau the trigger is most likely to be mining activity**. These seeps can persist for decades and do not constitute a negligible impact.

SCT Operations comment:

> "*There appears from the iron staining evident in the water flowing in Cataract Creek to be some ongoing impacts from previous mining that was undertaken some 30-40 years ago, so the post mining recovery appears to be relatively slow*."

The BSO PAC Panel comments in its 2010 report that:

> "*the consequences of iron staining, opacity, bacterial mats and deterioration of water quality has potentially significant consequences for hydrologic values (water quality), ecological values, environmental quality and amenity value*".

And

> "*The Panel considers there is strong evidence that growth of bacterial mats, opacity and the deterioration in water quality accompany iron staining and that these impacts may persist for long periods*."

The SCA advises[11] that manganese dissolution and precipitation accompanies iron dissolution and that:

> "*During rainfall events, acidic rain water and surface run-off re-mobilises iron and manganese oxides and hydroxides, eroding them from the streambed and dissolving them from floating mats and returning these metals again to the aquatic system to cause further pollution downstream.*"

And

> "*During high water stages when turbulent flow prevails, iron mats are washed from pools and meanders where they have been immobile during low flow conditions, resulting in further contamination as they are dissolved in acidic conditions.*"

The SCA also advises in the 2010 BSO PAC report that "*Experimental studies in the Waratah Rivulet showed that rainwater is able to completely remove iron/manganese precipitates (Figure 6) increasing their concentration during and after rainfall event. The dissolved phases of iron and manganese are transported into Woronora storage causing significant increasing loading of these metals*" Insoluble oxides and hydroxides transported into water storages add to their sediment load and reducing oxygen. The SCA estimates that between February 2002 and August 2009 some 15 and 4 tonnes of iron and manganese respectively were added into the Woronora Reservoir from the shattered Waratah Rivulet.[11] It's likely that more than 5 tonnes of iron and 1.5 tonnes of

manganese will have since been added to the reservoir, together with other contaminants that include barium and strontium.

Figure 12. October 2012 photograph of the impact of subsidence induced 'springs' in the Waratah Rivulet. The water is green with dissolved iron and other metals and the stream is lined with iron oxide deposits, and iron and manganese oxidising bacterial mats. In periods of good rainfall the Rivulet supplies 30% of the inflow to Woronora Reservoir and up to 50% in dry periods.

The proposed mining will exacerbate existing seeps and create new seeps, adding to the catchment burden.

Remediation - a False Promise

There are currently no independently agreed methods for remediating broken watercourses or swamps. Peabody has spent very substantial sums of money injecting polyurethane resin (PUR) in two locations in the very badly damaged Waratah Rivulet. The work has yet to meet the SCA's performance measures and the BSO PAC Panel expressed concerns the injected curtain would divert water. The method can only be used in ideal locations and its medium to long term durability in a subsidence zone is unknown.

Swamp remediation is likewise problematic. PUR, or some other 'grout', injection can only be undertaken in ideal locations and access would require clearing of swamp vegetation. Propagating the promise of remediation, the Draft Statement of Commitments (Part D of the EA) states "*Should*

the standing water level or groundwater quality be unacceptably affected due to subsidence, methods to ameliorate the situation until the water level or water quality recovers will be investigated." In reality, once a swamp is damaged, there is no prospect of returning it to its pre-mining state, or some reasonable approximation of that state.

Project approvals made with commitments to remediation are nonetheless in fact approving the loss or damage of the threatened asset. It is misleading or delusional hubris to suggest otherwise.

Water Protection Required Under the Law

The Environmental Assessment and Planning (EP&A) Act 1979 requires a consent authority to "*refuse to grant consent to a development application relating to any part of the Sydney drinking water catchment unless the consent authority is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on the quality of water*." **Damage to swamps and watercourses inescapably fails the Neutral or Beneficial Effect (NorBE) on water test, in contravention of the EP&A Act.** Cumulative impacts cannot be ignored

In the interests of the proponent and consequential State revenue, and ignoring considerations of cumulative impacts, the meaning of neutral could of course be 'redefined' and blurred by the consent authority admitting some 'negligible' deviation from neutral and accepting some level of damage to swamps. The public could then have no respect for the consent authority or the legislative framework within which it operates..

Public Scrutiny of Management Plans

In general, the public are not afforded an opportunity to review and comment on management plans, such as Subsidence Management Plans (SMPs) and Environmental Assessments (EAs) rarely provide any insight into their likely content. In its hasty 2012 approval of Gujarat's 'modification' to add triple seam mining to its Preliminary Works Project (MP 10_0046) the PAC Panel comments on the lack of community consultation with respect to SMPs: "*consultation must be meaningful and the Department must take full account of it in its assessment and approval of the subsequent plans. Concern has been expressed to the Commission on multiple occasions (including this one) that neither proponents nor the Department necessarily meet expectations in this area*". As discussed below the SMP for one of the MP 10_0046 longwalls is inadequate in providing no effective swamp protection.

Access to Environmental Performance Data

Mining companies collect environmental performance data as a condition of approval and will provide tabulated or graphical summaries of that data in end of panel reports or annual reports. The data is collected in the public interest and all of the data should be made available to the public- not just the summaries provided by the company. Doing so would entail little additional effort or cost.

Any consultants reports obtained by company in advance or as part of the development of an EA should also be made available. For instance, a number of documents referred to in this EA do not seem to be publically available' e.g. Biosis 2011.

Mine layout maps for the lease, past and present should be made readily available in electronic and hardcopy form.

Attempting to Form an Alternative Community Consultation Framework

Some three months into their three year Preliminary Works project approval period and three months before the due date, Gujarat sought to form an alternative to the conventional Community Consultative Committee (CCC) utilised by other mining companies. Gujarat relentlessly sought to impose what was clearly an unwieldy community advisory system that was not in accord with the DoPI CCC guidelines.

A group of community members selected by Gujarat as an engagement framework development oversight and design group (Community Review Team) repeatedly advised the company that the CCC alternative being pursued was not in accord with DoPI guidelines, would not be functional and was not acceptable. Gujarat ignored the advice and requests of the oversight group put their proposed alternative to the DoPI and, in doing so, made it clear that the company was not sincerely engaging in a consultation process. Remarkably, the company suggested to the DoPI that it was the community that sought a CCC alternative - this was not the case.

Though having refused to meet with community representatives to discuss their concerns, the DoPI eventually agreed with their position and a conventional CCC has since been formed. A CCC was required to have been formed and operating by April 13 2012; it was instead formed in July and its first meeting was held on the 21st of August - some 10 months into the projects three year approval period.

The DoPI will be well aware that the account of the formation of the CCC given in the EA documentation for the Preliminary Works modification proposal (MP 10_0046 Mod 1) is incorrect and very misleading. The account suggests a company acting in accord with requirements and sympathetic to the interests of the community. The correspondence between the company, DoPI and community representatives makes it clear however that this not the case.

In describing the consultation process led by Twyfords in Part A of the current EA, Gujarat NRE again misrepresent the truth in stating "*The use of a Community Consultative Committee (CCC) that is commonly used in other mine sites was not selected as part of this strategy*." As the email correspondence documents, the community was not at any stage asked to make choice between a conventional CCC and the framework being sought by Gujarat. The pros and cons of the conventional CCC were not canvassed by Twyfords. The impression in the meetings was that the framework being drawn out by Twyfords was to be in addition to a conventional CCC. When concerned community representatives asked if a conventional CCC would be formed, the response was vague.

Part A of the EA also states "*NRE believes that a CCC at the core of the strategy would have a high risk in compromising both effective engagement, and effective business operation (Twyfords, 2012).*" The statement is not explained and neither concern was raised during the Twyfords led consultation process of 2012. At no point did Twyfords raise concerns about the conventional CCC. In hindsight its clear Gujarat had an outcome in mind and the consultation process was a failed attempt to give the impression it was the community that sought that outcome. The process, and its subsequent representation by the company and Twyfords, was dishonest and this reflects poorly on both.

Undermining Confidence in the NSW Assessment and Regulatory System

Many reasons have accumulated for a decline in confidence in the NSW assessment and regulatory System. The saga of Gujarat's expansion of the NRE 1 mine behind Russel Vale exemplifies its flaws and failures. The PAC was introduced as independent body, at least in principle, to address long standing concerns with the objectivity of Government departments with an economic focus (DoPI and DRE) assessing mining proposals that delivered revenue. The series of PAC approvals for the NRE 1 mine have damaged the credibility of the PAC - a risk the PAC recognised in granting the approvals.

Though seemingly well intentioned, Gujarat NRE have nonetheless established a track record of non-compliance. Management plans required for the approved Preliminary Works project were months overdue and the company was months late in establishing a Community Consultative Committee (CCC). End of panel reports are overdue and a due independent review has been delayed.

Gujarat have twice been penalised $1,500 by the EPA and the SCA fined Gujarat $1,500 for damage caused to swamp and *Pultenaea aristata* during the establishment of subsidence monitoring equipment for Longwall 4 in Area 2. The most recently completed longwall in their Wongawilli mine lacked a subsidence monitoring line. Though the DoPI initiated an investigation into a significant number of compliance failures in early 2012, there has been no consequential penalty - in contrast the fines imposed by the SCA and OEH.

The history of the expansion project is noteworthy. A Part 3A application titled ‘‘NRE No. 1 Mine Project’ (MP09_0013) was submitted in early 2009 for “*for the consolidation of its existing operations, continuation of operations and upgrade of associated surface facilities at NRE No. 1 Colliery*”. Director-General’s environmental assessment requirements were issued in March 2009. At some unknown point this project application was withdrawn. An "Underground Expansion Project" application was submitted by Gujarat in August 2009, apparently again under MP 09_0013 and again for the “*consolidation of its existing operations, continuation of operations and upgrade of associated surface facilities at NRE No. 1 Colliery*”. The application included a preliminary Environmental Assessment (EA) and this document is available from the DoPI Web site. Director-General requirements were issued in the same month. The DoPI received a draft EA for the expansion project in February 2011.

A substantial amount of the material in Appendix J of the 2012 Preliminary Works modification application (MP 10_0046 Mod 1) came from the yet to be completed Underground Expansion Project application- underscoring the view that **the modification proposal did not constitute an modification, but was to begin the longwall mining otherwise planned for the Underground Expansion Project**. The Preliminary Works proposal itself was submitted as a Part 3A application (MP10_0046) in March 2010 to extract remnant coal reserves within stipulated mining areas, and augment and upgrade existing infrastructure including surface facilities. The proposal did not include longwall mining or other secondary extraction.

The Preliminary Works application was approved in October 2011, in spite of agency opposition, opposition from Wollongong Council and opposition from the community. There were two noteworthy concerns with the approval;

(i) that it admitted a stepwise approach to the establishment of the delayed expansion project and

(ii) (ii) that approval was given for infrastructure work needed for the next phase of the expansion project - so applying pressure for the subsequent approval of the next phase.

The PAC recognised the risk of to its credibility in approving the project: *‘the Commission considers that separation of project applications where the primary purpose of the first is to facilitate the second could lead to lack of public confidence in the NSW assessment and regulatory systems and must be considered undesirable. In this context it should be noted that major regulatory authorities and Wollongong City Council were among those submitters who raised the concern*.’

Seeking to side-step the need for approval under the Environmental Planning and Assessment Act 1979 (EP&A Act), sometime around September 2011 Gujarat submitted a subsidence management plan (SMP) for Longwalls 4 and 5 (Area 2) to the Division of Resources and Energy (DRE) in the Department of Trade and Investment. On 24 February 2012 Gujarat advised the Australian Stock Exchange that they intended to commence mining of Longwall 4 from 13 March 2012. The DRE approved a SMP for Longwall (LW) 4 on 26 March 2012, subject to meeting certain conditions and the provision of additional documentation. Longwall 5 was not approved, posing a threat to significant upland swamps.

Gujarat succeeded in being able to abuse a transitional legislative provision (clause 8K) put in place to address the problem posed by a small number of mines operating without EP&A Act approval for historical reasons.

Gujarat succeeded in being able to abuse a transitional legislative provision (clause 8K) put in place to address the problem posed by a small number of mines operating without EP&A Act approval for historical reasons. Apparently unhappy with the use of the transitional legislation, the DoPI initially refused to endorse the DRE approval of the Longwall 4 SMP. Following a subsequent series of meetings with Gujarat, the DoPI changed its mind.

The provisions of the transitional legislation were to end on the 31st of December 2011, however the termination date was changed to March and then the 31st of July and then September 30th 2012. The transitional provisions exploited by Gujarat were not intended to allow the introduction of new longwalls and a challenge to the legality of the approval was initiated by the community group Illawarra Residents for Responsible Mining. The challenge had excellent prospects of success but had to be abandoned when the group was required by the Court to provide $40,000 in security funds. This underscores the great disadvantage the community suffers in seeking justice.

It is surely reasonable to suggest that the legislative provisions of NSW should not be manipulated or distorted to facilitate the commercial imperatives of developers. It is surely reasonable to suggest that the DoPI should act in the public interest and not yield to the commercial imperatives of developers.

It is surely reasonable to suggest that the legislative provisions of NSW should not be manipulated or distorted to facilitate the commercial imperatives of developers. It is surely reasonable to suggest that the DoPI should act in the public interest and not yield to the commercial imperatives of developers.

The modification proposal to add Longwalls 4 and 5 and Gateroad 6 to the Preliminary Works project was approved in haste and considerable community dissatisfaction in December 2012 The community argues that a proposal that added longwall mining and introduced the unknown impacts of triple seam mining to the Special Areas could not sensibly be regarded as a modification to the Preliminary Works project. The PAC recognised there was doubt, but nonetheless approved the proposal. Evidently recognising its falling credibility, the approval rejected the inclusion of gateroads 7 and 8.

The modification proposal contained errors, misleading statements and comprised an amalgam of subsidence management plans and expansion project material. Approval was granted by the PAC in the knowledge of the record of non-compliance, misleading representations and fines by the SCA and the Environmental Protection Authority. The approval states a recognition that approving works solely and clearly intended to establish infrastructure to enable mining for which approval has yet to

be sought would undermine confidence in the NSW approval and regulatory system. The PAC would have been aware that the same concerns had been raised in Gujarat's application for longwall mining in the Nebo area of its Wongawilli mine. That application included a driveage for a future expansion project unrelated to the Nebo longwalls. The PAC approved this proposal as well.

The PAC justifies its approvals as a consideration of the need for continuity of mining operations, which is the argument made by all of the companies extracting coal from the Special Areas. Credibility is the price paid in bending the regulatory system and setting aside rational and responsible decision making in order to accommodate the commercial needs of mining companies.

The PAC and the DoPI evidently regard the mining of coal as of greater importance than the credibility of the NSW assessment and regulatory system, and of greater importance than the environment from which it is extracted - and the water that environment provides.

