**Maules Creek Community Council Inc**
upthecreek2382@gmail.com
Steve Bradshaw 02 6794 4503
Phil Laird 0428 712 622
Alistair Todd 0427 936 745
Peter Watson 0427 434 643

29 February 2011

Attn: Mr Steve O'Donoghue,
Mining & Extractive Industries
Major Development Assessment
Department of Planning
GPO Box 39
SYDNEY NSW 2001

Dear Mr O'Donoghue,

**Re: Tarrawonga Coal Mine Expansion Project**
**Project Application Number: 11_0047**

Please find enclosed a submission by the Maules Creek Community Council Inc (MCCC) regarding the Environmental Assessment by Tarrawonga Coal Pty Ltd (Tarrawonga) prepared as part of the abovementioned Project Application. Our submission addresses key aspects of the Environmental Assessment which impact the Maules Creek community and we have obtained advice from independently recognised experts where possible.

The Environmental Assessment involves a substantial expansion of the existing mining activities in the Leard State Forest. The Maules Creek area is in the immediate vicinity of the Leard State Forest and Maules Creek residents are directly impacted by the mining activities in the Forest.

Furthermore, the Tarrawonga Expansion is immediately adjacent to the Boggabri Coal Mine and proposed Maules Creek Project also located in the Leard State Forest both of which are currently seeking planning approval to commence or expand their operations. We strongly urge you to consider both the individual and cumulative impacts of the Tarrawonga Expansion, Maules Creek Coal Project and the Boggabri Coal Mine in determining whether approval is granted for either or any projects and, if approved, the conditions that will be placed upon these coal mining operations.

Should you wish to discuss our submission further, please contact any of the individuals listed above.

Yours sincerely
**Maules Creek Community Council Inc**

# Tarrawonga Coal Mine Expansion

Project Application Number: 11_0047

Submission by: **Maules Creek Community Council Inc**

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Steve Bradshaw 02 6794 4503
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# Contents

# Executive Summary

Tarrawonga Coal proposes to expand open cut mining on farmland in the local area, extending into the Leard State Forest (the Forest), a significant piece of public land and diverse ecological habitat. The Maules Creek Community Council Inc (MCCC), which represents local landholders and residents, is a significant stakeholder in the immediate vicinity of the current and proposed mining operations. The MCCC has made previous submissions to the Dept of Planning (DoP) re the Aston Resources proposed Maules Creek Coal Project and the adjacent Boggabri Coal Project.

This submission identifies a range of issues relating to deficiencies in the EA, impacts to local residents, and suggested recommendations to ensure that if approved, the project provides a net benefit to all stakeholders including the environment.

The position of the MCCC is that for any project to be supported by the community and thereby approved it should provide a Net Benefit for all the stakeholders including the environment. The environment is vitally important as there are stakeholders who are not yet born and we believe that we represent these stakeholders as well.

Below is a summary of the issues of concern which are expected to result from Tarrawonga Coal's continuation/expansion plans using the open cut mining methodology which are explained in further detail in the body of this submission.

*Cumulative Clearing of Leard State Forest*

The project further impacts the native vegetation and critically endangered White Box Grassy Woodland communities contained within the Leard State Forest. The proponents own assessment identifies the cumulatively impacts to the endangered and threaten species that live in there.

*Adequacy and appropriateness of proposed rehabilitation*

The rehabilitation methodology as to its ability to rehabilitate the Forest to its pre-mining condition is questionable with 20 cm of topsoil spread over the spoil. Furthermore, it is expected that this soil profile will not restore the land capability to its former condition. The proposed final void is not leading practice and will provide long term impacts to the groundwater and fauna of the area.

*Offsets*

It is expected the purchase of offset land adjacent to the Kaputar National Park by Tarrawonga Coal could not establish "like" for "like" with regard to the ecosystem currently contained within the Forest due to different elevations and vegetation.

*Decreased air quality*

Open cut mining has well-documented health, agricultural productivity and social impacts due to a general reduction in air quality. The MCCC has submitted a list of "principles" to guide the development of an extensive Air Quality Monitoring Network for the area if the Environmental Assessment is approved.

*Reconciliation of Cumulative Total Suspended Particulates*

The cumulative impacts to air quality have been assessed by the MCCC to exceed the depositions identified in the cumulative air quality contour maps. The proposed new and expanded mines is the Leard Forest area are estimated to emit approx 18,000 tonnes of dust and the contour maps do not account for these total emissions as a combination of airborne particulates and dust deposition.

*Reduction in groundwater quantity and quality*

Due to dust suppression and coal washing requirements over the 17 year period of the open cut mining lease, it is expected significant quantities of groundwater would be diverted from environmental and food production purposes. Other losses of ground water associated with mining due to diversions of runoff and reductions in recharge are a major concern. Water supply in the area is highly dependent on seasonal rainfall and the increased demand on the aquifer by the mining operations will have significant impacts on the local community in periods of drought.

*Impacts on the nearby Groundwater Dependent Ecosystems (GDE)*

Stygafauna have been documented in the Maules Creek and Back Creek aquifers and are potentially found in perched water tables near Goonbri Creek. Due to the depressurization effect and permanent reduction in the water table as shown in the Environmental Assessment (Drawing A-46 in Appendix A of the Environmental Assessment) and due to changes in water chemistry from aquifer connectivity, there could be serious impacts on the stygafauna.

*Diversion in surface flows*

The containment of onsite water within the mine site will have impacts on groundwater recharge and a potentially permanent reduction in water flows to the Namoi River reducing the water available for environmental and food production purposes. Damaging surface water diversions to farmland, crops and road infrastructure has already been anecdotally reported.

Community concern has been expressed at meetings and in the media re environmental contamination due to releases of surface water from within mine sites (Boggabri Coal and Tarrawonga Coal).

The Namoi Catchment Water Study is designed to model all cumulative impacts to water within the catchment. Individual projects should not be considered in isolation and the Environmental Assessment should be subject to the Namoi Catchment Water Study model before a decision is made.

*Impacts to Aboriginal heritage sites*

Cultural sites that are within the Forest and as yet undiscovered will be lost.

*Proposed closure of Leard Forest Road is unfeasible and unacceptable*

The Leard Forest Road is a vital emergency and trade route which should not be closed. The MCCC has an agreement with the Narrabri Shire Council and Boggabri Coal to develop an alternate flood free route through to the Manilla Rd. The proposed realignment of the Goonbri Road on to the floodplain has serious implications to the communities expectation that negotiated agreements will maintain flood free access to the Manilla Rd.

*Noise*

It is expected there will be significant impacts on Forest fauna and birdlife, and neighbouring properties due to noise resulting from blasting and heavy equipment.

*Negative impacts on property values*

Due to the noise, dust and water impacts described above there is expected to be an impact on property valuations in areas immediately adjacent to the zone of acquisition/affectation. The number of potential buyers is expected to reduce significantly and a bargaining power imbalance exists between the mine and landholders. The timing of land disposal is out of the control of the existing land owner causing uncertainty and stress for those nearing retirement, changing enterprise or wishing to expand their operations. There is anecdotal evidence that this is situation in the immediate vicinity of Tarrawonga Coal.

*Cumulative impact of mines in the Leard State Forest*

Highly magnified cumulative effects due to other planned large scale open cut projects in the Leard State Forest will have unforeseen impacts on the Forest environment and on the local community.

*Greenhouse gases (GHG)*

The Tarrawonga Coal project is expected to make a significant contribution to the NSW GHG emissions impacting on the NSW Kyoto targets and the climate variability that will impact on future Maules Creek farm businesses.

It is plain to see the impacts that the recently developed large scale, open cut mining has had on the Hunter Valley. It was not until the mining in the Hunter Valley moved from underground to open cut that the serious community and environmental issues with coal mining started to emerge. There is no need for a repeat of the same issues in a different location. The people of NSW should not have their environment, community and agricultural production put at risk for the benefit of a largely foreign owned company.

In the event the Environmental Assessment is approved, strict conditions should be placed on any approval that is granted to attempt to minimise or mitigate the impact of the issues of concern raised in this submission.

# Summary of Recommendations

The following is a summary of commitments Tarrawonga Coal should be required to make prior to expanding its mining operations. Further detail as to these commitments is included in the body of this submission at the respective page references set out below.

*Underground Mining*

- Underground Mining studies to the standard produced by Boggabri Coal in their EA be completed and released.
- Cost Benefit Economic analysis that compares the underground and open cut mining methodologies be prepared that outlines Net Benefit by stakeholder.
- The alternative underground mining report should provide an assessment of the benefits to the community and the environment of not disturbing the environment and fragmenting the community.
- Department of Planning consider the alternatives from the perspective of the NSW and local communities.
- The entire strategy for the development of the Tarrawonga Coal deposit should be presented to the Department of Planning and the community so that a proper cumulative assessment of all (including future) environmental and community impacts within the project boundary and outside the project boundary can be made.

*Air Quality and Greenhouse Gases*

- Require Tarrawonga Coal to participate in establishing a regional air quality monitoring network.
- Require the existing and proposed mines in the Leard Forest area commence discussions immediately with the Local Community as to proposed Air Quality Monitoring Network. A working party should be formed with an independent chair being appointed. Budgets and timelines should be agreed.
- All baseline data should be made available NOW and displayed on an appropriate website.
- Portable Monitors should be included in the network to allow the network to respond to changing conditions. E.g. As landforms change, air flows change.
- A series of Temperature Inversion monitoring stations should provide real time input to the monitoring network for the purpose of determining the impacts of inversion layers on air quality.
- The GHG emissions of the project should be considered in terms of its contributions to overall NSW emissions and Tarrawonga Coal should be required to offset these emissions in the voluntary emissions trading market to the extent identified as the GHG externality in EIA.