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9. (a) *Submission on the strategic review of the impacts of underground mining in the Southern Coalfield - Attachment 2 –Subsidence impacts on natural features in the Southern Coalfields*; Dept. Environment and Climate Change NSW, July 2007. (b) *Submission on the strategic review of the impacts of underground mining in the Southern Coalfield - Attachment 1 DECC Scientific Services Report – Ecological Impacts of Longwall Mining in the Southern Coalfields of NSW – A Review.*; Dept. Environment and Climate Change NSW, July 2007.
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11. Jankowski, J., Knights, P.; "*Surface Water–Groundwater Interaction in the Fractured Sandstone Aquifer Impacted by Mining-Induced Subsidence; 2. Hydrogeochemistry*"; 2010 IAH Congress, published in Biuletyn Pañstwowego instytutu Geologicznego 441: 43–54, 2010 R

Some Objections to Project Application No. MP 10_0046 MOD 1

SOWC
save our water
catchment areas

September 19 2012

At a public rally before the last election the Premier of NSW stated that the next Liberal and National Government would "... *ensure mining cannot occur in any water catchment area and that any mining leases and exploration permits will reflect that common sense. No ifs, no buts, a guarantee*."

On December 1, 2011 the Premier told 2GB's Alan Jones: "*I don't intend to allow — particularly after the drought we went through over a decade — mining or any other activity to threaten water resources.*"

Note 1: *As advised in the cover letter, this submission is to replace the submission of September 3.*
Note 2: *This submission includes as an attachment a manuscript by Professor Philip Pells that is not to be placed on public exhibition.*

This submission is supported by the following community groups and organisations:

NATIONAL PARKS ASSOCIATION OF NSW
protecting nature through community action

LOCK THE GATE

Rivers SOS

TOTAL ENVIRONMENT CENTRE

Botany Bay and Catchment Alliance

Georges River Environmental Alliance

Illawarra Escarpment Network

Otford Protection Society

Hawkesbury Environment Network

Northern Illawarra Sustainability Alliance

Illawarra Residents for Responsible Mining

Stop CSG Sydney

Sutherland Shire Environment Centre

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Objections to Proposal MP 10_0046 - MOD 1

General Comments

The extent and impacts of the proposed additions to the Preliminary Works Project, reflected in the increased coal volumes, the introduction of use of longwalls and mining below two previously mined seams, the addition of new gate-roads and the use of documentation from the withdrawn expansion project, make it clear that this proposal cannot sensibly be regarded as simply a modification to the Preliminary Works project. Clearly Gujarat NRE is attempting to exploit the now repealed but nonetheless persistent 'modification' provisions of Part 3A legislation to incrementally establish its intended expansion project.

The Sydney Catchment Authority and other agencies expressed similar concerns in commenting on the Preliminary Works proposal: "*The SCA notes that the Wonga Mains Driveage is designed to obtain access to future mining areas.* ***The SCA does not consider it good practice to separate elements of a proposed new mining area into separate Projects resulting in assessment being undertaken in a piecemeal fashion.*** *The EA states that "NRE acknowledges that the construction of these access roadways and gateroads does not guarantee approval of longwall mining in the Wonga east area".* ***Nevertheless, it is considered that prior approval of the driveage could result in considerable pressure being placed on assessing and approval authorities to approve future mining projects which could compromise water quality and water quality.*** *The SCA considers that it would be more appropriate for the driveage to be assessed in conjunction with the assessment of future mining as part of Stage 2. This would enable the entirety of the impacts of this project to be assessed, and a more integrated approach to be taken to the management of impacts*." Note that the use of bold font has been added here.

The strategy being implemented by Gujarat circumvents cumulative impact considerations and side-steps the greater scrutiny that an expansion project application would attract - scrutiny which would occur within a changed legislative landscape. The persistence of the repealed Part 3A legislation does not and will not excuse the shameful ethical and moral failure of the consent authorities continuing to approve damage to our catchments and their ecosystems.

Abusing section 75W of the Environmental Planning and Assessment Act

In contrast to Section 96 of the Environmental Planning and Assessment (EP&A) Act, Section 75W provides no constraints on what might be proposed as a modification to an existing proposal - no matter how that proposal might offend the generally accepted understanding of the notion of a modification. Section 75W (s.75W) is part of the discredited and now repealed, in principle, Part 3A legislation. Unfortunately, as the current proposal demonstrates Part 3A and its excessive provisions lives on.

Section 96 is consistent with the understanding of the notion of a modification in stating "*the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted*".

The NSW Court of Appeal has commented on s.75W as follows (bold font added for clarity): "*All that can be usefully said in the abstract is that the requirement for approval of a modification must be understood in the context of three factors. The first is that the subject matter of Pt 3A is defined by reference to major infrastructure developments, as identified by the Minister (or by a State environmental planning policy), as having State or regional environmental planning significance: s 75B.* ***Secondly, the project is required to undergo environmental assessment and public consultation, of a kind not required of a modification. Construing s 75W in its context it is clear that the modification of an approval was something intended to have limited environmental consequences beyond those which had been the subject of assessment****. (Given the powers of the Director-General, it cannot be said, of course, that only modifications which properly required no further environmental assessment were envisaged.)"*

The addition of longwall mining to the Preliminary Works Project would significantly change the nature of that project and its impact of the Metropolitan Special Area. The Preliminary Works Project does not involve longwall mining and does not involve longwall mining under existing works and previously mined seams. As Appendices A and E of the Gujarat Environmental Assessment (EA) makes clear, multi-seam longwall mining is a large step into the unknown that emphasizes the stark distinction between what is being proposed as a modification and the original project.

That the current proposal cannot sensibly be regarded as modification is further highlighted by the more than 900 pages of environmental assessment material - some of which seems to be have been prepared for the expansion project. Emphasizing that the proposal is not simply a modification, the Preliminary Works reference to the use of Main Gates 4 and5 is changed from being exploratory driveages to operational gateroads. The subsidence impacts referred to in the Water Management Plan of the belatedly updated Appendix J are those of the expansion project. For instance; "*However up to 5m of depressurisation in the Hawkesbury Sandstone is predicted, which may generate up to 0.07ML/day reduction in flow to Cataract Creek, once all of the proposed panels in Wonga East are mined*." And "*Subsidence at Wonga East was predicted using the SDPS model, with the Cataract Creek main channel predicted to subside by less than 200mm, with valley closure of up to 100mm and upsidence of up to 60mm (Seedsman Geotechnics, 2012*)." Appendix A presents subsidence modelling for the expansion project.

Approval of the current proposal as a modification would further undermine confidence in the NSW planning assessment and regulatory system.

Errors, omissions and misleading statements in the Gujarat EA

The Gujarat Environmental Assessment (EA) is misleading, contains errors and refers to material that has not been provided.

A particularly misleading error is the repeated statement that a report by Geoterra (Appendix I) indicates little or no impact to swamps over Longwalls 4 and 5. The Geoterra report refers specifically to CRHS1, which is not located above the longwalls, and makes no mention of the swamps that are directly or partially above the longwalls.

The EA seems to provide no subsidence information, predicted or observed, for Longwall 4. The EA suggests revised subsidence predictions for Longwalls 4 and 5 are provided in Appendix B, however the contours appear to be associated with Longwall 5 only, though they extend over Longwall 4. Longwall 4 is believed to have been completed, yet there is no mention of the impacts of the longwall on swamps or whether the observe subsidence met or exceeded predictions. Longwall 5 would reactivate and compound the subsidence of Longwall 4, yet this is not mentioned or discussed. There appear to be no predictions for valley closure or upsidence, other than a mention of upsidence in CRHS1.

The EA does not explain why Longwalls 4 and 5 are being sought rather than other longwalls planned for the expansion project. Longwalls 1, 2 and 3 for instance are not shown or mentioned.

The EA enigmatically suggests a 'suck it and see' approach to problematic geological formations and in Appendix E Pells comments on the lack of consideration of these challenges.

The EA provides essentially no mitigation information. Instead, with limited clarity, the EA refers the reader to Appendix J as follows: "*As per the Approved Project, including without limitation, updating relevant management and monitoring plans as an **Extraction Plan** and ongoing monitoring, with specific reference to the Plans of Management presented in **Appendix J**.*" The material referred to was not available until Wednesday August 29 - just a few days before the close of the limited exhibition period.

The subsidence management plans (SMPs) eventually exhibited on the DoPI Website were prepared for Gujarat's partially successful attempt to bypass the EP&A Act approval process by abusing transitional provisions of the Act. The attempt succeeded for Longwall 4, but not Longwall 5. That is, the SMPs for Longwall 5 were rejected. The Biodiversity Management Plan is for both longwalls, whereas the Water Management Plan is for Longwall 4 only. Other management plans referred to in the EA were required as part of the Preliminary Works Project and it seems plans were submitted late and some have not yet been approved - though the EA suggests otherwise.

The Biodiversity Management Plan (BMP) belatedly provided in Appendix J seems to provide subsidence contours for Longwall 4, however the vertical subsidence figures seem too small and are not explained. Appendix A appears to be a subsidence prediction and management document from Seedsman Geotechnics for the expansion project that provides no specific information for Longwalls 4 and 5. The longwalls are not labelled in most the diagrams and it's difficult to see how the current proposal relates to the modelling reported in Appendix A.

The Biodiversity Management Plan (BMP) advises that if fracturing occurs remediation should be undertaken as soon as possible, prioritising areas where fracturing has resulted in a loss of surface flows. The BMP observes; "*To date remediation measures have been attempted at a number of sites with mixed results, and it is likely that many of these would not be applicable to natural features present in the Longwall 4 SMP Area. Grouting in the majority of creeks and swamps in the Longwall 4 SMP Area would be impractical and slope stabilisation works and drainage and erosion control would likely cause substantial damage to these natural features*."

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date remediation measures have been attempted at a number of sites with mixed results, and it is likely that many of these would not be applicable to natural features present in the Longwall 4 SMP Area. Grouting in the majority of creeks and swamps in the Longwall 4 SMP Area would be impractical and slope stabilisation works and drainage and erosion control would likely cause substantial damage to these natural features." Presumably the same is true of Longwall 5.

In contrast the Water Management Plan confidently asserts successful remediation of subsidence damage in the Georges River and Waratah Rivulet. While the mining companies responsible for the remediation may make this claim, independent assessments disagree. Grouting can only be applied in a small number of favourable locations, as the BMP suggests, and where it has been applied it may be contributing to a redirection of subsurface flows away from the local catchment.

The EA states that Geoterra have assessed that minor to no adverse change in flow and duration would be observed in seepage from the directly undermined swamps. Whereas the Water Management Plan belatedly provided in Appendix J suggests otherwise, commenting that the following would be within modelling predictions; *fracturing of bedrock in ephemeral drainage lines that are directly undermined, up to 3 month lowering of pool water levels and swamp seepage discharge reduction greater than baseline variability*.

The EA lacks an account of the local geology, for instance there is no mapping of the distance of the Bald Hill Claystone from the surface. The Water Management Plan indicates there are areas where it emerges at the surface. Pells provides an informative cross-section depiction that shows the Bald Hill Claystone rising towards the surface from west to east.

The Metropolitan Special Area is a Schedule 1 Area, not a Schedule 2 Area as the EA suggests. The EA makes no reference to the Sydney Drinking Water SEPP or its embodied Neutral or Beneficial Effect (NorBE) on water test.

.The planned expansion project has been determined to be a "controlled action" under the EPBC Act. Presumably this would also be the case for the proposed longwalls, yet there is no mention of this in the EA.

Subsidence

In Appendix E of the Environmental Assessment (EA) provided by Gujarat, Professor Philip Pells cautions that subsidence prediction is fraught with uncertainty, in large part because of geological unknowns. Pells cites the following examples:

- Appin Colliery LW703 – 33% to 52% over prediction.
- Westcliff Colliery LW34 – 10% under prediction.
- Tahmoor Colliery LW24A – 290% under prediction.
- Tahmoor Colliery LW26 – 100% under prediction

Another well-known example is that of Waratah Rivulet, where modelling failed to predict dramatic subsidence impacts along a two kilometre section of this important water course. Modelling for the longwalls impacts was undertaken by MSEC using the Incremental Profile Method that Pells otherwise describes as "excellent". MSEC attributed the significantly under-predicted vertical displacement to the geology of the immediate roof strata and strata layers within 150m of the seam

roof at Metropolitan Colliery. While events of this kind may be low in frequency, they have significant impact and cannot be ignored.

The longwalls that caused the dramatic damage to the Waratah Rivulet were 158 metres wide and only slightly wider than the 145 metre width of Longwalls 4 and 5 in the current proposal. Significantly, the mined Bulli seam is around 450 metres below the surface in the vicinity of Waratah Rivulet and so about 100 metres deeper than the Wongawilli seam of Longwalls 4 and 5, which are about 330 metres below Cataract Creek. In principle, it would seem the Waratah Rivulet is better protected than the surface features above Longwalls 4 and 5.

Like Longwall 4, the longwalls that damaged the Waratah Rivulet were approved via the approval of a SMP. A repetition of the damage inflicted on the Waratah Rivulet may be unlikely, but it can't be ruled out. The Gujarat project area has already been damaged by mining, as is evident in the Water Management Plan of Appendix J and is commented upon in Appendix E by Pells.

Further highlighting the uncertainty of subsidence prediction, the PAC observes in its report[1(b)] on the Metropolitan Colliery Expansion project proposal that "*strains are not necessarily uniformly distributed in accordance with theoretical predictions. For example, a predicted tensile strain of 1mm/m may eventuate in the field as a 5mm wide crack every 5m, or a 10mm wide crack every 10m*."

As far as we are aware there are no Southern Coalfield precedents for mining below two previously mined seams. Pells notes in Appendix E that MSEC propose a 10% to 20% increase of subsidence factors for the second mining, whereas Li recommends that a subsidence factor of 80% should be adopted for the second mining. No subsidence increase factors are suggested for a third mining, presumably because of a lack of precedent.

Further highlighting the uncertainty of subsidence prediction, the PAC observes in its report on the Metropolitan Colliery Expansion project proposal that "*strains are not necessarily uniformly distributed in accordance with theoretical predictions. For example, a predicted tensile strain of 1mm/m may eventuate in the field as a 5mm wide crack every 5m, or a 10mm wide crack every 10m*."

Given the examples noted by Pells and that of Waratah Rivulet, clearly subsidence prediction cannot prudently be viewed as anything more than an impact gambling guide of uncertain reliability. The discussion in Appendix A on multiple seam subsidence further emphasizes the significant uncertainties. It is interesting to read in this section that Gujarat advise "*We are not willing to comply with the direction of the Sydney Catchment Authority to use the Li et al method*."

Subsidence impacts on swamps, surface waters and groundwater has been described in detail in the Southern Coalfield Inquiry report and the PAC reports for the Metropolitan Coal and Bulli Seam Operations (BSO) projects.

Groundwater

Deep groundwater impacts arise as a result of 'goafing' and a consequential subsidence induced connected fracture zone above the goaf. The height of this zone cannot be reliably predicted, but in the Southern Coalfields it is believed to vary between 1 and 1.5 times the width of the longwall panel - *for single seam mining*. The extent of the highly connected zone following multi-seam mining will be increased by an amount that is not reliably known.

Longwalls 4 and 5 are 145 metres wide and have a depth of cover ranging from approximately 320 m to 340 m (note the Gujarat EA incorrectly states on page 2 that longwalls 4 and 5 have lengths of approximately 530 m and 115 m respectively, and a depth of cover between 300 m and 340 m below previously extracted Bulli and Balgownie seams). The highly connected and freely draining zone would not be expected to extend more than 200 metres or so above the longwalls. This estimate however is based on single seam mining, whereas Longwalls 4 and 5 are below two previously mined seams.