*Cumulative Impacts: Reconciliation of Total Suspended Particulates*

- A full audit of total cumulative TSP emissions needs to be completed for the three coal projects that take into account the inversion layers that occur 41% of the time within the Maules Creek basin.
- Existing background air quality conditions exceed OEH guidelines and there is no scope for additional dust emissions.
- That if coal mining is to occur, Underground Mining is the most viable means of maintaining air quality.
- If open cut mining is approved, the identified cumulative Zone of Affectation (ZoA) is significantly greater in extent compared to the ZoA described in the EA. The ZoA should extend as much as a 30 kilometre radius from the cumulative projects central point.
- That CALPUFF should be used for modelling of cumulative dust emissions from Coal Mines in the Leard Forest Area.

*Noise*

- Detailed Cumulative Noise Contour Maps be made available immediately including the assumptions.
- Measured noise levels including location, stability class, date and time data be made available.
- Noise monitoring be included in all air quality monitoring locations in the proposed Regional Air Quality Monitoring Network.

*Ecology and Biodiversity*

- Future EA's should not be deemed adequate until all environmental management documentation is available and included in the Environmental Assessment.
- Goonbri Creek should remain in its current location
- Land and soil capability be returned to the pre-mining levels in all areas of the project area post mining
- The final void should be closed
- Tarrawonga develop a detailed assessment of impacts to Threatened and Endangered species that are likely to occur in the area as described in theenvirofactor review.

*Groundwater Dependent Ecosystems*

- Develop four ecological monitoring programs in areas near the project boundary and a monitoring plan in put place to report to Planning NSW any changes in groundwater quality or groundwater depths which may impact adversely on the Stygofauna. These include:
    - Surface water sampling of aquatic macroinvertebrate, fish and amphibiam communities in surface aquatic ecosystems, including identified threatened species;
    - Ground sampling of water levels and chemistry adjacent to surface aquatic ecosystems; and
    - Groundwater sampling of subsurface stygofauna community

  - Groundwater sampling of subsurface microbial community

- Establishment of water levels and water chemistry monitoring to determine ranges and the width of the vadose zone saturation profiles associated with rooting depths of potential groundwater dependent vegetation communities that may be detrimentally impacted by sustained drawdown and/or rapid fluctuations in water levels.
- Establishment of a terrestrial vegetation condition monitoring program.

*Leard Forest Environmental Trust*

- Among the Dept of Planning consent conditions the companies should make provision for the impacts to the environment and the local community by forming the Leard Forest Environmental Trust (the Trust) and the Maules Creek Community Fund (the Fund).
- That clearly defined No Go Zones be identified by the NSW Dept of Planning and that these areas are adjacent to and include the Kaputar National Park, Leards Forest Conservation Area, Maules Creek, Middle Creek, Horesarm Creek and the Namoi River.
- Consulting Environmental Economists be engaged to determine the value of the Forest. Our suggestion is that Dr Ian Curtis be resourced to value the forest. That the value be peer reviewed and that the value form the basis for the provision identified in the Trust documentation.
- A working group be formed to develop the strategic plans, guidelines, and rules for the Fund and the Trust. This would include a detailed analysis of the households and farm properties within the provision area.
- Trustees for both the Fund and the Trust be appointed.
- An Arbitrator be identified to resolve issues that arise for the operation of the Fund.

*Surface Water*

- The steep overburden embankments at the Tarrawonga Coal Mine and the Boggabri Coal mine need to be modified/managed to reduce the velocity of the water reaching the floodplain. Larger water storage structures need to be in place to store the increased runoff created by the reduced water holding capacity of the rehabilitated areas.
- A resolution strategy for changes to overland flows should be developed with Office of Water or the EPA consultants providing arbitration/mediation services and baseline flow data. These services need to be advertised in the local media.

*Leard Forest Road Alternative route*

- Leard Forest Road Diversion and Goonbri Road Diversion should have the engineering drawings developed as part of the pre consent conditions required for both projects should any approval be granted.
- Leard Forest Road Diversion and Goonbri Road Diversion should be in place prior to the Leard Forest Road being cut by the mining operations of Boggabri Coal.

- Goonbri Road component of the alternative route must be out of flood reach to a similar degree to the existing flood free access provided by the Leard Forest Rd.

*Groundwater*

- That Goonbri Creek remain in its current location
- That the area of the recharge shown on the Leard Forest Drainage maps remain undisturbed.

*Health Impact Assessment*

- Hunter and New England Health should develop a baseline survey of all residents health within the cumulative affected area prior to the commencement of large scale coal mining.
- Carry out ongoing long term monitoring of the health of all residents within the cumulative affected area to determine if there is any damage to human health including mental health.
- Require modelling of the PM 2.5 emissions be revisited each successive year in the first 5 years to determine if initial modelling is correct. This information can be used to guide modelling of PM 2.5 emissions in future modifications and expansion projects in the area.
- Put in place optional housing relocation plans for residents should monitoring show exceedences for PM 10 or PM 2.5 emissions.
- Increase the number of PM 2.5 monitors in the proposed Air Quality Monitoring Network.
- Develop a groundwater and surface water monitoring/testing program to ensure zero impact to water quality.
- Regular monitoring of rainwater tanks of residents within the cumulative affected area.

*Compliance*

- The DPI provide trained staff for an office in Boggabri with approximately 2 EPA compliance inspectors per shift per mine. The office should be provided with appropriate administration support.
- Establish user pays funding for each of the proposed mines.

*Community Fund*

- Among the Dept of Planning consent conditions the companies should make provision for the impacts to the environment and the local community by forming the Leard Forest Environmental Trust and the Maules Creek Community Fund.
- That clearly defined No Go Zones be identified by the NSW Dept of Planning and that these areas are adjacent to and include the Kaputar National Park, Leards Forest Conservation Area, Maules Creek, Middle Creek, Horesarm Creek and the Namoi River.
- A working group be formed to develop the strategic plans, guidelines, and rules for the Fund and the Trust. This would include a detailed analysis of the households and farm properties within the provision area.
- Trustees for both the Fund and the Trust be appointed.
- An Arbitrator be identified to resolve issues that arise for the operation of the Fund.

*No Go Zones*

- Departmental briefings at the Maules Creek Hall to advise local people of what future exploration leases, expressions of interest and planned developments are known.
- Delineation of specific No Go Zones in the area. Departmental consultation at the Maules Creek Hall to identify these No Go Zones.

*Soils and Land Use*

- A detailed sub-soil management plan should be provided to ensure the land can be returned to its pre-mining soil capability. i.e. the depth of the soil needs to be returned to a sufficient depth to meet the criteria for a particular land capability. In other words maps of required soil depths would be needed which include subsoil placement between the regraded spoil and topsoil materials
- Post mining slope of the rehabilitated land needs to be returned to that of the slopes pre-mining in order to retain the existing land capability.
- It is inappropriate to apply a topsoil suitability for topdressing method to subsoils and that the amount and volume of subsoils to be moved, potentially stored and then put back, needs to be stated.

*Final Landform*

- The final void should be closed.
- The land capability in the area of the proposed final void should be returned to its current value.
- Funds should be retained in trust sufficient to close the final void.
- The Aquifer Interference License should not expire at the conclusion of mining after the final void is closed. Funds should be retained for monitoring of the groundwater levels sufficient for a minimum of 400 years.
- Tarrawonga Coal should use a impervious membrane to ensure that there is no potential for salts or heavy metals to concentrate in the soil above the standing water level.
- Detailed investigations should be conducted and appropriate works undertaken to ensure that there should be no potential for salts or heavy metals to get into the ground water.
- The final landform should be engineered in such a way as to maximize social, recreational and educational opportunities.

# Alternatives to the Proposed Project

The MCCC believes serious consideration should be given to the other options mentioned in the Environmental Assessment. These other options have not been fully investigated in the Environmental Assessment.

In our Boggabri Coal and Maules Creek Coal submissions the MCCC argued that examination of Underground Mining and its Economics for the key stakeholders should be mandatory for all open cut developments. This is particularly so on Public Land, with impacts to Native Vegetation and strongly recommends that this study should be completed before the Tarrawonga Coal Expansion Project Application is considered further.

## Key Issues and Concerns – Underground Mining Alternative

The Tarrawonga EA makes it clear that there are large coal reserves underlying the existing target seams and that these seams are unable to be accessed using open cut methods. The EA does not indicate the future plans of the company regarding these seams. It is the view of the MCCC that the company should provide information as to how these resources would be developed so that we can make a determination on how the proposed project dovetails into the development of the resource and whether it is an appropriate development of the State's assets for the benefit of the community as required under the EP&A Act.

As mentioned in earlier submissions, underground mining has many advantages for the environment and local community and the position of the MCCC is that if the Tarrawonga Expansion, proposed Maules Creek Coal project and the Boggabri Coal Mine extension are approved, the local community and environment can be best served by consenting to underground mining methods.

It is the view of the MCCC that this option should be considered as the best of the mining options. A recent CSIRO report[1] states that forests and native vegetation play a much larger role as carbon sinks than was originally thought and now that a price has been put on carbon pollution, we need to acknowledge that open cut mining in a forest is a retrograde option and is out of step with current thinking. As such it should be avoided at all costs.

Our reading of the Director Generals requirements say that the EA must include a "detailed description of the project including …alternatives considered". Despite this Tarrawonga Coal have not included a full or detailed analysis of the Underground Mining Option including economic modelling simply referring to the companies corporate objectives.

No detail is provided on an alternative project that utilizes all the coal seams in the sequence for the benefit of the people of NSW. A cost benefit analysis of such a project would inform this and other projects in the area.

Such an incremental development is typical of the Whitehaven model of project planning whereby small incremental projects are put forward for approval so that the cumulative impacts are very

[1] http://www.csiro.au/news/Forests-absorb-one-third-our-fossil-fuel-emissions.html

difficult to determine. These cumulative impacts are substantial and the community needs visibility as to the companies plans for the deposit. Initial project plans of a total of 7 M tonnes of coal with limited local impact have blown out to a major impact with many of the local farms being purchased and the community depopulated.

As mentioned in our other submissions, underground mining in the area is not without precedent. The nearby Narrabri Mine which is owned and operated by Whitehaven in another State Forest, Pilliga, has limited surface disturbance and community impact.