Given there is considerable uncertainty in estimating the likely extent of the highly connected and freely draining zone above Longwalls 4 and 5, there is a possibility that the zone may extend upwards beyond the Bald Hill Claystone. Accordingly it is not possible to entirely exclude the possibility of hydraulic connectivity from the surface to the underlying mine workings, with potentially significant impacts on shallow groundwater and surface water systems – and the mine.

Irrespective of the extent of the highly connected and freely draining zone above Longwalls 4 and 5, shallow groundwater will be impacted by fracturing in the vicinity of the surface as a result of 'sagging beam' bending, shear, tensile (stretching) and compressive forces. These forces produce in a zone of vertical fracturing and horizontal shear impacts that typically extend 15 to 20 metres below the surface. The EA suggests surface fracturing of this extent and the Water Management Plan in Appendix J torturously states "*Mine subsidence can delaminate and/or dilate erosion surfaces and bedding planes within and between strata which occurs preferentially along the interface between lithologies with different elastic properties. Enhanced interfacial permeability is therefore possible at sub-cropping sandstone and outcropping shale interfaces*." Though unclear, the latter sentence probably refers to the Bald Hill Claystone being exposed at the surface in various parts of the project area. This claystone layer would be damaged where it is within the surface fracture zone.

The creation of a surface fracture zone will change near-surface groundwater flows and may accordingly lead to losses from the local catchment, as the SCA believes has occurred as a result of damage to the Waratah Rivulet.[1,2] If the permeability of the strata immediately below the near surface fracture zone is increased, then shallow groundwater may also be redirected towards deeper flows and/or the highly connected and freely draining zone (assuming this hasn't extended to the surface fracture zone) that leads to the mine. Figure 1 depicts the Sydney Catchment Authority view of longwall mining impacts.

In a publication arising from the 2010 Congress of the International Association of Hydrologists, the Sydney Catchment Authority makes the following comment in assessing the damage to the Waratah Rivulet caused by longwall mining: "*If the fracture system has significant vertical extension and intersects one or more bedding planes, it is feasible that some water could join the regional groundwater flow system and water can be permanently lost to a neighbouring catchment.*

Alternatively, water could discharge several kilometers northeast on the cliff escarpment, where springs are known to occur."[2]

The SCA believes that water is being lost from the catchment under low-flow conditions. The paper also makes the following observation: "*Prior to mining the streams in this area were usually connected-gaining, with groundwater level above the lowest streambed elevation. However, shallow piezometers located near the stream close to the edges of already mined longwall panels indicate that shallow groundwater close to the stream is affected by subsidence, causing the majority of groundwater levels to be below the streambed, causing the stream to be disconnected-losing with the diversion of surface water into subsurface voids*." This of course has dire implications for swamps as well as streams.

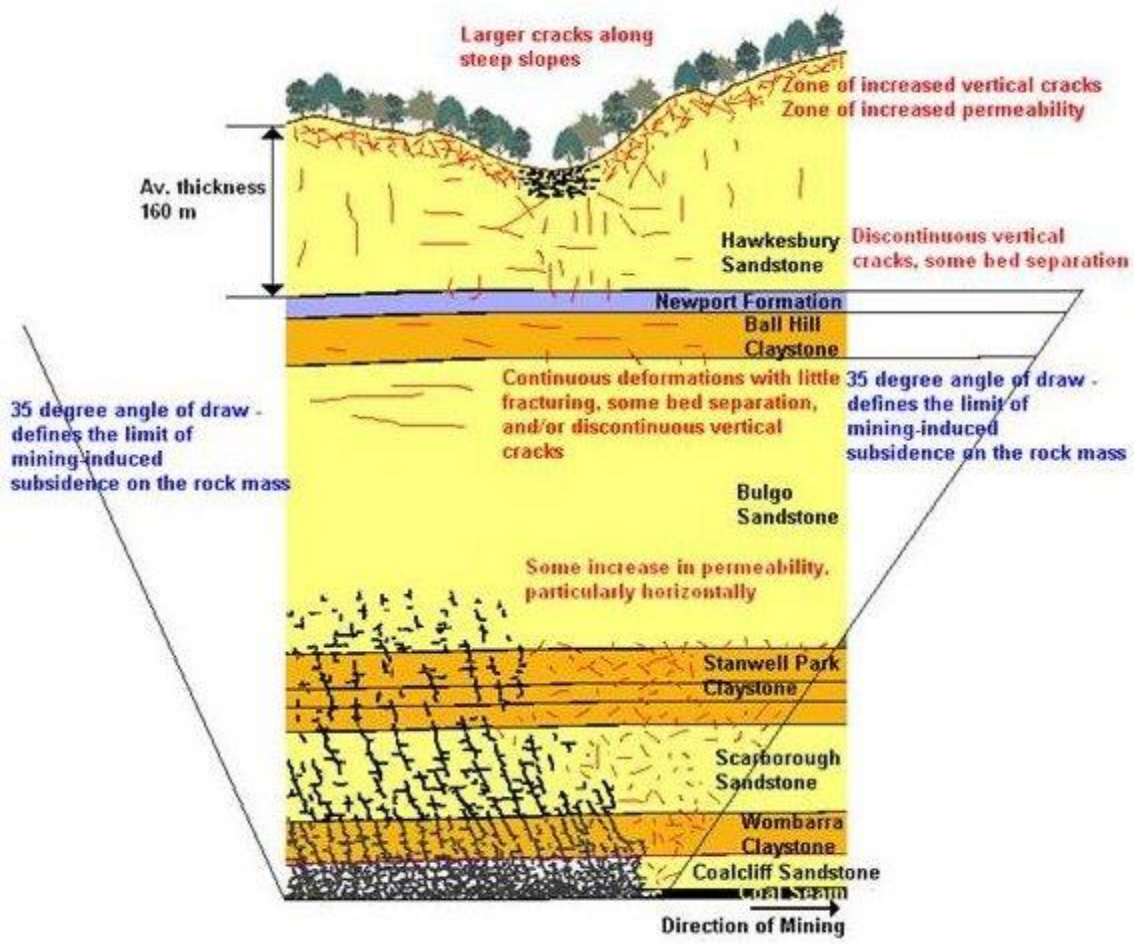

Figure 1. Sydney Catchment Authority depiction of the impact of longwall coal mining on the overlying sandstone and claystone layers, based on piezometric analysis of water flow changes. Subsidence breaks up the lower claystone layers and increases the permeability of the sandstone aquifers. Fresh and saline waters mix and water drains more readily into the coal mine. The graphic depicts the impacts of mining under the Waratah Rivulet and is representative of longwall mining impacts elsewhere in the Woronora Plateau. As a consequence the Waratah Rivulet has been transformed from a 'connected gaining stream' to a 'disconnected losing stream'.

Fracturing and deformation of otherwise low permeability strata may provide hydraulic connectivity between aquifers, such that they can no longer be regarded as confined. Echoing the concerns of the SCA, Madden states that "*increased lateral fracturing and connectivity within the same strata can be another consequence of subsidence movements, and in some situations may result in the diversion of stream flow and shallow groundwater away from the streams and the catchment of origin*."[3(a)]

Subsidence and strata movements affect groundwater by deforming existing fractures, enlarging existing fracture apertures, creating new fractures, separating bedding planes and changing the hydraulic properties of the strata, such as porosity and permeability. Changes to hydraulic gradients, groundwater levels, and groundwater flow paths result.[3(a)] The SCA believes such changes have resulted in a loss of water from the Woronora Reservoir catchment.

Piezometer data from the Metropolitan Colliery (Bulli seam; 158 metre wide longwalls) in the vicinity of the Waratah Rivulet and Area 2 of the Dendrobium Colliery (Wongawilli seam; 245 metre wide longwalls) in the vicinity of Lake Cordeaux, show a subsidence induced increase in permeability in the zone between the highly connected and freely draining zone and the surface fracture zone.

The piezometer data also show that the highly connected and freely draining zone extends upwards through both the Wombarra and Stanwell claystone layers (respectively about 40 and 110 metres above the Wongawilli seam). These claystone layers are widely regarded as 'aquitards' and have been assumed to provide at least some protection from groundwater drainage and inflow into the mine beneath. As discussed below, Professor Pells and others question the industry preferred view of confined strata and of claystone layers acting as aquicludes. Work by Pells highlights the complex and variable character of the Bald Hill Claystone and finds that its permeability overlaps with that of the Hawkesbury Sandstone and other strata.

Reporting a detailed study in Area 2 of the Dendrobium Colliery, Madden states[3] the following: "*The investigation showed that all aquifers and aquitards in the deep groundwater monitoring network are influenced by mining. There were groundwater level declines, changes to aquifer conditions and groundwater flow directions, and leakage from upper to lower stratigraphic units. The investigation has provided a greater understanding of the hydrologic and hydrogeologic response to longwall mining, which can broadly be applied to other underground mines using longwall mining techniques*."

There are significant similarities between the Dendrobium Colliery and the Gujarat NRE 1 mine. Both mine the Wongawilli seam and both are in the immediate vicinity of stored water, streams and swamps. It would be highly irresponsible to ignore the lessons of Dendrobium. Madden comments on significant inflow events in 2007 and 2008 and subsequent inflow evens have been recorded in the end of panel reports for the Dendrobium Colliery. The SCA has expressed concerns for water loss at the Gujarat NRE 1 mine, commenting on "*… a reported loss of water in the vicinity of the V-Mains over subsided Bulli Seam workings*."

The Bald Hill claystone, typically some 250 or so metres above the Wongawilli coal seam, has traditionally been viewed as an effective aquitard able to insulate surface and near-surface waters from the depressurisation impacts of longwall mining. Reflecting this view the Water Management

Plan states "*The depressurisation effects described below for the deep groundwater system is not anticipated to propagate up through to the Hawkesbury Sandstone, where the Bald Hill Claystone is present and maintains its low permeability*."

The industry preferred assumption that the Bald Hill Claystone acts as a protective aquitard or aquiclude has been contested since at least the time of the Reynolds Inquiry in the 1970s.[4] Recent work by Pells[5,6] further strengthens the case that the 'aquitard insulation' assumption is unrealistic and that the claystone permeability overlaps with that of the overlying Hawkesbury sandstone. Pells confirms the finding of Reid in 1996 that "… *permeabilities of the Bald Hill Claystone and the Hawkesbury Sandstone are of a similar order, despite their marked lithological differences*."[7] Pells advises that the Bald Hill Claystone contains as many as eight soil profiles, is fissured and jointed, and is transgressed in places by faults and igneous intrusions. It is not safe to assume the Bald Hill Claystone insulates surface waters from dewatering impacts. The Water Management Plan seems to recognise this in stating "*However up to 5m of depressurisation in the Hawkesbury Sandstone is predicted, which may generate up to 0.07ML/day reduction in flow to Cataract Creek, once all of the proposed panels in Wonga East are mined*." Pells points out monitoring data consistent with a vertical gradient propagating outwards form the mine area.

With permeability overlapping that of Hawkesbury Sandstone, the Bald Hill Claystone contains as many as eight soil profiles, is fissured and jointed, and is transgressed in places by faults and igneous intrusions. It is not safe to assume the Bald Hill Claystone insulates surface waters

The geological cross-section provided by Pells in Appendix E shows the Bald Hill Claystone rising to the surface from west to east, to 'break-out' at Cataract Creek. It seems likely then that the claystone layer will be fractured where it passes into the surface fracture zone, so increasing its permeability.

As Pells points out in Appendix E, it is reasonable to expect that Longwalls 4 and 5 will have an impact on near-surface ground-waters and surface waters, whether or not the highly connected and freely draining zone extends from the mine to the surface. As seam dewatering and drainage occurs a drawdown depressurisation wave will travel outwards from the mine and extend beyond the immediate subsidence zone. Though it may take some considerable time, it is reasonable to expect that at some point the thin aquifer that is swamp CRHS1 will be effected, even if it is not directly damaged by subsidence or upsidence.

The Swamps

The Biodiversity Management Plan provided in Appendix J points out that all the swamps within the Wonga East domain of the NRE 1 mine form part of a medium sized swamp cluster located between Cataract Creek in the north and Cataract River to the south. Illustrating the importance of protecting the swamps, the SCA advises that inflows to the Woronora Reservoir from the Waratah Rivulet are greater than from the Woronora River because of the baseflow release of water from swamps in the vicinity of the Waratah Rivulet. In periods of reasonable rainfall the Waratah Rivulet provides 30% of the inflow to the Woronora Reservoir. Importantly, in dry times it provides up to

50% of the inflow to the reservoir. All of the swamps should be protected in the interests of long term water security.

In March 2012 the Upland Swamps were listed by the NSW Scientific Committee as an Endangered Ecological Community (EEC) under the NSW Threatened Species Conservation (TSC) Act. In a lengthy summary of longwall mining impacts, the listing points out that longwall mining was listed as a Key Threatening Process under the TSC Act in 2005. A listing of the swamps under the Commonwealth Environmental Protection and Biodiversity Conservation Act is expected in the very near future and moves are afoot to obtain a RAMSAR listing. The swamps are exceptionally species rich with up to 70 plant species in $15m^2$ and are habitats of particular conservation significance for their biota. They present a biodiversity pool of global standing.

Figure 2. Collapsed and eroded Swamp 18 following longwall mining.

Figure 3. Cracked swamp bedrock above the Dendrobium Colliery

Figure 4. Dried and cracked swamp sediment above the Dendrobium Colliery

The Gujarat proposal notes that there are seven upland swamps (referred to as CRHS1, CRHS2, CRHS3, CCHS1, CCHS2, CCHS3 and CCHS4) either directly above or in the very near vicinity of the proposed development. Of these CRHS1, CCHS3 and CCHS4 are highlighted as having "special significance status" under DECCW 2011 draft guidelines on upland swamps. CCHS3 (3.5 ha) and CCHS4 (1.8 ha) include Tea-Tree Thicket communities and the PAC points out Tea-Tree

Thicket are a swamp community having the "most limited community in terms of occurrence and extent". Tea-Tree Thicket is rare because it requires a permanently wet habitat.

Adding to the value of the swamps, Aboriginal site 52-3-0322 is located on the eastern margin of CRHS1 and Aboriginal site 52-3-0320 is mapped as occurring on the eastern margin of CCHS3.

CCHS3 and CCHS4 are in the vertical subsidence zone of longwall 5, with CCHS3 being directly undermined by longwall 5 where vertical subsidence is estimated to be 1.15 m, with up to 17 mm/m in tilt and between -10 to +12 mm/m strain. The NSW Planning Assessment Commission (PAC) has stated the following; "*Fracturing of sandstone has generally been observed in the Southern Coalfield where the systematic tensile and compressive strains have exceeded 0.5 mm/m and 2 mm/m, respectively*".

There can be no doubt that CCHS3 and CCHS4 will be impacted by longwall 5, possibly fatally. These swamps may have already suffered impacts from prior mining. Aboriginal site 52-3-0320 will also be very vulnerable to Longwall 5.

The PAC makes the following observations in its report on the Bulli Seams Operations proposal[1]:

> "*In the 18 months or so since the Metropolitan Coal Project information was collated, the focus of some government agencies and NGOs has been on gathering information on some swamps that have been recently undermined by longwalls. The information points to significant impacts on the hydrology of the swamps in question and the potential for serious environmental consequences. The swamps brought to the Panel"s attention are Dendrobium Swamp 1, East Wolgan Creek Swamp-Newnes Plateau, Kangaroo Creek-Newnes Plateau, Junction Swamp-Springvale Colliery, Swamp 18-Elouera Colliery, and Swamp 32. In addition to these, the Panel observed that multiple swamps either side of an undermined (and severely impacted) reach of Lizard Creek appeared to be dry and undergoing compositional change from invasion by wattles and eucalypts. Swamps associated with the unaffected reaches of Lizard Creek did not show these same characteristics*.
>
> *This Panel and previous Panels[143] have sought examples of dessicated swamps that have not been undermined but none have been forthcoming to date. The limited monitoring data that is available is not adequate to preclude mining induced subsidence as the root cause of changes in the hydrology of at least some, if not all, of the swamps noted above. At this point in time, neither conventional nor unconventional subsidence effects, singly or in unison, can be eliminated as the source of changes in swamp hydrology*."

The PAC includes Swamp 1 in Dendrobium Area 2 as an example of an impacted swamp and clear evidence for this is provided in piezometer monitoring records. More recently monitoring of twenty seven shallow piezometers located within Swamps 12, 15a, 15b and 16 has shown impacts to swamps 12, 15B and 16 in Dendrobium Area 3A as a result of the passage of Longwall 7 earlier this year. The end-of-longwall report conservatively concludes "*Based on the available data obtained from the piezometers and nearby rainfall stations, it appears that shallow groundwaters in Dendrobium Area 3A, particularly those associated with Swamp 15b in sub-catchment (of Sandy Creek) SC10C have been impacted by subsidence resulting from the mining of Longwall 7*." The then DECW identified Dendrobium Area 3A as a reference area to monitor before approving further undermining of swamps.

Figure 5. Dessicated swamp vegetation above the Dendrobium Colliery.

The swamps are effectively wide but thin and fragile local aquifers inherently vulnerable to subsidence damage and dewatering effects. The evidence of harm to swamps caused by longwall mining is overwhelming. It is no longer credible or acceptable to take a 'Japanese whaling' approach and allow further harm to these Endangered Ecological Communities on the basis of yet further information gathering.

The 2010 BSO report notes that DECW identified Dendrobium Area 3A as a reference area to monitor before approving further undermining of swamps. The May 2012 end of panel report for Dendrobium Longwall 7 in Area 3A shows damage to swamps 12, 15B and 16. The evidence of harm to swamps caused by longwall mining is overwhelming. It is no longer credible or acceptable to take a 'Japanese whaling' approach and allow further harm to these Endangered Ecological Communities on the basis of yet further information gathering.

The Subsidence Monitoring Plan for Longwalls 4 and 5 (Appendix J) states that the NSW Division of Resources and Energy (DRE) requires performance criteria with negligible environmental consequences for the swamps CRHS1, CCHS3 and CCHS4, including:

- *negligible change in the size of the swamp;*
- *negligible change in the functioning of the swamp;*
- *negligible change to the composition or distribution of species within the swamp; and*
- *negligible drainage of water from the swamp, or redistribution of water within the swamp*

The PAC specifies negligible to mean "*small and unimportant so as not to be worth considering*". Satisfying the DRE criteria is clearly not possible for the swamps within the subsidence zone of Longwall 5 and may well not be possible for CRHS1 which is within the immediate vicinity of the longwalls and within the SMP zone and management/application area.

Swamp CRHS1 is well within the Longwall 5 subsidence impact zone defined by the 35 degree angle of draw accepted for the Southern Coalfield. The swamp is 75 metres from the end of the longwall and the impact zone would extend outwards for at least 200 metres. Reflecting the extent of the impact zone, the length of Longwall 4 has been curtailed to avoid impacts on Mt Ousley Road. Accordingly Longwall 4, like Longwall 5, is about 300m from Mt Ousley Road. In contrast CRHS1 is about 75m from Longwall 5 - well within the 35 degree angle of draw subsidence impact zone. Risking harm to repairable public roads is not acceptable, but risking harm to priceless and irreparable natural features is acceptable.

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Remediation of swamps is not possible and the PAC observes "*For swamps there is no solid evidence that self-sealing occurs at all, or is 100 percent effective if it does occur*." By the time monitoring has established swamp impacts it may well be too late to prevent the decline of the impacted swamp.

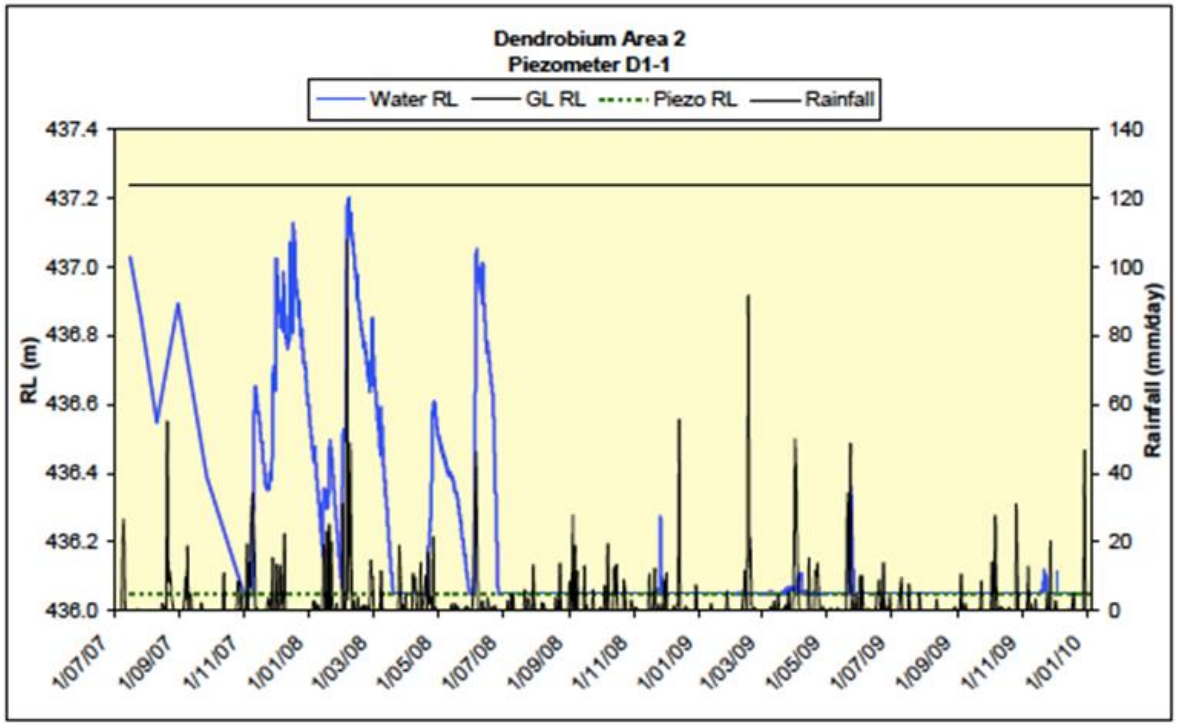

Figure 6. Shallow groundwater piezometer (blue line) readings before during and after mining of longwall 5 in Dendrobium Area 2. The piezometer stops responding to rain as a result of mining, with the water level dropping.

The EA enigmatically states "*Monitoring of perched groundwater within valley fill and upland in the broader study area, has been shown to fluctuate between no standing water after extended dry*

periods to approximately 1.8 m below ground surface." The meaning of this statement is unclear, but suggests significant impacts on swamps and/or near-surface waters (see Figure 6 for a relevant example). The Water Management Plan of the updated Appendix J describes difficulty in installing piezometers in the dry soils of CCHS3 and CCHS4. It may well be then that these swamps have already been damaged by previous mining. Approval of the current proposal would of course compound existing damage.

Approving Longwalls 4 and 5 would approve the loss of the nearby swamps. The Gujarat EA states "*If these subsidence effects result in changes to groundwater and drying of soils they may result in the loss of wetter sub-communities (Tea-tree Thicket) and contraction of Upland Swamps along with resultant encroachment of surrounding woodland communities*." The EA foreshadows the loss of the swamps; swamps of special significance status and listed as Endangered Ecological Communities under the TSC Act.

Approving the development proposed by Gujarat will contradict the purpose of the March 2012 Endangered Ecological Community listing of the swamps under the NSW Threatened Species Conservation Act. The TSC Act listing declaration provides considerable detail on the importance of the swamps. As mentioned, the declaration lists longwall coal mining as a threat and points out that longwall coal mining has been listed as a Key Threatening Process under the TSC Act.

Approving the development proposed by Gujarat would ignore the repeated statements by the Sydney Catchment Authority (SCA) emphasising the vital role of the swamps in the Special Areas. The SCA's view of the importance of the swamps has been recognised and accepted by the PAC. The PAC states that the swamps "*act as significant regional water stores providing baseflow to the drainage systems of the plateau*". The PAC also states that it "*regards the hydrology of swamps to be especially vulnerable in view of their thin plate-like structure*" and "*They are, in effect, very thin plate-like aquifers*."

In discussing the role of the swamps the PAC states: "*The conventional wisdom that the upland swamps are perched systems and not in contact with the underlying groundwater systems rests on very little hard evidence. Swamps in the Kangaloon area are reported in the EA as perched but these swamps are situated some 30 km to the south and are relatively small in areal extent. There is a real possibility that the larger swamps of the Woronora Plateau and the high density of swamps have, over the course of time, sustained an elevated water table that is very close to or connected with the base of swamps. Subsidence induced disturbance beneath swamps may have wider implication for regional groundwater flows*." The PAC also observes that it and others have " … *sought examples of desiccated swamps that have not been undermined but none have been forthcoming to date.*"

Approving the development proposed by Gujarat will ignore the value of the swamp cluster located between Cataract Creek in the north and Cataract River to the south.

Approving the development proposed by Gujarat would ignore the expectation that the swamps will soon be listed under the Commonwealth Environmental Protection and Biological Conservation (EPBC) Act. The PAC summarises reasons for an EPBC listing of the swamps in its report on the BSO project.

Surface Waters

The Subsidence Monitoring Plan for Longwalls 4 and 5 (Revision 7 of July 30 2012) states that the NSW Division of Resources and Energy (DRE) requires performance criteria with negligible environmental consequences including:

- *negligible diversion of flows or changes in the natural drainage behaviour of pools;*
- *negligible gas releases and iron staining; and*
- *negligible increase in water turbidity*

The PAC specifies negligible to mean "*small and unimportant so as not to be worth considering*" and further states[1]:

> *The Panel therefore recommends that the definition of "negligible impact" for rivers and streams should be: "no diversion of flows, no change in the natural drainage behaviour of pools, minimal iron staining, minimal gas releases and continued maintenance of water quality at its pre-mining standard".*

.Acknowledging existing damage, Cataract Creek has been recognised by the Planning Assessment Commission (PAC) as having "*highly significant values*" making it "*worthy of protection.*[1] Approximately 800 metres of Cataract Creek is located in the proposed subsidence management area. The creek passes over the north eastern first workings and is 30 metres from Longwall 5. Cataract Creek is well within the 200 metre subsidence impact zone defined by the 35 degree angle of draw accepted for the Southern Coalfield.

Figure 7. Loss of flow in Lizard Creek and Waratah Rivulet following longwall mining. Other examples include Cataract River, Georges River, Native Dog Creek and Wongawilli Creek.

As the Gujarat Environmental Assessment (EA) implies, Cataract Creek will suffer the now well documented impacts of subsidence in the region and these impacts will not be negligible. The Gujarat EA advises "*it is not possible to exactly define the potential magnitude of these losses or the lengths of streams likely to be impacted*." It is of note that the proposed panel widths are much the same as those responsible for the severe damage to the Waratah Rivulet and its tributaries. The

depth of cover above the seam being mined is some 100 metres greater at the Waratah Rivulet than at Cataract Creek.

The Gujarat EA optimistically states "*The impacts are likely to be restricted to short reaches where flow infiltrates into cracks in the bed, then remerges further downstream*." Some of the diverted flow may be lost from the Cataract catchment, as the Sydney Catchment Authority believes has occurred in the damaged section of the Waratah Rivulet in the Woronora Catchment. The optimistic expectations of the Gujarat EA do not constitute negligible impacts.

Low order streams play a vital role in connecting upland swamps to higher order streams. Evidently originating at the edge of swamps, two first order streams join together directly over Longwall 5 to form a second order tributary to Cataract Creek; these streams will be severely impacted by the subsidence over Longwall 5. A first order stream is associated with swamp CCHS3 over Longwall 5. There is also a first order stream emerging from the northern side of CCHS4 .

Figure 8. Loss of flow in Wongawilli Creek following longwall mining.

Water protection required under the law

The Environmental Assessment and Planning (EP&A) Act 1979 requires a consent authority to "*refuse to grant consent to a development application relating to any part of the Sydney drinking water catchment unless the consent authority is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on the quality of water*." Given the role of swamps, damage to swamps inescapably fails the Neutral or Beneficial Effect (NorBE) on water test, in contravention of the EP&A Act.

In the interests of the proponent and consequential State revenue, and ignoring considerations of cumulative impacts, the meaning of neutral could of course be 'redefined' and blurred by the consent authority admitting some 'negligible' deviation from neutral and accepting some level of

damage to swamps. The public could then have no respect for the consent authority or the legislative framework within which it operates. Cumulative impacts cannot be ignored.

Biodiversity

As mentioned the Coastal Upland Swamps of the Sydney Bioregion has been listed as an Endangered Ecological Community under the NSW Threatened Special Conservation (TSC) Act. The listing by the NSW Scientific Committee summarises the impacts of subsidence on these complex and biologically rich communities. Most of the Coastal Upland Swamps of the Sydney Bioregion are located on the Woronora Plateau, most of those are within the Schedule 1 Special Areas and most of those are within the Metropolitan Special Area.

The Biodiversity Management Plan (BMP) provided in the updated Appendix J points out that swamps CRHS2, CRHS3, CCHS1, CCHS2 and CCHS4 are mapped as potential habitats for the Giant Burrowing Frog and Littlejohn's Tree Frog, which are listed as vulnerable under the TSC Act and the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act. The BMP tabulates a number of other fauna and flora species listed as endangered, threatened or vulnerable under TSC and/or EPBC Acts.

There is increasing recognition of the importance of protecting and nurturing biodiversity; this widely acknowledged need can no longer be dismissed as an irritating obsession of fringe 'greenies'. The CSIRO for instance has recently released a report recommending an expansion of national parks as a response to the threat to biodiversity posed by climate change. Coal mine emissions of course contribute to global warming.

Biodiversity, like water, is fundamentally essential; coal is not.

Economic Benefit

Annually coal mining in the Southern Coalfields contributes approximately 10% of the State's coal mining royalties, which provide approximately 2-3% of the total State revenues. The Southern Coalfields employ 2,500 people of some 180,000 employed in the region. Employment levels have declined with the introduction of improved machinery and equipment, as is the case for Gujarat NRE.

Substantial sums of money are invested in mining equipment, but much of that equipment is manufactured overseas. The longwall machine recently purchased by Gujarat for instance was made in China. Most coal mining companies are either multinationals or entirely foreign owned, and their profits largely flow overseas.