## Recommendations

- Underground Mining studies to the standard produced by Boggabri Coal in their EA be completed and released.
- Cost Benefit Economic analysis that compares the underground and open cut mining methodologies be prepared that outlines Net Benefit by stakeholder.
- The alternative underground mining report should provide an assessment of the benefits to the community and the environment of not disturbing the environment and fragmenting the community. These benefits have not been properly considered in the EA's references to underground mining report as an economic and social assessment has not been undertaken.
- Department of Planning consider the alternatives from the perspective of the NSW and local communities.
- The entire strategy for the development of the Tarrawonga Coal deposit should be presented to the Department of Planning and the community so that a proper cumulative assessment of all (including future) environmental and community impacts within the project boundary and outside the project boundary can be made.

# Air Quality and Greenhouse Gases

## Key Issues and Concerns – Green House Gases (GHG)

The proposed Tarrawonga Project's mining operations make a significant contribution of an additional of .12% (200,000 tonnes of CO2 / 163,000,000) to the NSW GHG 2020 budget. If GHG emissions from the burning of coal produced at the Tarrawonga Coal mine where accounted for in the NSW emissions, these emissions would be the equivalent of 5.5% (9,000,000 tonnes of CO2 / 163,000,000 ) of the NSW GHG 2020 budget.

These emissions make it more difficult for NSW to reach its 2020 targets. As more mines in other parts of the state are put before the Dept of Planning, the scope for reaching these targets is further reduced.

Increased GHG emissions have been shown to directly contribute to extreme weather events and changes in climate. The mining of coal in the Maules Creek area and the burning of the produced coal will directly contribute to the climate change problem that we are leaving to our children. As farmers our environment and our livelihood is directly impacted by severe weather and climate change. Our future generations will continue to pay the price long after mine closure and Whitehaven and Idemitsu have moved on.

We would note that the GHG external cost to Tarrawonga of $61 M has been identified by Gillespie in the Economic Impact assessment. This is significantly lower than the discounted (7%) external cost borne by the world of the burning of the produced coal calculated by Economists at Large of $2,636,070,208.

A full explanation of our GHG concerns are provided in Appendix 4, in reports prepared by Dr Ian Lowe for the Maules Creek Coal Mine and the Boggabri Coal Mine.

## Key Issues and Concerns – Global significance of cumulative impacts

The report by Dr Ian Lowe includes the cumulative emissions from all three mines and shows that the burning of the produced coal from the Leard State Forest coal complex is globally significant. As shown in the emissions by country data if the cumulative impacts from the three proposed coal mining projects in the Leards Forest coal complex were a country then the impacts to the atmosphere would rank 51$^{st}$ in the world ahead of Sweden, Hungary, Finland, Portugal and Norway and be ahead of 165 other countries.

A full listing of the GHG emissions by country is shown in Appendix 4.

## Key Issue and Concern - Air Quality

The Air Quality specialist study (PAE Holmes 2011) for the recently proposed Aston Resources Maules Creek project indicates that an inversion layer will persist over the Maules Creek valley floor to the north of the project area 41% of the time and 69% (Bridges Accoustics. 2011) of the time over winter. Anecdotal evidence bears this out. The topography of the surrounding Nandewar mountain ranges shown above effectively traps the inversion layer and adds to the cold air pool in the valley below due to relatively cold air which flows down slope.

The net result of the inversion layer is "that the dispersion conditions are such that dust emissions disperse slowly for a significant proportion of the time". (PAE Holmes 2011).

However the mixing height on the southern side of the Willowtree Range is significantly worse for the residents of the area immediately adjacent to the mine.

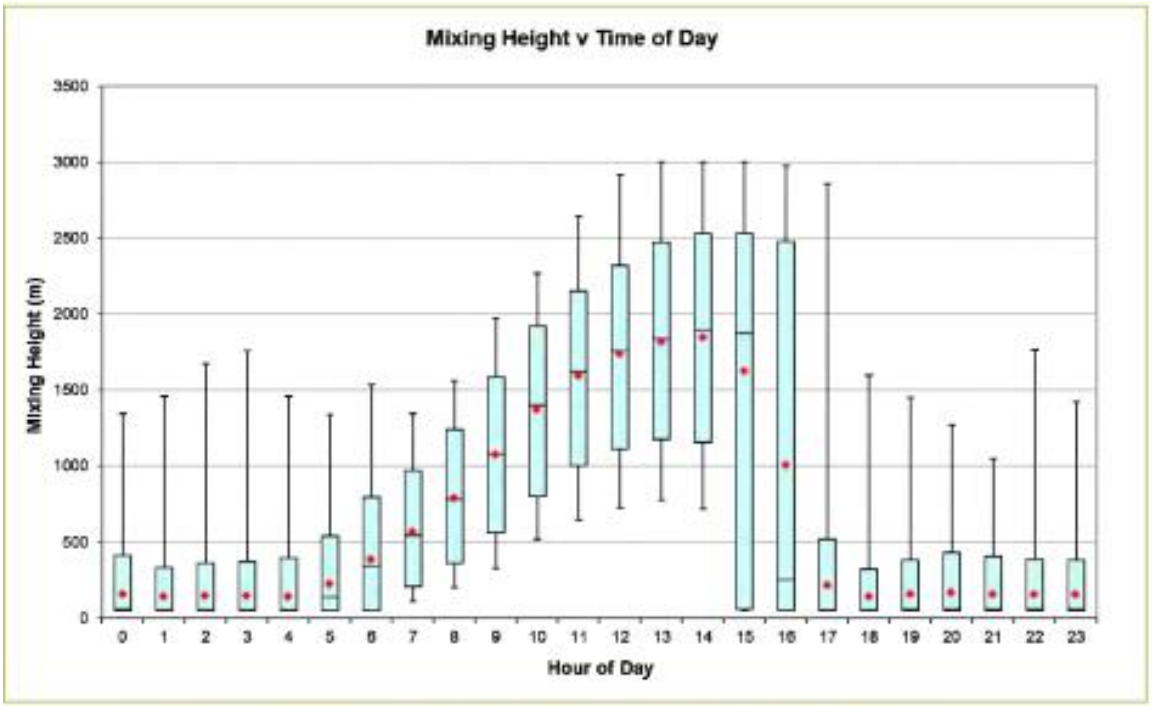


**Figure 6.3: Average Daily Diurnal Variation in Mixing Layer Depth**

The mixing height data for the Tarrawonga Coal Mine is shown on page 37 of the PAE Holmes Specialist Study and identifies that the mixing height only exceeds 1200 m the approx height of the surrounding mountains for 8 hours or 33% of the day. In fact in as many as 13 hours per day the mixing height does not exceed 500 m. PAE Holmes on page 35 describe a significant number of calms in the area leading to even fewer opportunities for disbursing the dust emissions from the site. Dust emissions on some days may not clear the immediate area and there may be a cumulative impact from the previous day that is not modelled.

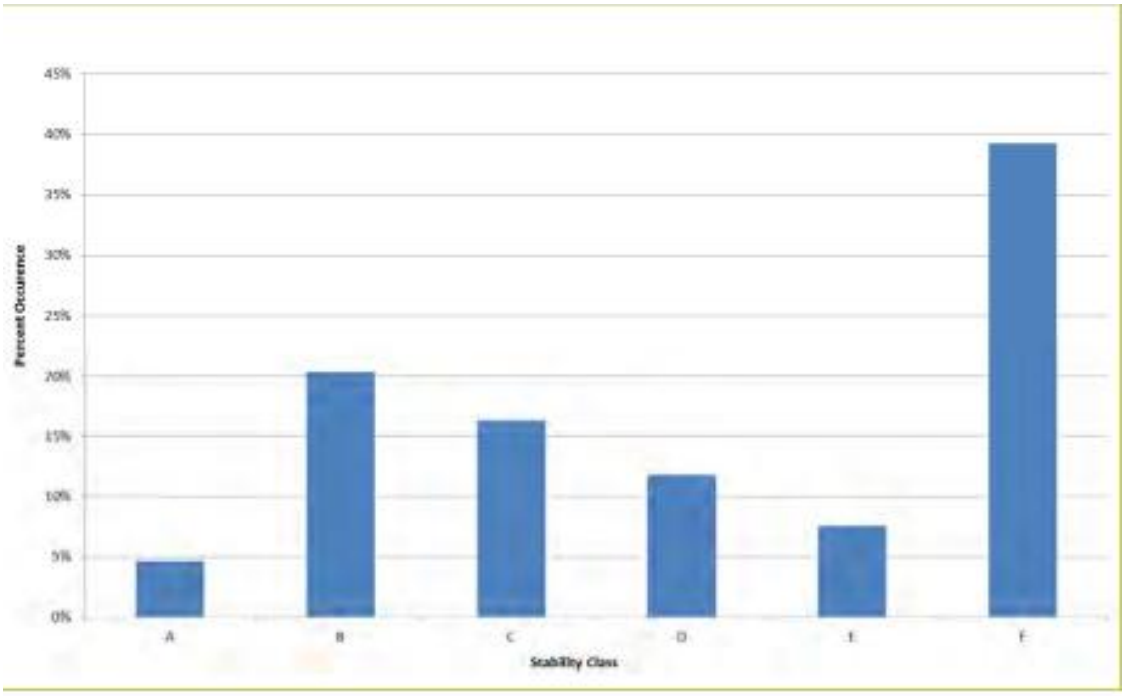


**Figure 6.2: Stability Class Frequency (2010)**

The above diagram taken from page 36 of the PAE Holmes report shows the likelihood of stability class F inversion layers. Page 27 of the Noise Assessment by Wilkinson Murray 2011 for the Tarrawonga EA mention that this figure also includes the worst case Stability Class G inversion events.

These inversion layers will provide a virtual ceiling in which noise is "refracted" down towards the ground. In addition dust will be trapped in the inversion layer. It follows from the inversion data and the mixing height data that noise and dust will be concentrated in the local area for long periods of time particularly at night during winter with low or no winds.

This concentration of dust pollution for long periods of time will be a major source of impact to the health of local people. These impacts have been described below in the Health Impact Assessment Section.