In promoting the purported benefits of coal mining, proponents and Government fail to fully assess the impact costs of mining, which include increasingly evident and largely quantifiable health and utility infrastructure costs to the tax payer and largely unquantifiable short and long term environmental and social costs. The toxins and compounds produced when coal is burnt include mercury, sulfur dioxide, nitrous oxides and fine particulates which penetrate deep into our lungs. Coal combustion is a leading driver of climate change. It is folly not to assess the full life cycle costs of coal mining and usage.

In contrast to the readily assessed and relatively limited benefit of longwall coal mining, the ongoing inter-generational value of protecting the catchments that currently provide water to some five million people and harbour high biodiversity communities cannot be financially assessed.

The value of the Special Areas goes beyond the provision of high quality drinking water; a role which in principle could be augmented or replaced by filtration and/or desalination plants. Sydney has already had to invest $2 billion in a desalination plant to meet water supply demands during drought. Southern Coalfield royalties might pay for the plant over twenty years or more, but the tax payer continues to pay for the very high operating costs.

The relevant irony of the Special Areas and Dharawal National Park

After more than two decades of community lobbying, in March 2012 the NSW Coalition Government declared the Dharawal National Park, so honouring a pre-election commitment. This followed the lapsing of coal mining leases that had apparently prevented the previous Labor Government from honouring its 1993 pre-election commitment to establish the national park. Mining is banned within the Dharawal National Park.

In effect the declaration of the Dharawal National Park ‘absorbed’ and replaced the Dharawal State Conservation Area and the Dharawal Nature Reserve. While mining is possible within state conservation areas, in practice it would require closure of otherwise publicly accessible areas. BHP Billiton’s large and complex Bulli Seam Operations (BSO) project nonetheless proposed mining beneath the then Dharawal State Conservation Area.

The area defined by what was the Dharawal State Conservation Area and Nature Reserve largely coincides with the Sydney Catchment Authority managed Schedule 2 O'Hares Creek Special Area, which was declared in April 1927. Prior to the declaration of the Dharawal National Park, the O'Hares Creek Catchment of the O'Hares Creek Special Area had been recognised by the Federal Government as being of National Environmental Significance, with National Estate listing.

The BSO proposal posed a significant dilemma for the then Labor State Government and a public relations challenge for BHP Billiton. Approving the BSO project would yield royalties, but this would require finally abandoning a long standing Labor commitment to protect the area. It would also require closing the state conservation area to the general public - an area for which there was a compelling case, and strong community demand, for full protection from mining.

In this context, in July 2010 the NSW Planning Assessment Commission released a highly critical assessment of the BSO Project. The BSO report rejected BHP-Billiton's environmental provisions, recognised the importance of the area's natural surface features, set negligible-impact benchmarks for natural features such as rivers, streams and the upland swamps and criticised the process by which environmental impact assessments (EAs) are provided by project proponents.

Evidently accepting that there was very little realistic prospect of ever gaining mining approval, in October 2010 BHP-B abandoned its plans to extract coal from the Dharawal State Conservation Area and eighteen months later Dharawal National Parl was declared and mining was banned within its borders - to the centre of the Earth.

The declaration of the Dharawal National Parl exposed a significant irony. The Schedule 2 O'Hares Creek Special Area sits between the Schedule 1 Woronora Special Area on its northern border and the much larger Schedule 1 Metropolitan Special Area on its southern border. While the natural features that are protected within the National Park know no nothing of borders, unauthorised public access to the neighbouring Schedule 1 Special Areas is not permitted. The Schedule 1 Special Areas are intended to protect the immediate catchment area for the SCA managed water reservoirs.

The O'Hares Creek Special Area has a relatively small Coastal Upland Swamp community; in contrast the Metropolitan Special Areas harbours a large community, most of which is concentrated in its north eastern corner just over the southern boundary of the O'Hares Creek Special Area. Four swamps clusters are regarded by the NSW Office of Environment and Heritage as having particular significance in providing large contiguous areas of related habitat; all are the in the Metropolitan Special Area.

Ironically, with all of its runoff going into the Georges river, the declaration of the Dharawal National Park does nothing to protect the drinking water supply for Greater Sydney, the Illawarra or Southern Highlands. Just over the fence in the Schedule 1 Special Areas next door, from where the public is banned, mining companies daily damage the catchments.

Ironically, the declaration of the Dharawal National Park does nothing to protect the drinking water supply for Greater Sydney, the Illawarra or Southern Highlands. All of the runoff from Dharawal runs into the Georges River, making no contribution to the region's water supply. While mining is now banned in the Schedule 2 O'Hares Creek Special Area (Dharawal National Park), mining is not

banned in the adjacent Metropolitan and Woronora Schedule 1 Special Areas. Mining continues to cause damage daily in the Schedule 1 Special Areas.

In effect, the Schedule 1 Special Areas are 'fenced-off' special mining areas where mining companies may carry out catchment-damaging operations out of sight of the banned general public. Conversely, next door in the Dharawal National Park mining companies are banned so that the general public can enjoy a picnic - with no risk them harming the catchments.

The longwalls sought by Gujarat are in the Metropolitan Special Area, where the public is banned. The longwalls are not in a state conservation area that would have to be closed to allow mining to safely proceed, and where the public would otherwise see the damage the PAC approves.

Comments on Gujarat NRE

Gujarat NRE have established a track record of non-compliance. Management plans required for the approved Preliminary Works project have been months overdue and the company was months late in establishing a Community Consultative Committee (CCC). The formation of a CCC in accord with DoPI guidelines by a fixed date was a requirement of the Preliminary Works project approval.

Six months into the approval period for the Preliminary Works project, prompted by concerns raised by the community, the DoPI initiated a compliance investigation in April of this year. Four months later there has been no finding and no penalty. At the time of writing, the first anniversary of the three year project is just a few weeks away.

Gujarat have twice been penalised $1,500 by the EPA and the SCA has very recently fined Gujarat $1,500 for damage caused to swamp and *Pultenaea aristata* during the establishment of subsidence monitoring equipment for Longwall 4.

Some three months into the project approval period and three months before the due date, Gujarat attempted to form an alternative to the conventional Community Consultative Committee (CCC) utilised by other mining companies. Gujarat relentlessly sought to impose what was clearly an unwieldy community advisory system that was not in accord with the DoPI CCC guidelines. A group of community members selected by Gujarat as an engagement framework development oversight and design group (Community Review Team) repeatedly advised the company that the CCC alternative being pursued was not in accord with DoPI guidelines, would not be functional and was not acceptable. Gujarat ignored the advice and requests of the oversight group and in doing so made it clear that the company was not sincerely engaging in a consultation process. Remarkably, the company suggested to the DoPI that it was the community that sought a CCC alternative.

Though having refused to meet with community representatives to discuss their concerns, the DoPI eventually agreed with their position and a conventional CCC has since been formed. A CCC was required to have been formed and operating by April 13 2012; it was instead formed in July and its first meeting was held on the 21st of August - some 10 months into the projects three year approval period.

The DoPI will be well aware that the account of the formation of the CCC given in the EA is incorrect and very misleading. The account suggests a company acting in accord with requirements

and sympathetic to the interests of the community. The correspondence between the company, DoPI and community representatives makes it clear however that this not the case. It is disappointing and disturbing that the DoPI appears to knowingly accept the misleading account given in the EA.

A pattern is emerging that reveals Gujarat have adopted a step-by-step approach to expanding their NRE 1 mine, having so far failed to successfully submit an application for the expansion project. A Part 3A application titled ‘‘NRE No. 1 Mine Project’ (MP09_0013) was submitted in early 2009 for “*for the consolidation of its existing operations, continuation of operations and upgrade of associated surface facilities at NRE No. 1 Colliery*”. Director-General’s environmental assessment requirements were issued in March 2009. At some unknown point this project application was withdrawn. An "Underground Expansion Project" application was submitted by Gujarat in August 2009, apparently again under MP 09_0013 and again for the “*consolidation of its existing operations, continuation of operations and upgrade of associated surface facilities at NRE No. 1 Colliery*”. The application included a preliminary Environmental Assessment (EA) and this document is available from the DoPI Website. Director-General requirements were issued in the same month. The DoPI received a draft EA for the expansion project in February 2011. There appear to have been no further submissions for MP09_0013 from Gujarat. A substantial amount of the material in Appendix J of the current Modification application would appear to be associated with the Underground Expansion Project.

The Preliminary Works proposal was submitted as a Part 3A application (MP10_0046) in March 2010 to extract remnant coal reserves within stipulated mining areas, and augment and upgrade existing infrastructure including surface facilities. The application was approved in October 2011, in spite of agency opposition and opposition from Wollongong Council. As mentioned, a number of management plans required under the approval are believed to remain outstanding and there are submitted plans that have yet to be approved.

Seeking to side-step the need for approval under the Environmental Planning and Assessment Act 1979 (EP&A Act), sometime around September 2011 Gujarat submitted a subsidence management plan (SMP) for Longwalls 4 and 5 to the Division of Resources and Energy (DRE) in the Department of Trade and Investment. On 24 February 2012 Gujarat advised the Australian Stock Exchange that they intended to commence mining of Longwall 4 from 13 March 2012. The DRE approved a SMP for Longwall (LW) 4 on 26 March 2012, subject to meeting certain conditions and the provision of additional documentation. Longwall 5 was not approved, being directly beneath significant upland swamps.

Gujarat have succeeded in being able to abuse a transitional legislative provision (clause 8K) put in place to address the problem posed by a small number of mines operating without EP&A Act approval for historical reasons.

Gujarat have succeeded in being able to abuse a transitional legislative provision (clause 8K) put in place to address the problem posed by a small number of mines operating without EP&A Act approval for historical reasons. Apparently unhappy with the use of the transitional legislation, the DoPI initially refused to endorse the DRE approval of the Longwall 4 SMP. Following a subsequent series of meetings with Gujarat, the DoPI changed its mind.

The provisions of the transitional legislation were to end on the 31st of December 2011, however the termination date was changed to March and then the 31st of July and then September 30th this year. The current modification proposal to add Longwalls 4 and 5 to the Preliminary Works project was submitted in August 2012

The transitional provisions exploited by Gujarat were not intended to allow the introduction of new longwalls and the legality of the approval is currently the subject of a 'David and Goliath' court challenge by the community group Illawarra Residents for Responsible Mining.

It is surely reasonable to suggest that the legislative provisions of NSW should not be subverted to facilitate the commercial imperatives of developers. It is surely reasonable to suggest that the DoPI should act in the public interest and not yield to the commercial imperatives of developers.

It is surely reasonable to suggest that the legislative provisions of NSW should not be subverted to facilitate the commercial imperatives of developers. It is surely reasonable to suggest that the DoPI should act in the public interest and not yield to the commercial imperatives of developers.

Comments on the Role of the Department of Planning and Infrastructure

The environmental assessment (EA) for the current proposal lacked referenced material and contained errors and misleading statements. The EA referred to material in Appendix J that became available on the Department of Planning and Infrastructure's (DoPI's) Web site on Wednesday August 29. The DoPI were unaware that material was missing until members of the pubic expressed concern. When the missing management plan information was pointed out to the DoPI, the presumptive, dismissive and bewildering response was that the general public did not need to see these documents and few would want to see them.

A corrected commitments section of the proponents Environmental Assessment was provided by the DoPI to one person late in the afternoon of Friday August 31. This revision does not appear to have been made available on the Department's Web site and seems to have appeared on the proponent's site sometime between Friday August 31 and the closing date of Monday September 3.

The EA refers to approved management plans that it seems have not been approved (discussed further below). With omissions, misleading statements and corrections made 'on the run', this proposal was clearly not ready for public exhibition.

The SCA expresses similar concerns about the Preliminary Works proposal; "*The SCA is concerned there are discrepancies in the EA including different mine layouts for the V-Mains; inconsistent Wallandoola Creek characterization plans; and no groundwater monitoring within the V-Mains area*".

Failure to comply with the Preliminary Works project approval requirements and a number of other issues led to a DoPI compliance investigation being initiated earlier this year. As noted above, to date there has no finding or penalty.

The DoPI's evident tolerance of Gujarat's tardiness, omissions and misleading statements is sharply contrasted by its dismissive responses to the concerns of the public. The current Modification proposal has more than 900 pages of documentation associated with it, yet it was made available for public comment for just three weeks. Perplexed members of the public requested an extension of the submission deadline, pointing out the extensive documentation and that working members of the community with family and other personal commitments had little time in which to read, absorb and comment on the proposal. The Department refused the extension requests, suggesting instead that initial submissions be submitted by the fixed deadline with the option of subsequently providing a revised submission. This concession provides little relief for those making submissions, with most preferring not to take a staged approach.

In responding to the requests for a deadline extension, the DoPI commented that it was only obliged to provide a two week exhibition period. Evidently the community was to be grateful for the generosity of a three week submission period. Gujarat initially advised that the exhibition period was four weeks, but amended that advice when it learned the DoPI period was three weeks. Another mistake it seems.

While the DoPI refused to grant a deadline extension to the general public, it readily tolerates late submissions from Gujarat. When community representatives requested a meeting with DoPI to discuss their concerns with the approach Gujarat was taking to the formation of a CCC, they were refused.

It is difficult to conclude other than that the NSW assessment and regulatory system, as manifested in the DoPI, is biased in favour of the developer. It is difficult to conclude other than that the DoPI's determination to facilitate the interests of the project proponent, in contrast to its dismissive response to the concerns of the general public, reflects regulatory capture.

The Federal Senate Inquiry into the management of the Murray Darling Basin and the impacts of coal seam gas highlighted the long standing concern that governments and their agencies act under a corrupting conflict of interest. That is, the adjudicator and regulator is also the recipient of revenues from project proponents. Senator Edwards asks an industry spokesperson "*how long do you think it is going to be before the community expects there to be an independent umpire for regulation of this industry and what have you with regard to the current problem where the recipient of significant royalties and benefits from the coal seam mining—gas explosion in terms of growth—is also the regulator of all the environmental and community issues?*"[8]

The community is of course very well aware of this conflict of interest. While the PAC is formally an independent body set up in response to community concerns, noting its members are appointed by the Minister for Planning and Infrastructure by a selection process that is not given on the PAC Website, the DoPI is an agency of government. The DoPI is pivotal in determining proposal outcomes and the specification and adjudication of approval conditions and requirements. The DoPI may or may not accept the recommendations of the PAC. For instance the PAC made the following recommendation in its report on the Metropolitan Expansion Project; "*The Panel recommends that a specific program be developed between the Sydney Catchment Authority (SCA) and the Proponent to further investigate the existence or otherwise of catchment yield impacts*." That recommendation was not included in the conditions of approval for the contentious project and that recommendation has not otherwise been acted upon.

Suggestive of the concerns of Senator Edwards, in its report on the Bulli Seam Operations (BSO) project the PAC commented on the lack of credibility in having proponents select and fund consultants to undertake environmental assessments. That clearly corrupting system remains in place.

As government agencies the SCA and OEH provide expert advice and recommendations that the DoPI may choose to accept or set aside; there is a substantial history of the latter. The DoPI explains their liberty as necessary in considering the 'bigger picture'. Few beyond the concerned community will be aware of this hierarchy in the NSW assessment and regulatory system. Choice modelling manipulations aside, most would expect that if the SCA determined that a proposal posed an unacceptable risk to the Special Areas, then that activity would not be allowed to proceed.