## Key Issue and Concern – Reconciliation of Total Suspended Particulates

### Introduction

The MCCC has completed a cumulative TSP reconciliation using figures obtained in volume two of the Tarrawonga Coal Project EA, specifically the Air Quality Impact Assessment as provided by PAE Holmes. An earlier TSP reconciliation developed for the proposed Maules Creek Coal project is contained in Appendix 4. This reconciliation does not contain the Tarrawonga expansion TSP data and provides a generous 4g per m2 allowance rather than the 2g per m2 allowance provided by the Boggabri Coal PAC.

**Planning Assessment Commission Guidelines**

This reconciliation has been completed using the principles highlighted within the Planning Assessment Commission review report for the Boggabri Coal Project. In particular, this report stated that;

**5. Compliance with the air quality standards**

The cumulative dust levels from the mine and any other sources must not exceed the national and state air quality standards at any occupied residential property, regardless of land tenure.

The proponent must ensure that the project does not contribute to any exceedence of the PM2.5 goal, and any PM2.5 criteria (when this is finalised nationally and/or at a State level) at any occupied residential property, regardless of land tenure.

In the event that any air quality standards are exceeded, the mine should be required to immediately shut down (where dust levels cannot be brought into compliance), or scale back activities on site (if this is sufficient to quickly bring dust levels down to within the criteria).

Proactive management will be required to achieve compliance in variable weather conditions.

**6.1 Dust**

Open cut mining by its nature involves numerous dust generating activities and has the potential to generate considerable particulate air pollution. The impact of dust on the environment is generally assessed by two broad parameters:

- suspended particle concentrations, expressed as total suspended particulates (TSP) or particulate matter smaller than 10 micrometres (PM10) or smaller than 2.5 micrometres (PM2.5); and
- deposited particulate matter or 'dust fall', expressed as a deposition rate in terms of grams per square metre per month (g/m2/month).

**6.1.1 Current Goals and Standards**

The particulate matter standards that apply in NSW are set out in Table 6-1.

**Table 6-1 Particulate Matter Emissions Criteria**

| Pollutant | Standard or Goal | |
|---|---|---|
| | 24 hours | Annual mean |
| Total suspended particulate matter (TSP) | | 90 µg/m3 b |
| PM10 | 50 µg/m3 a b | 30 µg/m3 b |
| PM2.5 | 25 µg/m3 c | 8 µg/m3 c |

Notes:

a. National Environmental Protection Council (NEPC) standard (exceedences allowable - 5 days a year)
b. NSW EPA impact assessment criteria
c. National Environmental Protection Council (NEPC) advisory reporting standard These standards are derived from two sources:

- the National Environment Protection Council (NEPC), which sets national air quality standards for environmental pollutants; and
- the NSW Environment Protection Authority which also specifies other relevant air quality assessment criteria.

At the time of writing PM2.5 standards remain advisory and are yet to be formally adopted at either a state or national level. Nonetheless, the 24 hour advisory level of 25 μg/m3 is consistent with World Health Organisation guidelines and the Commission considers that the project should be considered and monitored against this PM2.5 goal.

Dust deposition rates must also be assessed under the EPA air quality assessment criteria and are specified in Table 6-2, below.

**Table 6-2 Deposited dust criteria**

| Pollutant | Maximum increase in deposited dust levels | Maximum total deposited dust level |
|---|---|---|
| Deposited dust | 2 g/m2/month | 4 g/m2/month |

### 6.1.4 Commission's Consideration

Given the limited assessment provided in relation to cumulative impacts, the Commission considers *it is likely the predictions made understate the potential dust levels* (MCCC emphasis), should each of the potential mining proposals in the area proceed.

More detailed modelling of the potential cumulative impacts would be ideal, however the Commission acknowledges that mining proposals for the area will continue to evolve. By the time any further modelling was undertaken, further changes may have occurred.

The Office of Environment and Heritage (OEH) has considered both the Boggabri and Maules Creek proposals in detail and has recommended conditions of approval that would require both project specific and regional air quality management plans, as well as a Reactive Particulate Management Strategy. The Commission agrees with this approach.

In carefully considering the potential dust impacts from the project, the Commission notes that the project has the potential to exceed health based criteria for exposure to particulates at neighbouring properties including both privately owned properties and properties which have been purchased by various mining companies in the area. The proponent's consultants have predicted that the exceedences of the PM10 health criteria that are caused by the mine would occur on fewer than 5 days a year and consequently would be acceptable (Hansen Bailey, 2010). However, the Commission considers that the exceedences allowed in the NEPC standards should be considered as one off exceptions to provide for unforeseen and uncontrollable events such as dust storms or bushfires, beyond the control of the mines.

The Commission considers that any exceedence of the 24 hour 50 μg/m3 PM10 or 25 μg/m3 PM2.5 standards, caused by the mine or any combination of mining and other factors would be unacceptable. The Commission also expects that by combining real-time monitoring with sophisticated, predictive, reactive and collaborative management and shut down procedures for all the mines in the region, dust impacts from mining could be minimized and exceedences as a result of mining could be avoided.

The Commission understands that the Office of Environment and Heritage and the mining companies with proposals in the Leard State Forest and surrounds are actively working to achieve this goal. The Commission supports the need for a regional strategy to address cumulative impacts.

**Methodology of Reconciliation**

The TSP reconciliation aimed to identify the potential regional cumulative air quality impacts of the three projects within the Leard Forrest Coal Complex. Due to the conflicting Wind Rose results from various regional weather stations, the MCCC has instead concentrated on a mass balance approach of total TSP emissions. The general form quoted for a mass balance is;

> *The mass that enters a system must, by conservation of mass, either leave the system or accumulate within the system.*

To manage and monitor changes in air pollution it is necessary to measure the amounts of pollutants in the air. The two basic physical quantities used in measuring air pollution are mass and volume.

A third consideration used within the reconciliation is source description, by nature coal mines operate 24 hours a day and in this context it must be assumed that the "emission plume" is constant.

Mixing height versus time of day for the Tarrawonga project appears similar to the other projects, therefore an average mixing height of 770m was adopted for the calculations. This appears reasonable considering that 13 hours of the Average Daily Diurnal Variation in Mixing Layer Depth as presented in Figure 6.3 is below 250m, coinciding with 39% stability class F as presented in Table 6.2 Stability Class Frequency 2010.

Due to the uncertain commencement dates for each of the projects, year 5 TSP emission figures were used for Boggabri Coal and the Maules Creek Coal Project, and an average year 5 TSP figure were calculated for Tarrawonga by averaging year 4 and 6 TSP emissions as presented in Table 8.1.

**TSP Reconciliation**

**Table 1 – Estimated TSP Emissions for each Project Year 5**

| | Year 5 TSP (tonnes) | PM2.5 (4.7% TSP) | PM10(34.4% TSP) | PM10-30 (60.9% TSP) |
|---|---|---|---|---|
| | | | | |
| Boggabri Coal | 7219 | 339 | 2483 | 4936 |
| Maules Creek Project | 6584 | 309 | 2264 | 4009 |
| Tarrawonga | 2858 | 134 | 983 | 1740 |
| | | | | |
| Total TSP (tonnes) | 16,661 | 782 | 5730 | 10,149 |

The calculated figures from the above table are now used to calculate the volume of space required to "accommodate" the emissions at legal concentrations over a 24 hour period using the 770m average mixing height.

**Table 2 – Volume of Space Required for Legal Concentrations of Airborne Emitted Particulates**

| | | | Annual Mean | 24 Hr | Annual Mean | 24 Hr |
|---|---|---|---|---|---|---|
| | Annual tonnes TSP | Daily tonnes TSP | $km^3$ required at 8 µg/m3 | $km^3$ required at 25 µg/m3 | $km^3$ required at 30 µg/m3 | $km^3$ required at 50 µg/m3 |
| | | | | | | |
| PM2.5 (4.7% TSP) | 782 | 2.142 | 267 $km^3$ | 85 $km^3$ | | |
| PM10(34.4% TSP) | 5730 | 15.968 | | | 523 $km^3$ | 313 $km^3$ |
| | | | | | | |
| | | | | | | |

**Table 3 - Square Kilometre and Hectares Required at 770 metre Mixing Height of Airborne Emitted Particulates**

| | | | Annual Mean | 24 Hr | Annual Mean | 24 Hr |
|---|---|---|---|---|---|---|
| | Annual tonnes TSP | Daily tonnes TSP | $Km^2$ required at 8 µg/m3 | $Km^2$ required at 25 µg/m3 | $Km^2$ required at 30 µg/m3 | $Km^2$ required at 50 µg/m3 |
| Square Km at 770m mixing height | | | 346 $km^2$ | 110 $km^2$ | 679 $km^2$ | 406 $km^2$ |
| | | | | | | |
| Ha Required at 770m mixing height | | | 34,600 Ha | 11,000 Ha | 67,900 Ha | 40,600 Ha |
| | | | | | | |

The next table provides a simple calculation of dust deposition using the remaining TSP not accounted for as an airborne contaminate at the legal concentration of 2 g/m2/month.

**Table 4 – Dust Deposition at Legal Deposition Rates**

| Tonnes of TSP | 2 g/m2/month |
|---|---|
| | 240kg Ha/ year |
| 10,149 | 42,287 Ha |

**Study Results**

The TSP reconciliation has identified the approximate areas required to maintain legal TSP concentrations surrounding the Leard Forrest coal complex if the above three projects proceed. Consideration should also be given to "dust plume" characteristics from source point to dispersion. Dust plumes generated from constant source points will display a tendency to widen and increase in height downwind from the source point therefore creating a pyramid style plume emission that varies with mixing heights, wind velocity, and a myriad of other climatic and topographical factors that vary on an hourly, daily and seasonal basis.

Due to the relatively small geographical proximity of the three projects, it would seem obvious that receivers downwind of the complex, will find themselves experiencing exceedences of all current goals and standards for air quality. The dust deposition area of 42,278 hectares far surpasses any modelled outcome for the projects, and of even more concern is the PM 2.5 annual mean and maximum daily allowances area calculation of 34,600 and 11,000 hectares respectively from a health perspective. The Boggabri Coal PAC recommendation of no allowable exceedences of any goals and standards at any time seems impossible using the above calculated areas. The annual PM 10 standard will require 67,900 hectares or 26 km by 26 km to meet government standards.