Instead however the DoPI may judge that a degradation of the Special Areas is acceptable when balanced against its assessment of revenue, investment and employment benefits - even if that might ultimately require a new filtration plant or perhaps a desalination plant. This was the response when a very senior member of the DoPI was asked in May of this year of the consequences if what is already known of the impacts of longwall mining were to be propagated across the leases held over the Special Area lands and waters. The SCA expects more than 90 percent of the Special Areas to be undermined over the next twenty years. Each project approval is a step towards that expectation.

The front cover of this submission depicts the then Opposition Leader campaigning to protect water from coal mining. In Government and corrupted by royalty revenue that "common sense" is forgotten. The Premier and his minsters will argue that they have to take tough decisions to balance the budget. Maybe, but there is a limit to what can sensibly be sacrificed for the next budget and the following election. Biodiversity is far more important than coal. Water is far more important than coal.

Comments on the role of the Planning Assessment Commission

In its brief report recommending approval of Gujarat's Preliminary Works Project the PAC states

"*It is clear from the submissions and the assessment report that there are substantial concerns with the proposed future expansion project. However, the Commission has not seen this proposal and is in no position to form any view on it. Consequently, the Commission's decision on the project application before it cannot be construed as any form of endorsement of any aspect of this future expansion project.*

That said, the Commission considers that separation of project applications where the primary purpose of the first is to facilitate the second could lead to lack of public confidence in the NSW assessment and regulatory systems and must be considered undesirable. In this context it should be noted that major regulatory authorities and Wollongong City Council were among those submitters who raised the concern."

That is, the PAC is well aware that there is a significant level of concern among relevant agencies such the SCA and Wollongong City Council and recognises that such concerns would not be groundless. The PAC nonetheless sets the agency concerns aside, with a determination not to know anything of the expansion project. The 'see no evil' attitude expressed in the PAC report contradicts

its earlier recognition of the need for caution in considering environmental impacts, which was expressed in some detail in the report on the Bulli Seam Operations (BSO) project.

Choosing to ignore the expansion project may perhaps be legally defensible within the current legislative framework in NSW and welcomed within Government, but it is not morally defensible and it surely offends basic common sense**.** That abdication of responsibility would be compounded if the PAC likewise buried its head in the coal of the Modification proposal

The PAC is a tad late in recognising the risk of losing public confidence. Given the almost relentless and statistically unlikely record of project approvals, community confidence in the PAC is all but gone and community confidence in the DoPI is long gone.

The PAC's stern statement that approval of the Preliminary Works cannot be construed as any form of endorsement of the planned expansion is a statement for the record that in practice means nothing. Gujarat would without doubt see approval of the Preliminary Works project as a step toward approval of the expansion project; the water has been tested and the next step towards expansion will follow. The current 'Modification' proposal is the third step, with DRE and DoPI having assisted with the 'tricky' second step around the obstacle that is the Environmental Planning and Assessment (EP&A) Act.

The PAC approval of the Preliminary Works states; "*The Commission is aware that development of this infrastructure could be used to pressure both decision makers and regulators in relation to this future expansion project. However, the Commission notes that the Proponent in response to these submissions confirmed that it would be developing the infrastructure at its own financial risk*."

Again a statement for the record that means nothing in practice. In approving the Preliminary Works project the PAC has initiated substantial investment in infrastructure needed for longwall mining in the Metropolitan Special Area. The history of PAC and DoPI approvals give Gujarat, and other mining companies, every reason to confidently expect follow-on approvals.

That confidence can be found for example in Peabody undertaking mine works, installations and de-gassing well in advance of the announcement of the approval of its expansion of the Metropolitan Colliery. That confidence can be found in the PAC yielding to Peabody assertions of mine closure when setting requirements and recommendations for the approval of the expansion of the Metropolitan Colliery. That confidence can be found in PAC approval recommendations that are ignored by the DoPI. That confidence can be found in Gujarat's statements to the stock exchange. That confidence is reinforced by the DoPI evidently being readily swayed by Gujarat's arguments to accept the abuse of the transitional clause of the EP&A Act that has allowed Longwall 4 to be mined under a DRE approved Subsidence Management Plan, though a continuation of section 74 of the Mining Act of 1992. The arguments that swayed the DoPI are unknown, but it seems likely they would have been centred around an imminent mine closure threatening jobs and State revenue, and the pressing need to accordingly leverage investment in the Preliminary Works project. That confidence would be further reinforced by the remarkable tolerance the DoPI have shown towards Gujarat's compliance failures.

Setting aside the advice and recommendations of expert agencies such as the SCA and OEH aside, themselves Government agencies subject to Government policy and pressure, both undermines their credibility and brings their relevance and value into question. At the same time it erodes the

credibility of the DoPI and PAC. It won't escape notice that while a member of the public face fines of $44,000 for walking into the Schedule 1 Special Areas, the SCA has fined Gujarat $1,500 for removing endangered swamp and *Pultenaea aristata* vegetation during Longwall 4 operations.

Many reasons have accumulated for the loss of "*public confidence in the NSW assessment and regulatory system*s".

Conclusion

In gaining Subsidence Management Plan approval to commence Longwall 4 from the Division of Resources and Energy (DRE) with the support of the Department of Planning and Infrastructure (DoPI), Gujarat NRE have abused a transitional provision of the Environmental Planning and Assessment Act to bypass the approval process otherwise required of new mining projects. Following that precedent, Gujarat now seek to abuse section 75W of the discredited and repealed Part 3A legislation to further incrementally establish their expansion project, following the Planning Assessment Commission (PAC) approval of their Preliminary Works Project. The PAC approval set aside the concerns of the Sydney Catchment Authority (SCA), the Office of Environment and Heritage and Wollongong Council. With contortions suggestive of the desperation of a Banana Republic, the DRE, DoPI and PAC evidently value coal royalties more than long term water security and biodiversity protection.

The current proposal has errors, misleading statements and is contains of an amalgam of subsidence management plans and expansion plan material. Gujarat have a record of non-compliance, misleading representations and have been fined by the SCA and the Environmental Protection Authority. Nonetheless, the statistically implausible track record of approvals by the assessment and consent agencies will give Gujarat sound cause for confidence that the current proposal will be approved.

It may be twenty or thirty years before a coal mine is closed and begins to slowly fill with water; until then water will be lost from aquifers, streams and swamps. When the mine does fill many years later, aquifer cross-contamination and leaching from fracture zones will have degraded near surface groundwaters and surface waters. No rational person free of vested interest could conclude other than that coal mining contradicts the intent of the Special Areas and violates the provisions of the Environmental Planning and Assessment Act. No rational person would value coal more than water and biodiversity.

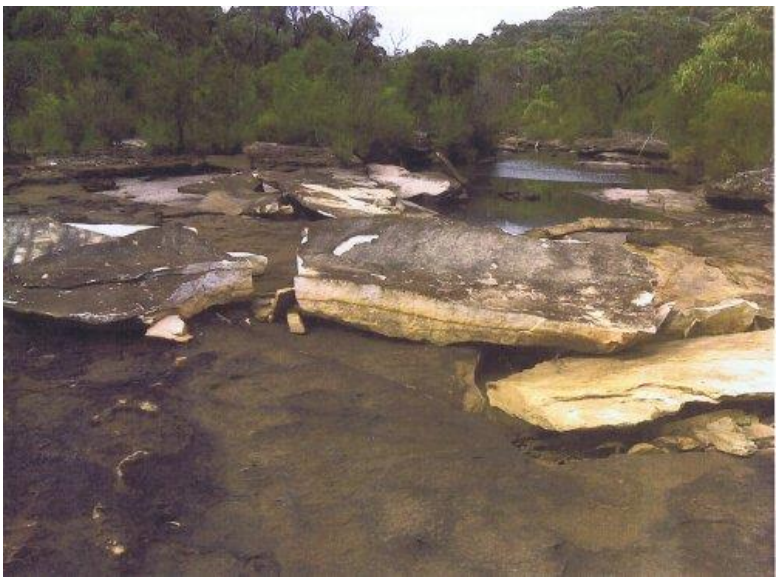

Figure 9. Large bed rock fragments displaced following subsidence at the Waratah Rivulet.

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24 December 2012

PAC Determination – NRE No 1 Colliery, Preliminary Works Project Modification 1 – MP10_0046 MOD 1

1. Background

The mine the subject of this determination (NRE No. 1) is located approximately eight kilometres north of Wollongong. Underground mining has been undertaken on the site since the late 1880s in the Bulli and Balgownie Seams. The current owner and operator is Gujarat NRE Coking Coal Ltd (Gujarat).

On 13 October 2011 the Planning Assessment Commission (the Commission) granted project approval (MP07_0103) for the NRE No. 1 Colliery Preliminary Works Project. This permitted extraction of up to 1 million tonnes per annum (Mtpa) of run-of-mine coking coal for a period of three years. The approved coal extraction methodology was through first workings and pillar extraction only, from the Bulli and Wongawilli Seams.

Since this approval, Gujarat has extracted coal using longwall mining techniques from one panel (Longwall 4). This occurred under a Subsidence Management (SMP) approved by the Division of Resources and Energy (DRE) due to a transitional provision in the Environmental Planning and Assessment Regulation 2000 (clause 8K). Gujarat sought DRE approval for Longwall 5 through this same process. However, DRE did not determine this matter and the transitional provision window has now closed.

Gujarat has also submitted a Part 3A project application for its Underground Expansion Project (MP09_0013). This would significantly expand mining to the west for a period of 18 years, and involves longwall mining for up to an additional 16 longwall panels. The Director-General's Requirements were issued on 18 August 2009. The EA has recently been submitted to the Department and is currently being considered for adequacy prior to any public exhibition.

2. Project Modification

On 14 May 2012 Gujarat lodged an application to modify the project approval for the Preliminary Works Project, seeking consent to:

- extract coal using longwall mining techniques in the Wongawilli Seam for Longwalls 4 and 5; and
- develop the maingates for Longwalls 6, 7 and 8.

During the course of the application the length of Longwall 5 has been shortened from 1,145m to approximately 845m, primarily to reduce the potential impact on an upland swamp (CCUS4).

The Commission notes that there is no current approval for extraction of Longwalls 6, 7 and 8 which the proposed maingates are intended to service.

A total of 877,220 tonnes of coal would be extracted. The capital investment value is $20 million, and the proposal would continue employment for 284 workers at the mine.

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3. Delegation to the Commission

The Honourable Brad Hazzard MP, Minister for Planning and Infrastructure, delegated his powers and functions to determine certain project applications to the Planning Assessment Commission.

The NRE No 1 Preliminary Works project was referred to the Planning Assessment Commission, and then determined under the terms of the Minister's delegation of 14 September 2011. This subsequent Modification 1 under section 75W of the *Environmental Planning and Assessment Act 1979* also meets the terms of this delegation, and as such has been referred to the Commission for a decision.

Ms Gabrielle Kibble AO nominated Dr Neil Shepherd AM to chair the Commission and Mr Garry West to be a member of the Commission for determination of the modification.

4. Department's Assessment Report

The Director-General's Environmental Assessment Report provided a detailed assessment of the following key issues:

- Subsidence effects;
- Upland swamps;
- Surface water;
- Biodiversity;
- Groundwater;
- Impacts of various changes to the conditions and Statement of Commitments; and
- Socio-economic implications.

Other issues considered include: Aboriginal and non-Aboriginal heritage, air quality/greenhouse gas emissions, waste and noise.

5. Commission's Consultation

On 18 and 19 December 2012 the Commission met with representatives of the following:

- Illawarra Residents for Responsible Mining (IRRM);
- Save Our Water Catchment Areas (SOWCA);
- National Parks Association (NPA);
- Construction, Forestry, Mining and Energy Union (CFMEU);
- Wollongong City Council;
- The Proponent (NRE);
- The Department of Planning and Infrastructure (the Department);
- Office of Environment and Heritage (OEH);
- Sydney Catchment Authority (SCA); and
- NSW Office of Water (NOW) (via teleconference only).

At each meeting the Commission Chair for this determination (Dr Neil Shepherd AM) provided an outline of the process to date, the timing for a decision, the process compared to other matters (such as a review), that the EA for the major expansion project has recently been submitted, other meetings to be held, the scope of documents reviewed and appeal rights.

The Commission's summary of the other matters discussed at each of these meetings is available in Appendix A.

6. Commission's Comments

6.1 Timing of the Decision and Process

The Commission received this project modification for determination on the evening of 3 December 2012. The nature of the modification, and the proximity of its arrival to the traditional Christmas 'shut-down', created some issues for the determination process. Under its usual procedures for a project of this type the Commission would hold a public meeting to give the general community and Special Interest Groups an opportunity to provide comment to the Commission on the content of the Department's Assessment Report and recommendation. These meetings require advertising, appropriate notice and a significant amount of organizing. As a matter of practice they are not held in the period from shortly before Christmas until toward the end of January. The reason is that any public process conducted in this period is generally considered to lack *bona fides.*

The Community Groups argued (and maintain the position) that a public meeting should be held in February 2013. But for this project, deferral of the public process until February 2013 would mean closure of the two mines and significant loss of employment. Faced with these opposing interests, the Commission made a decision to proceed as follows:

- invite the Community Groups who had been involved with the project assessment to a meeting with the Commission to discuss their issues directly. This meeting was held in Wollongong on 18 December 2012. Meetings were also held at Wollongong on that day with the CFMEU, Wollongong City Council and the Proponent;
- invite the government agencies who had expressed concerns to meet with the Commission on 19 December 2012. Meetings were held with OEH and SCA, and a teleconference was held with NOW; and
- receive a briefing from the Department on 19 December 2012.

The Commission itself met on 18 and 19 December and liaised on other occasions.

The Commission recognises that this does not satisfy the concerns of Community Groups and that some individuals were unable to attend the meeting with the Commission. However, a wide range of issues was discussed (see section 5.1) and the Commission considers that it was presented with a comprehensive overview of the issues of concern across the full spectrum from residential amenity to impacts on the drinking water catchment and the perceived deficiencies in process, information and consultation associated with this modification and its assessment. There was also considerable focus on the track record of the Proponent in relation to previous commitments and regulatory requirements and whether this record demonstrated a lack of capacity to meet commitments or requirements necessary to achieve the performance outcomes under this proposed modification.

The Commission has made changes to the recommended conditions as a result of the meetings with Community Groups, government agencies and the Council.

6.2 Socio-Economic Factors

The Community Groups argued that the acknowledged difficult financial position of the Proponent was attributable to actions by the Proponent and should not be allowed to influence either the timing of the Commission's decision or the decision itself. The Commission agrees with this assessment.

However, employment is a relevant consideration and there are some 284 jobs directly dependent on the decision and a further 236 indirectly dependent (but closely tied) jobs at the sister colliery (Wongawilli). It appears to be common ground between the Proponent, CFMEU and the Department that if the modification is not approved both mines will close with the loss of 520 jobs. There have already been significant reductions in contractor positions with completion of Longwall 4 and in line with similar reductions elsewhere in the

mining industry. The usually claimed local and regional multiplier effects have not been factored into the above employment figures.