By using a Trapezium calculation for an area of 60,000 hectares, using an opposite side input of 10km (dust emission source), a base input of 30km (width of plume at extent of area of affectation), and a length of 30km (distance from source to plume extent), we can draw a simple conclusion that any receivers downwind of the coal complex within 30km will be constantly effected by PM10 emissions.

**Conclusion**

The introduction for the Tarrawonga Project in Volume One of the EA states that; *The Tarrawonga Coal Mine is an open cut mining operation located approximately 15 kilometers (km) north-east of Boggabri….(Figure1.1)*. The wind rose data in Volume Two of the EA suggests that the predominate wind direction for the Tarrawonga Met Station is from **the north east**. While the MCCC disagrees with this wind data due to conflicting information from the Maules Creek Met Station, it can be clearly seen that Boggabri **will** be within the area of affection due to its proximity to the projects if this data is correct. The MCCC believes the predominate wind direction is from the south, and that both Tarrawonga and Boggabri Coal Met Stations are shielded from southerly airflows by the Tarrawonga overburden dumpsite.

Regardless of wind direction, the impacts from dust emissions have been grossly understated by the proponent and PAE Holmes within their Cumulative impact assessment of regional air quality.

**Recommendations**

- A full audit of total cumulative TSP emissions needs to be completed for the three coal projects that take into account the inversion layers that occur 41% of the time within the Maules Creek basin.
- Existing background air quality conditions exceed OEH guidelines and there is no scope for additional dust emissions.
- That if coal mining is to occur, Underground Mining is the most viable means of maintaining air quality.

- If open cut mining is approved, the identified cumulative Zone of Affectation (ZoA) is significantly greater in extent compared to the ZoA described in the EA. The ZoA should extend as much as a 30 kilometre radius from the cumulative projects central point.
- That CALPUFF should be used for modelling of cumulative dust emissions from Coal Mines in the Leard Forest Area.

## Key Issues and Concerns - Air Quality Monitoring Network

Open cut mining has well documented health, agricultural productivity and social impacts due to a general reduction in air quality. It is essential for ongoing sophisticated real time air quality monitoring to reduce long term company - community conflict. To minimize this potential the MCCC has submitted a list of "principles" described below to guide the development of an extensive Air Quality Monitoring Network for the area. It is important that these detailed list of principles be included in any DoP consent for this project.

***Purpose of the Air Quality Monitoring Network***

The Network should enable the various government agencies, local residents and other stakeholders to view the air quality of the Maules Creek area generally and in the immediate vicinity of the individual mines. The Network should be expandable to Gunnedah, Caroona and beyond as required.

The real time nature of the data should enable day to day tactical operational procedures (including temporary cessation of mining activities) to ensure air quality is maintained at or above minimum standards and help to identify mining practice change should it be deemed necessary. Clearly defined trigger levels should be set at various locations to help identify the need for remedial activities. These levels would be set by DECCW is conjunction with the mines and local community and be reviewed annually.

***Minimum Requirements***

Based on the purpose of the Network described above, the minimum requirements to ensure accurate, timely and independent date collection and analysis are as follows:

*Data Collection and Ownership*

- The air quality monitoring data should be gathered by automatic, electronic, wireless monitoring stations.
- The air quality monitoring data should be collected and displayed in real time.
- The information should be displayed over various cumulative periods (e.g. 1 hour, 1 day, 1 week).
- Data should be kept indefinitely so that historical comparisons are able to be made (e.g. year on year).
- The data should be owned by DECCW or an independent authority.
- The data should be shared to the public via a link on the DECCW website.
- Ambient weather data specific to key locations within the network should also be available.

*Type and Location of Monitoring Equipment*

- The equipment should be designed to capture a range of particulate material and noxious gases.
- There should be a mix of equipment (e.g. PM 10, PM 2.5, PM 1.0) and blast gas monitoring equipment.
- The network should include Monitoring Equipment to capture the presence of inversion layers.
- The equipment should be located around each mine so as to capture the source of the dust or gas before the dust or gas leaves the mine site.
- Additional equipment should be located around the district in order to capture air quality levels outside the Maules Creek mining precinct to enable comparison.

*Cost*

- The air quality monitoring equipment capital and operational costs should be paid for by the coal mines. This would include the costs of repairs and periodic calibration.
- The cost of development and ongoing maintenance of the air quality website should be paid for by the mines and outsourced to a specialist third party.
- The costs should contain a mix of fixed and tonnage based levies to allow for expansion of the Network should there be a increase in capacity of the mines or a necessary increase in the level of service.
- Co-ordination of the repairs and maintenance should be done by DECCW.
- Co-ordination of expansion of the network should be done by DECCW.
- Minimum service levels on equipment (e.g. 24 hour maximum downtime) should be specified.

*Reporting*

- Simple web based Graphic displays similar to the Hunter Valley Air Quality Monitoring Network be available with the ability to highlight a site and drill down into the available detailed data.
- Noxious gases arising from blasting and other activities should be reported.
- Available detailed data to include various cumulative periods (e.g. 1 hour, 1 day, 1 week) with the ability to make historical comparisons. (e.g. hour on hour, day on day, week on week, year on year).
- Quarterly reporting by DECCW of summary air quality information including breaches and remedial activities.
- Equipment status should be available online at all times.

## Recommendations

- Require Tarrawonga Coal to participate in establishing an air quality monitoring network as described above.

- Require the existing and proposed mines in the Leard Forest area commence discussions immediately with the Local Community as to proposed Air Quality Monitoring Network. A working party should be formed with an independent chair being appointed. Budgets and timelines should be agreed.
- All baseline data should be made available NOW on the website.
- Portable Monitors should be included in the network to allow the network to respond to changing conditions. E.g. As landforms change, air flows change.
- A series of Temperature Inversion monitoring stations should provide real time input to the monitoring network for the purpose of determining the impacts of inversion layers on air quality.
- The GHG emissions of the project should be considered in terms of its contributions to overall NSW emissions and Tarrawonga Coal should be required to offset these emissions in the voluntary emissions trading market to the extent identified as the GHG externality in EIA.

# Noise Impact Assessment

## Key Issues and Concerns – Modelling shortcomings

The Maules Creek Community Council is committed to ensuring minimal noise impacts to residents and properties in the surrounding areas of the Tarrawonga Coal Project and the Leard Forest area as a whole. Cumulative noise arising from mining operations is a significant impact to amenity and property valuations.

In order to ensure noise impacts are maintained below the levels identified in the EA, it is important for noise monitoring. We note that Tarrawonga is implementing a real time noise monitor however results of this monitor are not available. Furthermore no measurements of ambient baseline noise levels or existing operational noise measurements are available in the EA. Heights of equipment are not available.

The cumulative noise contour maps are not available in the EA and in the view of the MCCC the EA does not meet the Director Generals Requirements to describe the cumulative impacts. In particular it does not show how the cumulative impacts have increased since the lodgement of the Boggabri Coal EA in December 2010. These increased impacts must inform the Boggabri Coal and Maules Creek Planning Assessment Commission's who are currently developing their reviews of those project applications.

The MCCC is concerned with the secondary effects that temperature inversion layers may contribute to noise distribution during the cooler months of winter.

## Recommendations

- Detailed Cumulative Noise Contour Maps be made available including the assumptions.
- Measured noise levels including location, stability class, date and time data be made available.
- Noise monitoring be included in all air quality monitoring locations in the proposed Regional Air Quality Monitoring Network.

# Ecology and Biodiversity

## Key Issues and Concern – Terrestrial Ecology

Wendy Hawes from theenvirofactor has reviewed the various EA reports associated with Flora and Fauna. The review is contained in Appendix 5.

The review identified that a lack of management reports means that little can be gained from the material presented in the EA. As with the Maules Creek Project EA the community is unable to form a view as to the appropriateness of the mitigation measures and it is the view of the MCCC that both documents should not have passed the adequacy requirements of the Dept of Planning and should not have gone on exhibition.

The review goes on to identify and expand on a range of issues. These issues include;

- Clearing of 397 Ha of Native Vegetation that is in moderate to good condition.
- Movement of Goonbri Creek
- Problems with rehabilitation of mined areas including topsoil depth and final void
- Offsets in different locality and region
- Exclusion of threatened and endangered species from the EA assessment

## Recommendations

- Future EA's are not deemed adequate until all environmental management documentation is available
- Goonbri Creek should remain in its current location
- Land and soil capability be returned to the pre-mining levels in all areas of the project area post mining
- The final void should be closed
- Tarrawonga Coal develop a detailed assessment of impacts to Threatened and Endangered species that are likely to occur in the area as described in theenvirofactor review.

## Key Issues and Concerns – Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems are dependent on the maintenance of groundwater levels and groundwater chemistry within specific tolerances is order to survive.

As shown in the Tarrawonga EA Groundwater Cumulative Maps Fig A-46 and Maules Creek Coal EA (Fig 1 Appendix I) the proposed coal mining projects will impact on the ground water in the vicinity of the Maules Creek alluvial aquifer by 1 meter and the Goonbri Creek alluvial aquifer by up to 2 meters according to cumulative groundwater draw down contours.

While this may be inside the range of normal seasonal variation, when combined with seasonal variation it follows that the proposed coal projects cumulative draw downs will exceed normal variation. Furthermore forecast changes to seasonal variability due to climate change from such activities such as the mining and burning of product coal (see Appendix 4 Greenhouse Gases) will likely cause deeper peaks and troughs in the normal seasonal variation.

## Key Issues and Concerns – Stygafauna - changes to water chemistry

Due to highly connective nature of the coal measures and the alluvials, the drawdown of 1 to 2 meters could impact on the water chemistry balance in the alluvial aquifers impacting on the stygofauna communities.

Changes to the recharge of groundwater within the project boundary identified by SoilFutures (see MCCC Maules Creek Submission - Appendix 3) could lead to changes in the saline water/freshwater interface boundary which will alter the chemical balance in the alluvials. This is a significant threat to the aquatic ecosystems as they are adapted to high water quality/low salinity levels and therefore would be detrimentally impacted if there were changes to water chemistry outside of the current, natural range.

It is highly likely that the placement of overburden on a highly porous alluvial aquifer will present a significant threat to: 1) the aquifers water chemistry and the aquatic surface ands subsurface ecosystems through the introduction of leachate of oxidized metals and nutrients from the filtering of rainfall through the disturbed soil matrix of the overburden; and 2) the potential smothering and disconnection of the subterranean ecosystem from the land surface thus increasing anoxic conditions in a relatively high oxygen aquatic environment.

## Key Issues and Concerns – Stygafauna - cumulative impacts

It is important to sample Bollol Creek and Goonbri Creek and the associated alluvials due to proposed impacts from the Tarrawonga Coal Mine which is proposing to move "Goonbri Creek". How this proposed relocation of Goonbri Creek will impact the cumulative groundwater levels and chemistry is unknown. However given the impacts described above, it is unlikely that increased mining activity will *improve* the overall habitat for Stygofauna and GDE vegetation such as the white cloud trees dotted along its banks.

## Recommendations

- Four ecological monitoring programs are suggested (Dillion et al 2009) in areas near the project boundary and a monitoring plan in place to report to Planning NSW any changes in groundwater quality or groundwater depths which may impact adversely on the Stygofauna. These include:
    - Surface water sampling of aquatic macroinvertebrate, fish and amphibiam communities in surface aquatic ecosystems, including identified threatened species;
    - Ground sampling of water levels and chemistry adjacent to surface aquatic ecosystems; and
    - Groundwater sampling of subsurface stygofauna community
    - Groundwater sampling of subsurface microbial community

- Establishment of water levels and water chemistry monitoring to determine ranges and the width of the vadose zone saturation profiles associated with rooting depths of potential groundwater dependent vegetation communities that may be detrimentally impacted by sustained drawdown and/or rapid fluctuations in water levels.
- Establishment of a terrestrial vegetation condition monitoring program.

### References

ALS 2011 Hansen and Bailey. *Desktop Assessment of the potential impacts on Stygofauna from Maules Creek Coal Project.*

Dillon, P., Kumar, A., Kookana, R., Leijs, R., Reed, D., Parsons, S. and Ingerson, G. (2009). Managed Aquifer Recharge - Risks to Groundwater Dependent Ecosystems - A Review. Water for a Healthy Country Flagship. Report to Land & Water Australia, 2009.

Lampert, G. and Short, A (2004) *River styles, indicative geomorphic condition and geomorphic priorities for river conservation and rehabilitation in the Namoi catchment, North- West, NSW* DIPNR, Sydney.

MacKay, H. 2006 *Protection and management of groundwater-dependent ecosystems:*

*emerging challenges and potential approaches for policy and management.* Australian Journal of Botany, 2006, 54, 231–237

Rask, B. 2011 *Review of Maules Creek Coal Project Groundwater Impact Assessment.*

Sinclair Knight Merz, *Environmental Water Requirements of Groundwater Dependent Ecosystems* (2001), Environmental Flows Initiative Technical Report Number 2, Commonwealth of Australia, Canberra.

## Key Issues and Concerns – Leard Forest Environmental Trust

The Tarrawonga Coal environmental offsets are being developed by the mining company by purchasing existing habitat, often some distance from the Leard State Forest. These offset lands are already in existence and no new habitat area is being created. The offset lands already operate as habitat for the current "occupiers" of native fauna and flora.

In reality offset lands are merely a change in ownership of the offset land and a vehicle to secure planning approval for a negative impact to Leard State Forest. Due to mining there is a reduction in habitat and a corresponding loss of eco system services provided by Leard State Forest to the surrounding district, the region and the world in general.

The MCCC has determined that this cumulative impact is an external cost to Tarrawonga Coal, Aston Resources and Boggabri Coal that is being borne by the local environment and the local community. In order to "internalize" this external cost the MCCC has engaged Dr Ian Curtis, a Landscape Economist to value the negative impacts to the eco system services for the purpose of determining the level of provision that is required for impact to the Leard State Forest in order to get a net benefit

from the project for the environment. Dr Curtis's report is contained in Appendix 10 and the key findings are shown below.

> *"The mining complex will impact by clearing all native vegetation, about 4700 hectares of land, some of which is a critically endangered ecological community.*
>
> *Accordingly the community of Maules Creek do not see any Net Social Benefit (NSB) accruing to them, or any tangible attempt to internalize what are significant negative externalities".*
>
> *"The ecosystem goods and services lost due to the clearing of the forest have been valued at some $490,000 per annum."*
>
> *"It is proposed that the Maules Creek Community be compensated, and the negative externalities internalized, by the establishment of two funds to be run for the lifetime of the mines and after. One fund to offset the environmental impacts, and the other to accommodate impacts to amenity, predicted detrimental changes to property prices and cumulative impacts."*

In order to manage the compensation for environmental impacts the MCCC has developed the following principles;

## Principles for Leards Forest Environmental Trust (LFET)

1. The objective of the fund is to offset the cost of impacts to the ecosystem services of the Leard State Forest.
2. The cost of ecosystem impacts to be determined by consulting environmental economists. Fund calculated to pay for total forest impacts over 21 year.
3. The LFET be contributed to by all mines in the Leards Forest Coal Complex
4. The contribution be paid annually apportioned by each companies impact.
5. The fund be administrated by a trust with 7 trustees. 2 Mining, 1 Narrabri Shire Council, 2 Community, 2 Environmental Groups.
6. Broad Objectives to be determined by the trustees after scoping submission process and projects to be tendered for on a competitive basis.

The Trust is proposed to provide for impacts to the Leard State Forest and its habitat only and is not a means to redress impacts to ground water, health issues, community impacts, loss of recreational use, non use values or any other impact that does not relate to the native vegetation and habitat of the Forest.

A detailed overview of the proposed Leard Forest Environmental Trust is outlined in Appendix 8.

Note that Dr Curtis's approach values the loss of eco system services and not the replacement value of the Leard Forest. The replacement value of the entire forest has been estimated by Economists at Large using freely traded market instruments and their methodology for the valuation of the Forest is fully explained in their report in the MCCC Maules Creek Coal Submission in Appendix 10.

## Recommendations

- Among the Dept of Planning consent conditions the companies should make provision for the impacts to the environment and the local community by forming the Leard Forest Environmental Trust (the Trust) and the Maules Creek Community Fund (the Fund).
- That clearly defined No Go Zones be identified by the NSW Dept of Planning and that these areas are adjacent to and include the Kaputar National Park, Leards Forest Conservation Area, Maules Creek, Middle Creek, Horesarm Creek and the Namoi River.
- Consulting Environmental Economists be engaged to determine the value of the Forest. Our suggestion is that Dr Ian Curtis be resourced to value the forest. That the value be peer reviewed and that the value form the basis for the provision identified in the Trust documentation.
- A working group be formed to develop the strategic plans, guidelines, and rules for the Fund and the Trust. This would include a detailed analysis of the households and farm properties within the provision area.
- Trustees for both the Fund and the Trust be appointed.
- An Arbitrator be identified to resolve issues that arise for the operation of the Fund.

## Key Issues and Concerns – Wildlife Corridor

Cumulative impact of the mining projects in the area will impact 3,081 ha of the possible 5,035ha of the vegetation within the Leard State Forest.

Many of the properties in the ZOA have been targeted as potential offsets, and will be used to create a corridor for wildlife from the East to the West. While both Boggabri Mine and Maules Creek Coal Project have, or will purchase properties jointly, the concern regarding the Wildlife Corridor is only compounded and does not lessen the impact that will be imposed on the Fauna; There will now be more coal laden trains, vehicle movements and services such as High Voltage Power Lines.

The Tarrawonga expansion will impact on this wildlife corridor by way of its extension into the area of Leard Forest immediately to the south of the Boggabri Coal mine.

# Surface Water

## Key Issues and Concerns – Moving Goonbri Creek

The MCCC is very concerned about plans to move a section of Goonbri Creek. The basis for this is an economic one for Tarrawonga Coal and is of limited benefit to the State of NSW and could be a major cost for the Narrabri Shire, its residents and its environment.

As shown on in maps produced for the Namoi CMA in the Gins Leap Gap Report (SoilFutures Dec 2010) the area of creek that is proposed to be "re-aligned" coincides with an area of recharge for Barbers Lagoon and the Boggabri Water Supply. The proposed permanent "realignment" of Goonbri Creek away from the recharge areas shown on these maps could have severe impacts to the Boggabri Water supply. Namely;

1. Reduction in the flow.
2. Contamination of the groundwater.

The Leard Forest Drainage map (Appendix 11) identifies the total yearly amount of groundwater recharge for the mapped area. The map shows that Goonbri Creek provides the highest groundwater recharge in the Leard Forest. The upper reaches of Goonbri Creek are described as moderate with very high total recharge due to the large area included while the lower reaches near the Tarrawonga mine are described as high.

Based on this map it is no surprise that we have heard unofficial anecdotal reports that there are serious ground water interception events at the existing Tarrawonga Mine and that a large number of pumps (10) is required at times to keep the water away. Where this water that probably contains salts and heavy metals is pumped to we do not know, and haven't enquired about.

The Leard Forest surface water runoff map (Appendix 11) shows moderate and high areas of runoff are also in the immediate vicinity of Goonbri Creek. This runoff would contribute to the recharge further down Goonbri Creek and is a significant source of floodwater flows as shown in the recent January 2012 flood photos shown in the surface water diversion below and evidenced by the email from Boggabri Coal in Appendix 11.

Together these maps indicate that it would be a major impact to the quantity of the groundwater for the entire area if Goonbri Creek were to be moved and converted into a drain.

In addition, the large groundwater recharge would be a major consideration in the ongoing mining operations and there could be a impact to groundwater quality should that contaminated water re-enter the alluvials or find its way off the site in large rainfall events.

It is the view of the MCCC that the proposed "bund" and creek "re-alignment" is a doubtful and complex long term engineering solution to a simple problem. Goonbri Creek should remain where it is.