The Community Groups pointed out that the positions were a very small proportion of the total Illawarra workforce, that industries came and went in the Illawarra on a regular basis, and that there was no guarantee that this project modification was any more than a temporary fix that would need to be re-visited within a short period. The Commission doesn't disagree with this analysis. However, the other side of the coin is that assessment of the main project[1] is now making some progress, continuity of employment during this period is highly desirable for the industry and for the employees and their families, and that there may be some longer term future employment prospects once a determination on the main project is made later in 2013.

In this uncertain framework the Commission is of the view that the balance lies with maintaining continuity of employment if this can be done within the context of the overall merits of the proposal and maintenance of proper decision-making processes.

6.3 Concerns with sufficiency of Information and Deferral of Decisions to Management Plans

The system of mining approvals under the former Part 3A (which still applies to some transitional projects including this one) relies on the project approval containing the performance outcomes and the 'skeleton' of the requirements for how these are to be achieved, monitored and reported on, with the detail contained in various plans required to be provided and approved prior to particular actions occurring, such as commencement of construction or increase in production. Approvals under Part 3A also effectively override controls under some other legislation, e.g. Threatened Species and Aboriginal Cultural Heritage.

Community Groups raised concern about the amount of information-gathering and decision-making that was being deferred to these subsequent plans which were not available when the decision to approve or refuse the project application was being made. They also expressed concern that these subsequent decisions were critically important in terms of the impacts of a project, but not subject to public consultation. These concerns have been raised with the Commission in relation to many other mining projects and have been identified in Commission reports. However, the overall model for mining approvals is a matter for government. The Commission's role is to be satisfied that the model can work in relation to the application under consideration.

In relation to the community group concerns about sufficiency of information and deferral of decision-making, the Commission has taken the view that, provided there is sufficient information on which to base the decision and the approval contains clear performance outcomes and clear requirements as to how these are to be achieved, the model can work. But what amounts to 'sufficient information' is a contested issue. Community Groups argue that all baseline information required under various policies and procedures should be available (e.g. 2 years baseline data on many natural features such as watercourses and upland swamps). This is echoed by some government agencies in the context of their statutory responsibilities (e.g. NSW Office of Water, Office of Environment and Heritage, Sydney Catchment Authority).

In the Commission's experience perfect data sets are rarely (if ever) available. While this is regrettable (and ought to be solvable), it is currently reality. The issue was discussed extensively in the Commission's determination reports on Boggabri Coal Expansion Project

[1] The Proponent has been preparing a proposal for a much larger project for some time (the Underground Expansion Project MP09-0013) which is referred to as the 'main project' in this report.

(2012)[2] and Berrima Colliery Continued Operations Project (2012).[3] The latter determination is currently under appeal to the Land and Environment Court,[4] in part on this issue. The Commission considers that, while the data are deficient for some important aspects of this project application (a point also acknowledged in the Department's Assessment Report at p.24), there is sufficient information available on which to base a decision and that the risks involved are manageable.

However, it is fair criticism that the relevant information for this modification was confounded with a large amount of information from the studies undertaken for the main project application and it was time-consuming and difficult for people to find and assess the relevant material in the time available. While information volume and time constraints are common complaints made to the Commission about participation in the assessment process, in this case the complaints were supported by examples of irrelevant material and changes to material during the exhibition period. The Commission has therefore allowed for the fact that the level of concern expressed by submitters, including the Community Groups, probably under-represents the level of concern.

The other important issue that was raised with the Commission in this context is that the subsequent plans often contain requirements for consultation with relevant government authorities (usually State, but also Councils and the Commonwealth) and/or the relevant community consultation forums. These consultation requirements are often relied on by these bodies to ensure that they can provide meaningful input at an appropriate stage to address concerns that they expressed in the assessment phase. Without this mechanism, outright opposition to approval would be much more evident.

It follows that for this to work the consultation must be meaningful and the Department must take full account of it in its assessment and approval of the subsequent plans. Concern has been expressed to the Commission on multiple occasions (including this one) that neither proponents nor the Department necessarily meet expectations in this area. In a number of recent approvals the Commission has addressed specific concerns by requiring that the relevant agency be satisfied with the plan prior to its approval by the Director-General (see Ashton South East Open Cut Coal Project Determination Report (2012), pp.11-12 re NSW Office of Water, and Boggabri Coal Expansion Project Approval, (2012) re Office of Environment and Heritage).

The problem with this as a general model is that it effectively re-introduces a *de facto* concurrence power into the approval. However, given the effect of Part 3A and the importance that the plans have assumed as a mechanism for addressing concerns held by various bodies about aspects of project proposals, this approach may need to be adopted more frequently in the future if the concerns expressed by agencies and the community groups about the effectiveness of consultation are not addressed.

The Commission has not taken this step for this project modification given its limited scope and duration of effect. However, the performance of the consultation processes for both agencies and the Community Consultative Committee under this approval should be considered as relevant inputs to decisions about the next stage(s) of the project.

6.4 The Role of Repeated Modifications in this Mining Project

This project modification needs to be seen in context. As noted above, the Proponent has been preparing a proposal for a much larger project for some considerable time. In October

[2] PAC, Boggabri Coal Expansion Project Determination Report, 2012, pp.3-4
[3] PAC, Berrima Colliery Continued Operations Project Determination Report, 2012, p.7
[4] SHCAG Pty Ltd v Minister for Planning and Infrastructure and Boral Cement Limited 2012 NSW LEC Case No 12/10752

2011 the Commission approved a modification to allow limited extraction and development of preliminary works for the main project in the belief that this would allow the environmental assessment for the main project to be lodged, exhibited, assessed and determined without the need for any other modifications. This approach was strongly opposed by some government agencies, Wollongong City Council and Community Groups on the basis that it was a piecemeal approach to planning in which the primary purpose of the application was to facilitate positive decisions on a subsequent controversial project proposal for which no detail was available.

The Commission agreed with the views expressed by these submitters: *'the Commission considers that separation of project applications where the primary purpose of the first is to facilitate the second could lead to lack of public confidence in the NSW assessment and regulatory systems and must be considered undesirable. In this context it should be noted that major regulatory authorities and Wollongong City Council were among those submitters who raised the concern.'*[5] However the Commission considered that the benefits of continued operation while a proper consideration of the main project was undertaken outweighed the concerns. The Commission also considered that the potential environmental impacts of the modification were acceptable.

The position with the current modification is essentially the same as the last one. It is an interim step designed to provide continuity of mine operations while the main project is assessed and determined. It also suffers from the same type of perceived defects as the last one: it seeks approval for some extraction and some development works to facilitate future operations for which limited detail is available. It has also received the same in-principle criticisms from the same sources. The only differences evident to the Commission are that the future operations to be facilitated are smaller in scale and the environmental assessment for the main project has at least now been lodged with the Department.

The question is what to do about it. The position of the Community Groups is clear: the modification is an abuse of process and should be refused. The agencies and Council are equally concerned about approval of the maingates without full information about the potential environmental impacts of extraction of the longwall panels they are designed to facilitate. The Proponent and CFMEU point out that, without at least some of the maingates in place when LW5 is completed, the continuity of operations will be lost and the main project will fail during the assessment process.

The position is compounded by the fact that, even if this current modification is approved, at least one or more modifications will be required to extract LW6 (and possibly LW7) before the main project can be determined. This is based on extraction of the shortened LW5 taking 4-5 months and the fact that the information relevant to a decision on LW6 and LW7 is not included in this modification application.

The Commission has carefully considered the options available and the concerns expressed by the various interested parties. The Commission is not prepared to agree to development of all the maingates sought (i.e. 6, 7 and 8). Because of the immediacy of the continuity requirements, the Commission will agree to the development of Maingate 6 in conjunction with extraction of LW5. (On the information available to the Commission, to approve LW5 without Maingate 6 would be a futile exercise.)

The Commission makes no comment about the merits of extraction for LW6. That will have to be considered on the basis of the information supplied at the time approval is sought. The approval of the maingate for LW6 should not be taken as any form of endorsement by this Commission of the possibility of approval for extraction.

[5] PAC, NRE No 1 Colliery Preliminary Works Project Determination Report, 2011, p.3

6.5 Upland Swamps

Community groups emphasised the Commission's previous position on protection of upland swamps in the Sydney Catchment Area based on their intrinsic biodiversity values and their critical role in regulating flow and water quality in the catchment (see Bulli Seam Operations Review Report, Chapter 6, pp.81-138).

The Commission considers that its decision to approve LW5 and Maingate 6 is consistent with the principles in the Bulli Seam Operations Review Report (BSO Review Report):

(i) the swamp of special significance, CCUS 23, has been protected by shortening the proposed LW5 and the swamp of special significance in the vicinity of LW6 (CCUS 4) will not be impacted by development of the maingates for LW6. OEH have confirmed (meeting with Commission 19/12/12) that they do not believe that LW5 will cause impact to CCUS 4 based on the subsidence data from LW4.

(ii) The swamp to be undermined (and therefore potentially impacted) by LW5 is CCUS 3. This swamp was originally thought to fit draft criteria for special significance, but the position has been revised based on work by the Proponent's consultant, Biosis. The Commission is satisfied that this revised position is not a matter of 'convenience'. Experts from both OEH and SCA were interrogated on this issue and supported the revised status. OEH investigations show the swamp to be relatively dry.

The BSO Review Report was clear that for mining to proceed in the catchment some swamps that were not classified as being of special significance would be impacted. The objective was to minimise the number to be impacted and the nature of the impacts (see pp.136-138 of the BSO Review Report re the application of the principles and the Metropolitan Coal Project Review Report 2009 pp.80-84 for a discussion of the issues). The additional factors since publication of the PAC review reports are the listing of upland swamps as EECs under the NSW Threatened Species Act in 2012 and the circulation of draft guidelines by OEH on upland swamp environmental assessments.[6]

The OEH draft guidelines have been used by the Proponent's consultants (Biosis) in their mapping of swamps in the Project Area. The Department's Assessment Report notes that this is appropriate (Assessment Report, p.13). The Proponent, when questioned by the Commission on this issue, responded that the guidelines provided a reasonable baseline to work from. SCA and OEH have indicated that the Biosis mapping is of high quality and supported by ground-truthing. The Commission therefore accepts the classifications of upland swamps provided in the Proponent's Response to Submissions (RTS) for the purposes of determination of this project.

In the absence of government decisions that no swamps will be impacted, or that no mining will occur in the catchment, the position remains essentially as described in the BSO report with the two additional factors described above.

The Commission considers that the socio-economic factors associated with this project modification warrant accepting that some impact will occur to swamp CCUS 3 associated with the mining of LW5. Additional monitoring conditions have been added to the draft approval conditions to improve the information base concerning subsidence impacts on upland swamps arising from longwall mining, including a focus on the swamps in Table 1 of Schedule 3. This covers CCUS4, CCUS3 and CRUS1. Both OEH and SCA consider this an acceptable outcome based on the information available. However, the agencies and the Commission note that monitoring must commence immediately.

[6] OEH, Draft Upland Swamp Environmental Assessment Guidelines, 2012

The issue of strategies to manage impacts to swamps was discussed with the Community Groups, the Proponent, OEH and SCA. From these discussions it appears to be common ground that:

- adaptive management strategies are not likely to work for upland swamps already exposed to impacts, but that they may inform management decisions for avoiding consequences for other swamps that may be exposed to similar subsidence impacts under the existing mine plan;
- like-for-like offsets are not available; and
- remediation of swamps will not be feasible in the forseeable future.

The options are avoidance, alteration of the mine plan in the vicinity of the swamp (principally narrowing longwalls or stopping short) or alternative forms of offset. For CCUS 23 the longwall has been shortened (LW5). The Proponent acknowledged that a similar approach will be required for CCUS 4 in the context of LW6.

6.6 Surface Water

Given the Commission's decision to restrict the approval to LW5 and Maingate 6 there is relatively little potential impact on surface waters. However, SCA raised concern that the predicted subsidence could cause impacts on Cataract Creek at the very end of LW5 and requested that the adaptive management plan reflect this risk and the need to avoid impacts above the 'negligible environmental consequences' threshold. The Commission considers that the amended conditions provide for this, but specifically draws the concern to the attention of the Proponent and the Department so that there is no possibility of misunderstanding the Commission's intent.

The SCA also drew attention to the differences between Cataract Creek and many other streams in the Catchment Area (also noted in the Department's Assessment Report at pp.15-16) and requested modifications to some of the performance outcomes in Schedule 3 to ensure that the potential impacts on this stream would be catered for adequately. The Commission has therefore inserted additional criteria in the relevant Table in condition 1 of Schedule 3.

6.7 Proposed Modifications to Existing Conditions and the 2010 Statement of Commitments

Four of these changes were recommended for approval by the Department. Community Groups were adamant that the process of consultation on these was unsatisfactory and complained about changes in the proposal to accommodate these modifications on the last working day of the exhibition period. The Community Groups generally objected to the proposals.

(i) Bulli Conveyor Decommissioning

Currently required by end 2012. This requirement was based on expected completion of other works that would have eliminated the need for the conveyor. These works have not been completed, but the need to move coal remains. This will have to occur using the conveyor or some other means. The conveyor is a source of noise impact on the surrounding community. The Department's recommendation was simply to extend the timeframe for decommissioning until 2016. However, the Proponent can meet its need to move coal using the conveyor during daytime hours only and this restriction has been inserted in the conditions. This is considered a reasonable outcome until the conveyor can be decommissioned. Decommissioning will now be required as soon as the driveage for the Wonga Mains is completed.

(ii) Bellambi Creek Diversion

The Proponent advised the Commission that the coal stockpile modification would not occur for some time and that there would therefore be no change in the current

risk profile associated with the existing underground pipe section of Bellambi Creek. The Department recommended the completion date be extended to December 2014. This is opposed by Council and by the Community Groups.

It is clear that the commitment will not be met by 31 December 2012 and it is also clear that the Community Groups see this as a high priority. The Commission has therefore imposed a condition to override the existing commitment with a required completion date of 31 December 2013.

(iii) Acoustic Screens

The Proponent had committed to construct two noise barriers as part of the original application for the Preliminary Works Project. There has been some contention over whether the noise barriers would be effective. The Community Groups clearly have an expectation that noise attenuation will be delivered. Simply deleting the screens as proposed by the Proponent and the Department will not meet this expectation. The Proponent has indicated to the Commission that it is prepared to provide the screens as committed, but considers that it would be preferable to spend the money on something that would be effective.

The Commission considers that the best course is to utilise the noise audit (or other noise assessment if the noise audit has been completed) to determine what options for noise reduction exist and to apply the funds to the most appropriate options. A condition has been inserted to achieve this.

(iv) Speed Limits on Bellambi Lane

The Commission considers the proposed amendment to the Statement of Commitments is acceptable. However, the Commission has inserted an additional condition requiring the Proponent to consult with Council concerning the possibility of imposing a general 50kph limit on Bellambi Lane. This would shift enforcement responsibility for speed limits to the appropriate authority.

6.8 Statutory Context

The application is for a modification under section 75W of the EP&A Act. Community Groups have submitted that this application is for a substantially different activity than is covered by the original Preliminary Works Project approval. The Department argues (Assessment Report, p.3) that, although there are some differences, they are minor and do not change the essential nature or scale of the activity.

The positions adopted appear to reflect different objectives rather than different facts. In the Commission's view the Department's position is arguably stronger, but the matter is not free from doubt. The Commission will therefore proceed to determine the matter on the basis that it is a legitimate exercise of the powers under 75W.

6.9 Conclusion

The Commission notes the considerable disquiet expressed by Community groups, government agencies and Wollongong City Council on a range of matters including, *inter alia,* absence of important information, the piecemeal approach to assessment of this mining project, the track record of the Proponent in meeting commitments and regulatory requirements and the risk to the catchment.

There were significant environmental impacts associated with this modification as proposed. These have been reduced substantially by reducing LW5 in length and by removing Maingates 7 and 8 from the proposal. Additional monitoring requirements have been imposed for natural features. The agencies with regulatory responsibilities for natural

resources (OEH, SCA and NOW) accept the revised proposals as reasonable and consider the predicted impacts of these revised proposals are acceptable.

The proposed modifications that would have affected residential amenity have also been amended to reduce their impact on the local community. However, their effectiveness is still dependent on implementation action by the Proponent. The Department will need to ensure this occurs.

The Commission's approach will secure the continued direct employment of up to 520 people during the next phase of this project development. The Commission considers that this is a significant benefit that weighs substantially in assessing the benefits and disbenefits of the proposal.

Overall, the Commission considers that this modification should be approved with significant amendments to reduce the environmental impacts to an acceptable level. However, the community clearly has little faith in the capacity of either the Proponent or the regulatory agencies to ensure that the project proceeds within the boundaries of the approval and that commitments are met. It is important for the credibility of the industry, the planning process, and the regulatory agencies that the litany of errors, breaches and non-delivery of commitments is not repeated.

7. Commission's Determination

The Commission has carefully considered the Department's Assessment Report, public and agency submissions, recommended conditions of approval, and associated documents such as the Proponent's Response to Submissions and the Addendum to that Response. The Commission has also considered views expressed at meetings with representatives of community and special interest groups, government agencies, Wollongong City Council, the CFMEU and the Proponent.

The Commission considers that the proposed modification is within the scope of section 75W of the EP&A Act and that, on balance, the modification should be approved subject to the Commission's amended conditions. The reasons are set out in this report. This approval does not extend to the development of Maingates 7 and 8 as identified in the modification application.

Dr Neil Shepherd AM
Member of the Commission

Mr Garry West
Member of the Commission

Appendix A – Details of the Commission's Consultation

A.1 Resident and Environmental Groups

The Commission met with representatives from the following resident and environmental groups on 18 December 2012 between approximately 10.00am and 12.30pm:

- Illawarra Residents for Responsible Mining (IRRM);
- Save Our Water Catchment Areas (SOWCA); and
- National Parks Association (NPA).

The matters raised by the groups' representatives included:

- Process issues:
    - No justification for not holding a public meeting, it is required under the PAC guidance and it should be held in February 2013.
    - The make-up of the PAC Commission members and the absence of an environmental representative on the PAC.
    - The timing and late notice of the meeting affected who could attend to represent the groups.
    - Timing and poor availability of documents during the exhibition period, including updated documents.
    - The proposal is not a 'modification' under s75W.
    - The supporting documents were over 1,000 pages which is not commensurate with a modification, and difficult for people to understand especially in tight notification timeframes.
    - No modification should be approved until existing issues are resolved.
    - Ongoing use of financial viability and job losses ('brinkmanship') by the Proponent to pressure the Government into making a decision.
    - Lack of enforcement of existing and proposed conditions of consent.
    - Broader concerns about the Proponent's poor compliance record.
    - Bias in Proponent funded reports and need for independent reports.
    - Poor consultation process (e.g. local Aboriginal people have expressed concern about lack of meaningful consultation, and lack of notification to local residents re conveyor and sound barriers in particular).
    - The Commission should read all the EA, and background documents and visit the site.
    - Reliance on community and environmental groups to take on a non-paid monitoring role, which is the enforcement authority's role.
    - Piecemeal, incremental and fractured assessment process.
- Environmental issues:
    - Triple-seam mining untested, yet being carried out in a highly sensitive area.
    - Shortening of longwall 5 does not resolve the impacts.
    - Subsidence impacts.
    - Impacts on swamps particularly Swamp 4, but also need to consider effects on Swamp 3 and question its reclassification from being a swamp of 'special significance'.
    - Previous mining has caused damage, such as rock fracturing from mining in the Bulli seam and drop in swamp water levels.
    - Long term impact on drinking water, including from acid mine drainage.
    - Uncertainty of impacts.
    - Potential that the community rather than the mine will bear the cost of remediation.
    - It is not possible to stop a longwall and therefore TARPs will be of no use.
    - TARPs are entirely ineffectual in relation to swamps.
    - Need to avoid damage as remediation is not always possible, and hence should seek 'nil' damage rather than 'negligible'.
    - Baseline monitoring has not been carried out and lack of confidence in compliance with conditions of consent.
    - Offsets are inappropriate and ineffectual.

    - Need to define words such as ‘negligible’ and provide criterion to ensure impacts are measurable.
    - Incremental decision making impacts on the environment, and the need to protect headwaters and swamps in the most important rivers and catchments.
    - A precautionary approach is required.
- Socio-Economic issues:
    - The project viability or financial position of a private company should not determine the planning process or outcome.
    - The employment benefit has been overstated (and would be some 221 rather than 300).
    - The employment generated is minor within the context of the broader area with some 180,000 people forming the Illawarra workforce.
    - As technology improves the employment rate decreases, and jobs have already been lost consistent with other coal mines.
    - Limited evidence that the mining industry has unusual upstream or downstream economic benefits.
    - The potential impact on the water supply is not factored into the potential costs of the project.
- Other local area issues:
    - Dust, noise and general health impacts on local residents.
    - Concern above the creek diversion and prior flooding event.
    - The need to manage overflow paths and the need for the Proponent to establish a notional self-insurance fund that is government guaranteed for liabilities in case of future events.
    - The conveyor should be decommissioned, as that was a commitment made and impacts that arise such as noise with no mitigation suggested.
    - The sound barriers should not be removed, as that was a commitment made and intended to reduce noise impacts with no real justification (e.g. noise assessment) or alternate suggested.
    - Noise audit required by condition has not been released.
    - Proponent cited lack of complaints as a justification – locals have ‘put up with impacts’ as they have been patient and expected the impacts to cease at the times set out in the project approval.
    - Impact on Aboriginal cultural heritage sites.
    - Need to provide bushwalker access to SCA areas to monitor mining impacts.

A.2 Construction, Forestry, Mining and Energy Union (CFMEU)

The Commission met with representatives from the CFMEU on 18 December 2012 between approximately 1.00pm and 1.30pm, where the CFMEU made the following key points:

- If the application is not approved, it will result in job losses at both No.1 and then Wongawilli (on top of recent job losses).
- If the application is not approved, other companies will not be paid resulting in broader job losses and economic impacts in the Region.
- Potential that without further income from the coal associated with Longwall 5 that current and future employee pay and entitlements may not be paid out.
- History of two-tier mining in the area, and now Longwall 4 has been completed.
- Longwall 5 appears likely to provide a better yield and quality of coal than Longwall 4.
- Longwall 4 was a learning and training opportunity, with the experience able to be applied to Longwall 5.
- Longwall 5 will bridge the gap to any approval of the major expansion project and keep the existing investment, infrastructure and employment maintained.
- Need the maingates to maintain continuity.
- General support for approval of the modification, and support for the company to continue operating, and recognition of the mine’s existing and future employment opportunities.

A.3 Wollongong City Council (WCC)

The Commission met with representatives from Wollongong City Council on 18 December 2012 between approximately 1.30pm and 2.00pm, where the Council made the following key points:

- Support for the shortening of Longwall 5.
- Need to ensure that environmental management and compliance is achieved and enforced.
- Concern about the delay proposed for the creek diversion and would prefer it within 6 months.
- Concern about both retention of the conveyor and removal of the acoustic barriers, due to current noise impacts on residents and lack of mitigation measures.
- In a flood event the Council would likely assist in any clean-up but no mechanism to claim compensation from the mine.
- Council is relying on Department advice with regard to swamps due to lack of in-house expertise in this specific field.
- Need for Council to both encourage employment in the short-term and also longer term environmental needs, with a particular emphasis on protecting the water catchment.

A.4 Proponent (NRE)

The Commission met with representatives of the Proponent on 18 December 2012 between approximately 2.00pm and 4.00pm, where the following was discussed:

- The Proponent outlined its planning history and process to date, which has resulted in the Preliminary Works and Major Expansion projects as separate applications.
- Confirmation that Longwall 4 is completed.
- Various delays have resulted in financial difficultly, and without approval it is difficult to secure investment finance.
- The company purchased the mines and made them operational, increasing employment and economic activity.
- Updated Management Plans have been submitted to the Department.
- The Proponent advised Maingates 6, 7 and 8 are required for continuity as they link to future stages, continue employment, and extract coal.
- If the future mine plan is not approved, the Proponent accepts the risk but also considers there would be some scope to modify the maingates (e.g. narrow pillars, narrow or shorten the longwalls).
- Use of data from Longwall 4 which is also multi-seam, to assist with Longwall 5.
- Longwall 5 if approved would take approximately 4 months commencing mid-January.
- Likelihood that further modifications would be required to continue mining due to the assessment timeframe likely for the major extension project.
- Likelihood of major issues with Longwall 8, particularly its impact on the surface features (including swamps and Cataract Creek).
- Inability to use TARPS when undermining a swamp, and potential for long-term impacts and inability to remediate.
- Discussions on the implications for any changes to the modification as recommended by the Department.
- Reasons for, timing, and possible mitigation impacts in relation to the conveyor. Ability to meet daytime operation restriction.
- Reasons for, and other possible mitigation impacts in lieu of the acoustic barriers. Need for an appropriate evidence base to justify any removal from the commitments.
- Issues surrounding the 50km/hr self-imposed speed limit on Bellambi Lane which is in conflict with the posted speed, and impossible for the Proponent to enforce considering the other users of the road. The Commission recommended approaching the Council about possible changing the posted speed limit which would then apply to all users.
- The Proponent's changes in consultants to SCT and Biosis and improvement in communication with government agencies.
- Issues with prior compliance and lack of base monitoring information.

A.5 Department of Planning and Infrastructure (the Department)

The Commission met with representatives of the Department on 19 December 2012 between approximately 9.00am and 10.00am, where the Commission outlined its concerns on the following:

- The need to monitor Swamp 3 during any mining of Longwall 5 and as an evidence base for Longwall 6.
- The need to monitor Swamp 4 during any mining of Longwall 5 because of risk of edge effect.
- The need to commence monitoring of Longwall 5 now to establish the baseline, noting it will commence from the west.
- The purpose of Maingates 6, 7 and 8 and implications of any approval.
- Likelihood of a future modification seeking to continue mining prior to any major expansion project approval, and status of the EA.
- Mitigation options in relation to the conveyor and implications if it is not decommissioned.
- The purpose of the creek diversion and timing.
- The Department advised the noise audit is currently being prepared, and the Commission's view is it needs to consider the audit results and more detailed noise assessment before a decision is made to remove the acoustic barriers.
- Lack of ability for a private operator to enforce speed limits on Bellambi Lane and the need to avoid large disparities in travel speed, and that a preferred approach is for the authority responsible for the road to determine the speed limit.

A.6 Office of Environment and Heritage (OEH)

The Commission met with representatives of the Office of Environment and Heritage (OEH) on 19 December 2012 between approximately 10.00am and 11.30am, where the OEH outlined its remaining issues as:

- The impact on swamps and creeks, including Swamp 3, is unknown and needs monitoring.
- Broad issue with prior mining damage to swamps and creeks, and the impact of different types of underground mining and effects.
- Issue with lack of monitoring, adequacy of monitoring, timing of monitoring, insufficient baseline data and that it would be useful for data to be provided to OEH.
- General issue with monitoring being pushed down the line to management plans where OEH is not an approval authority, and that without monitoring can't then demonstrate or measure whether consent conditions are met.
- Preference to simplify measurements (e.g. use of water level measurements with piezometers on swamps as a primary indicator with a substantial baseline) and a general issue on how to monitor and judge impacts attributable to mining.
- Issues associated with TARPS, swamp remediation and offsets.
- OEH advice that the Aboriginal consultation process was consistent with that undertaken for large-scale projects and it was satisfied with the consultation process and the assessment.
- General discussion on where there can be a disparity between Aboriginal consultation and the 'significance' identified and management outcomes of Aboriginal Cultural Heritage.
- Low likelihood of subsidence impacts on Aboriginal Cultural Heritage but mining processes generally seem to accelerate degradation. Preferred method is to avoid impacts and to protect the context of ACH.
- In relation to Condition 38 OEH requested upfront clarification in the definitions of what is 'negligible' environmental impact and 'in consultation with the OEH'. Concern that details are deferred to a management plan and that OEH has no approval role.
- OEH's general frustration with the piecemeal approach and ongoing information of information through the process which should have been available upfront.

A.7 Sydney Catchment Authority (SCA)

The Commission met with representatives of the Sydney Catchment Authority on 19 December 2012 between approximately 11.30am and 1.00pm, where the SCA outlined the following matters:

- The sensitivity of the location in relation to Sydney's drinking water catchment and that it is within a SCA Special Area.
- The SCA's mining principles being essentially about protecting water supplies, the environment and human health.
- Photographs from a recent site visit including discolouration in Cataract Creek including bedrock delamination presumed from recent mining activities.
- SCA endorses the recommended conditions in relation to negligible environmental consequences.
- SCA concern about Maingates 6, 7 and 8 providing access to further longwalls with potentially significant impacts on Cataract Creek, swamps and possibly Cataract Reservoir.
- The Proponent's poor record of compliance with conditions of approval.
- Evidence of some 'negligible' subsidence impacts on Cataract Creek.
- Potential for bank erosion of Cataract Creek and the need for additional negligible environmental consequence criteria.
- Potential for increase in sediment in Cataract Creek and the need for additional negligible environmental consequence criteria.
- Potential for reduction in quantity of water reaching reservoir and the need for additional negligible environmental consequence criteria.
- Research findings indicating redirected water flows are not simply automatically finding another path to reservoirs but may be being 'lost' from the system to the sea or groundwater storage areas that may or may not fill and then flow to the reservoir.
- SCA concern adaptive management not adequate to ensure acceptable environmental outcomes.
- Need for Proponent to report weekly during longwall mining on the surface impacts.
- Mining LW5 may need to pull up short to stop impact on Cataract Creek.
- Turbidity in streams and creeks.

A.8 NSW Office of Water (NOW)

The Commission spoke with a representative of the NSW Office of Water via teleconference on 19 December 2012 between approximately 2.00pm and 2.15pm, where the NOW outlined the following matters:

- Noted receipt of the LW5 water management plan, and no in-principle objection to the modification in itself.
- However, there remains a large degree of uncertainty about subsidence and its effects on upland swamps and creeks.
- Requirement for comprehensive monitoring and if performance criteria breached then need to cease operations.
- Need to properly use TARPs and apply effective adaptive management (e.g. if triggers reached need to reduce the width and length of workings).
- Issues with access to information from the Proponent, and also to the site for monitoring.