# Key Issues and Concerns – Surface Water Diversions – Damage to Farmland

In the floods of Nov 2011 and Dec 2012 significant "new" diversions of surface water have occurred. Flows that could be predicted by landowners who had occupied the land down slope from the Boggabri Coal Mine and the Tarrawonga Coal Mine for a number of generations found large volumes of water moving in areas away from its usual path. Surface water has been redirected across cropping land and destroyed three quarters (900 acres of 1200 acres) of December 2011 wheat crops ready to be harvested leading to serious financial hardship. Consultations between the landowner and the neighbouring mines (Tarrawonga Coal and Boggabri Coal) were unable to resolve the issue with neither mine prepared to accept liability.

Unsubstantiated claims made by the miners that the December 2011 flood flows were one in a hundred year events were repeated 2 months later in February 2012. This leads to concern about the modelling generally for the various projects.

In earlier submissions to the Dept of Planning (MCCC Boggabri Coal Submssion Appendix 3) SoilFutures clearly identified a reduction in Available Water Holding capability of the rehabilitated overburden and spoil heaps. The 10 cm of topsoil and underlying spoil is incapable of storing the large volumes of water that have fallen in the forest and remained in the area in earlier pre-mining times. The small number of creeks and gullies that emerge from the Leard Forest is testament to the water holding capability of the undisturbed forested area.

The steep slope of the overburden embankments is adding velocity to the large volumes of water finding its way across the floodplain forcing water in directions never before contemplated and creating damage to infrastructure such as contour banks, fences and dams.

Furthermore these flows appeared to contain mine effluent. This effluent could have long term impacts on the productivity of the land and the quality and value of the product grown there.

The high risk for affected landowners in financial impacts and soil erosion associated with these new surface water diversions means that it is not practicable for cropping to continue on that parcel of land, significantly reducing its long term income and the value of that agricultural land.

The experience of the "negotiations" has left the affected landowners bitterly disappointed and totally discouraged with their new situation. "Get used to it" seemed to be the message from these discussions. Without a resolution strategy to agree on a baseline and likely compensation, the MCCC is doubtful that agriculture and mining can co-exist.

This cumulative impact is a serious issue and leaves the MCCC wondering what will happen should other impacts (e.g. air quality) not be properly baselined and monitored. If such an issue developed between farming neighbours it would be sorted out and not repeated, however without some sort of regulatory intervention this appears unlikely in this case.

# Key Issues and Concerns – Leard Forest Road Diversion

The MCCC has had extensive negotiations with the Narrabri Shire Council and Boggabri Coal regarding a diversion of the Leard Forest Road. The proposed route is shown in Appendix 1, Map 1.

The proposed diversion of the Leard Forest Road has the support of the community if it meets the following 4 criteria.

1. The alternative road is of a similar physical standard to the existing road.
2. The alternative road provides flood free access.
3. The road provides a route to the Boggabri - Manilla Road and beyond.
4. The road will be paid for by Boggabri Coal.

The proposed diversion is through the north east corner of the Leard Forest and joins Goonbri Road which finds its way back on toward the Boggabri to Manilla Road.

Recent information contained within the Tarrawonga Mine Expansion outlines a realignment of Goonbri Creek and Goonbri Road out onto the floodplain making the flood free access that Maules Creek Residents currently have doubtful. (Appendix 2)

It is our view that existing flows and additional large volumes of water flowing from the overburden embankments will require significant earthworks on the floodplain to ensure flood free access and there will need to be a co-ordinated approach between the Narrabri Shire Council, Boggabri Coal and Tarrawonga Coal to get this road to an acceptable standard.

Furthermore this road embankment will need large numbers of box culverts to ensure that it is capable of handling the anticipated flows and that the existing beneficial flooding based on natural overland flows is maintained.

The following photos show how difficult it will be to provide flood free access once the Leard Forest Road is cut.

Goonbri Creek upstream from Dripping Rock Road during the rain event.

Gravel Swept off Dripping Rock Road down slope of the flood plain.

Dripping Rock Road closed with water from Bollol Creek 6 days later. Blair Athol Lane in the distance.

Looking West. Section of dripping rock road between the Tarrawonga Coal Haul Rd and Leard Forest Rd after flood events in November 2011, the Tarrawonga overburden dumps are on the right of photo approx 500m due north. February 2012 flood damage is much more severe.

## Recommendations

- The steep overburden embankments at the Tarrawonga Coal Mine and the Boggabri Coal mine need to be modified/managed to reduce the velocity of the water reaching the floodplain. Larger water storage structures need to be in place to store the increased runoff created by the reduced water holding capacity of the rehabilitated areas.
- A resolution strategy for changes to overland flows should be developed with Office of Water or the EPA consultants providing arbitration/mediation services and baseline flow data. These services need to be advertised in the local media.
- Leard Forest Road Diversion and Goonbri Road Diversion should have the engineering drawings developed as part of the pre conditions required for both projects should any approval be granted.
- Leard Forest Road Diversion and Goonbri Road Diversion should be in place prior to the Leard Forest Road being cut by the mining operations of Boggabri Coal.

## References

Soil Futures 2011, *Soils Review of Boggabri Coal EA*

Resource Strategies 2012, *Tarrawonga Coal Project – Environmental Assessment*

# Groundwater

Local landholders in the Maules Creek area rely on the groundwater supplied by the alluvial aquifers and also from the Permian aquifers associated with coal that will be extracted by Tarrawonga Coal in the area of the Leard Forest. Any reduction in the quantity and quality of these groundwater resources will negatively impact on the health and wellbeing of the community members as well as being detrimental to the farming, grazing and other businesses that currently operate in the area surrounding the Maules Creek Coal Complex.

It is vitally important to the community that Tarrawonga Coal identify and investigate any potential detrimental environmental impacts resulting from their planned operations in and around Leards Forest. Before the project is approved any potential risks to the water resource from their practices must be identified and reduced or removed prior to commencement of any mining operation.

## Key Issues and Concerns – Groundwater Recharge

As described above, the Leard Forest Drainage map (Appendix 11) identifies the total yearly amount of groundwater recharge for the mapped area. The map shows that Goonbri Creek provides the highest groundwater recharge in the Leard Forest. The upper reaches of Goonbri Creek are described as moderate with very high total recharge due to the large area included while the lower reaches near the Tarrawonga mine are described as high.

The Leard Forest surface water runoff map (Appendix 11) shows moderate and high areas of runoff are also in the immediate vicinity of Goonbri Creek. This runoff contributes to the recharge further down Goonbri Creek.

While these maps are publicly available from the Namoi CMA, they have not been referred to in the EA. Despite an extensive array of graphs, tables etc in the Groundwater Impact Assessment, it is clear that the impacts of the mine on groundwater recharge will be significant.

## Recommendations

- That Goonbri Creek remain in its current location and
- That the area of the recharge shown on the Leard Forest Drainage maps remain undisturbed.

# References

Rask, B. 2011 *Review of Maules Creek Coal Project Groundwater Impact Assessment*

Sinclair P, Barrett C and Williams RM. Nov 2005 Impact *of Groundwater Extraction on Maules Creek – Upper Namoi Valley, NSW Australia*,

Anderson, M.S. 2008. *Investigation of surface water groundwater exchange in Maules Creek Catchment.* Presentation to the IAH , 9 Sept, 2009. WRL UNSW Sydney.

Anderson, M. S. and Acworth, R. I 2007. *Chemical and Geophysical Sampling Campaign at Maules Creek. Data Report for 2006*. WRL Report 229, University of NSW.

# Health Impact Assessment

The development of a new coal mining precinct in the Leard State Forest will have significant impacts on the local people of Maules Creek. The Director Generals Requirements do not require a Health Impact Assessment (HIA) of the Tarrawonga Expansion Project or its cumulative impacts with the Boggabri Coal Continuation Project or the Maules Creek Project. **It is Recommendation that a HIA be carried out as a matter of urgency.**

The MCCC does not accept the assertions of the Tarrawonga Coal economic study (Gillespie 2011) that the impacts due to noise and dust have been internalized to the project by the purchase of a number of properties in the Zone of Affectation (ZoA). Based on recent medical research (Castleden, et al 2011 and Lockwood AH et al 2009) it is clear that there will be health impacts outside the ZoA and that these costs are external to the project. Many of these costs will be borne by the local Maules Creek community.

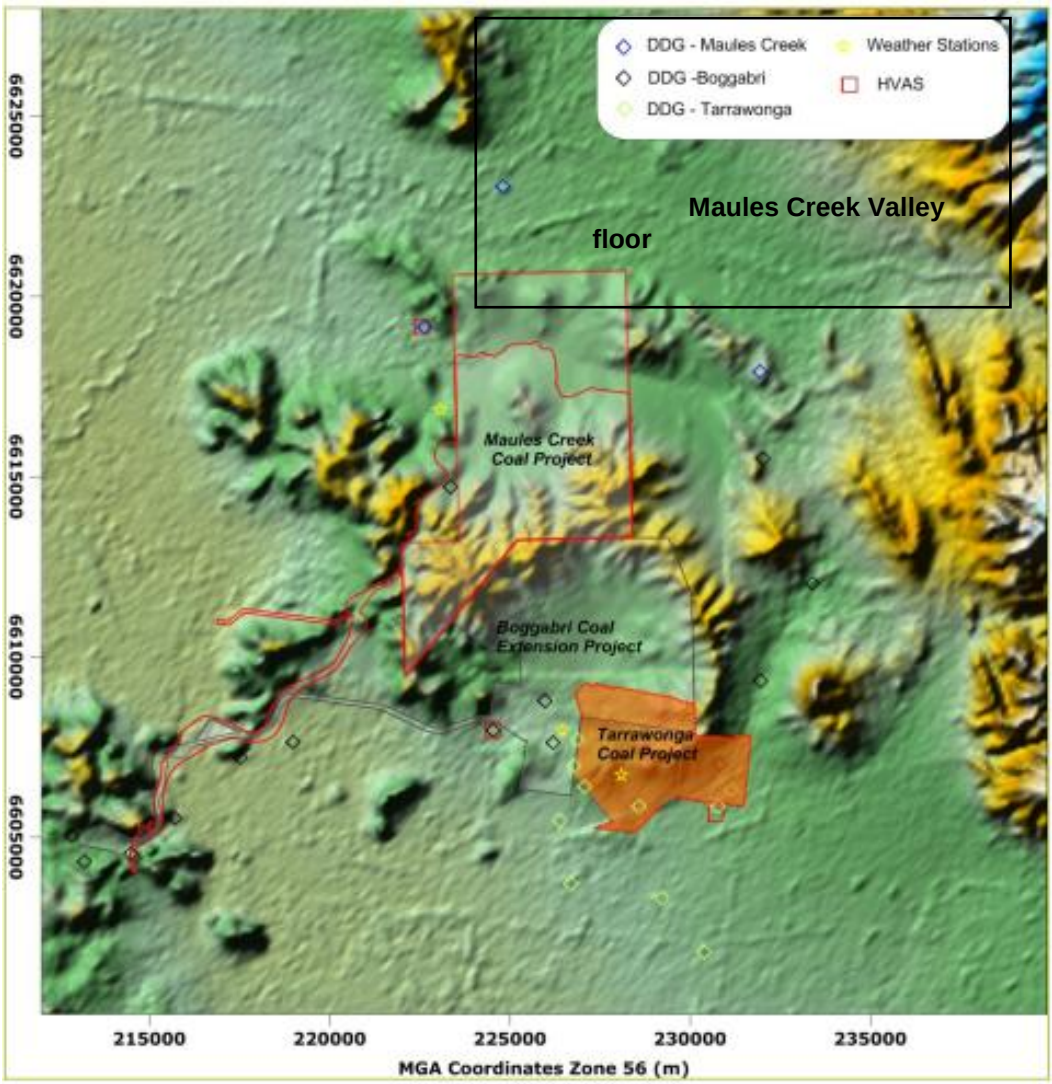


**Figure 3.3: Pseudo 3-dimensional plot of the surrounding terrain**

The image taken from Fig 2.3 of the PAE Holmes Specialist Study highlights the Maules Creek Valley.

# Key Issue and Concern - Documented Health Impacts of Coal Mining Dust Emissions

There are many documents that describe the impacts of fine coal dust particles on human health. This section taken from a report by Dr Steve Robinson and Murray Pakes in Appendix 7 is a suitable summary for this analysis and is quoted verbatim. Further evidence to the health impact of PM 2.5 emissions is provided in Appendix 7 - Affidavit of Matthew Peters in evidence to the Land and Environment Court.

> "When a fine dust particle lodges in the lung the body‟s immune system mounts a defence. Macrophages transport bits of coal to the lymph nodes but most of the particle is walled off with fibrous tissue whilst the T lymphocytes neutralize some of the toxins. The body has a limited supply of these immune cells so that numbers drop throughout the rest of the body leading to increased susceptibility to infections and vaccines.

### Respiratory system effects

> Just a few hours exposure to acidic particles will trigger a further attack of asthma in the predisposed. Children living 1.5km from a mine have a 33% risk of asthma, at 3km the risk is 22% and at 5km it is 12%. Particularly nasty toxins called Polycyclic Aromatic Hydrocarbons (PAH) and dioxins can damage the genes causing mutations which will produce new proteins that in turn lead to new cases of asthma. The fibrosis leads to Chronic Obstructive Pulmonary Disease (**COPD** – Australia‟s fourth biggest killer) with evidence of permanent damage in children as young as 12 years old in areas with high PM2.5 rates. Lung cancer increases in these same areas due to gene damage.
> In Singleton Dr Tuan Au has commenced testing the lung function of children and has already tested nearly 700 children with the aim of following them for five years.

### Cardiovascular system effects

> The platelets and other blood components become more viscous leading to clots in arteries whose walls have been roughened. Lipids are changed resulting in more fatty deposits in the vessel wall. Heavy metals in the coal such as nickel affect the electrical conductivity of the heart and cadmium attacks the elastic lining of vessels leading to aneurysm formation. The net effect is an increase in deaths from heart attacks and strokes. Blood vessels in the placenta are damaged leading to low birth weight babies.

### Neurological system effects

> Mercury breaks down the blood-brain and blood-bowel barriers letting in other toxins such as PAH which lead to a reduction in intelligence and an increase in autism and other damage which releases challenging (antisocial) behaviours.
> Lead from coal and released from the roofs by acid rain running into rural rainwater tanks leads to brain damage. Arsenic is also found in coal.
> The chemical toxins cause lethargy and depression with clusters of increased suicide noted downwind of one incinerator. Rare neurological syndromes occur in clusters such as a group

of people with Motor Neurone disease presenting in one street in Muswellbrook. Immune disease such as Multiple Sclerosis increase.

**Metabolic and other effects**

Thyroid function is often suppressed and combined with the lethargy arising from chemical toxins this can result in over-eating and excessive weight gain. Diabetes 2 rates increase. Eye diseases and skin rashes and infections all increase.

All the above damage to physical health is compounded by the psychological stress and depression arising from enforced changes to life plans, loss of quality of life, grief at the changed landscape, perceived powerlessness etc. Noise impairs concentration and sleep. Low frequency machinery noise (28Hz) may resonate in body cavities and peoples rooms and interfere with nerve conduction."

## Key Issue and Concern – Air Quality

Significant air quality issues will arise during periods of inversion with low winds (39% of the time in the immediate area and 41% of the time Maules Creek Valley floor). This concentration of dust pollution for long periods of time will be a major source of impact to the health of local people. Detailed discussion is provided in the Air Quality and Greenhouse Gas Section above.

## Key Issue and Concern - PM 2.5

Successive studies including the proponents Air Quality Specialist Study have shown that the PM 2.5 material is of major significance when assessing impacts to health from open cut mines. The Air Quality study explains on page 9 that PM 10 emissions "*while not able to affect health, can soil materials and generally degrade the aesthetic elements of the environment*". It follows that it is the PM 2.5 emissions that effect health and the main focus of monitoring the PM 10 should be re-directed to the PM 2.5.

Because there were no existing PM 2.5 monitors in the Maules Creek district at the time of the development of the Air Quality specialist study, there can be no conclusive assurances provided by the modelling of the effects of inversion layers and mixing heights on PM 2.5 emissions. It is distinctly possible due to the prevailing southerly winds that the PM 2.5 plume could settle over the residents of the Maules Creek valley floor in serious concentrations and become a major health hazard as described by van Steenis in Appendix 7.

## Recommendation

- Do a baseline survey of all residents health within the Maules Creek area prior to the commencement of large scale coal mining.
- Carry out ongoing long term monitoring of the health of all residents within the Maules Creek area to determine if there is any damage to human health including mental health.
- Require modelling of the PM 2.5 emissions be revisited each successive year in the first 5 years to determine if initial modelling is correct. This information can be used to guide modelling of PM 2.5 emissions in future modifications and expansion projects in the area.
- Put in place optional housing relocation plans for residents should monitoring show exceedences for PM 10 or PM 2.5 emissions.
- Increase the number of PM 2.5 monitors in the proposed Air Quality Monitoring Network.

## Key Issue and Concern - Blast Fumes

We would note that section 4.1 of the EA assumes the impacts to air quality due to blasting as being negligible and provides no further discussion relating to the quantitative impacts (either project alone or cumulative) to air quality due to blasting. The DGR's specifically mention the quantitative impacts to air quality and as blasting produces a range of toxic gases which is dangerous to human health (including death) it is the expectation of the community that these impacts should be included.

As described in the publication **Mining Australia**, (September 2011) in an article entitled "*Blast Fume Events: Addressing a Noxious Issue*", it was stated that: "Current World Health Organisation guides lines for NOx are a one hour level of 200µg m3 (approximately 200 parts per billion), and an annual average of 40µg m3. However, typical concentrations of NOx in post blast clouds can measure anywhere between 5.6 to 580 parts per million, exceeding the safe limits by around 30 to 3000 times. This is clearly far too high."

In Appendix 7 - "Ammonium Nitrate Blast Fumes" 2011, Hann K describes in detail the impacts that Blast Fumes that contain nitrous gases can have on human health. The Australian Explosives Industry 2011 Code of Practice for the Prevention and Management of Blast Generated NOx gases in Surface Blasting also describes the health effects of Blast Fumes and says that

> "…NOx gases must be recognized as a potential health threat and managed accordingly. Generally NOx plumes generated during blasting will dissipate to background levels in a relatively short time. Dissipation is highly dependent on local atmospheric conditions."

As shown in the above section on air quality, the atmospheric conditions in Maules Creek will be a factor in the dissipation of NOx gases. The atmospheric stability due to the inversion layer which is generally present 41% of the time and 69% over winter is likely to be conducive to slow dissipation of NOx gases.

Because the various mining projects in the vicinity of Maules Creek Project will produce a blast event every day and due to slow dissipation conditions, the resultant blast fumes could seriously impact on the health of the local people in Maules Creek. The frequency and the risk to the community is sufficiently high to require separate monitoring equipment of blast fumes as described in the MCCC Air Quality Monitoring Network Principles.

This is not only the concern of the MCCC. Recent reports from Oct 5 2011 in the Australian Newspaper are very alarming. http://www.theaustralian.com.au/national-affairs/state-politics/queensland-locals-fuming-as-mine-blasts-send-toxic-clouds-into-neighbourhood/story-e6frgczx-1226158548213

The NOx gases are also a OH&S issue and the movement of these gases from a work site to areas where there is exposure to the general public who may be of variable health is a significant risk. Because the health impacts are widely known and as these products can be so deadly, it follows that if the NOx gases leave the mine site Tarrawonga Coal should be responsible.

## Recommendations

- A quantitative modelling analysis of the impact of blast fumes on the air quality in the vicinity of the project be carried out.
- A monitoring plan be developed including separate monitoring equipment for NOx fumes as described in the MCCC Air Quality Monitoring Network Principles.
- A commitment in the Statement of Commitments that there will be no impacts to residents whatsoever from blast fumes. The statement should include reparations to the community should such an event occur.

## Key Issue and Concern - Noise

Noise can impact on the health of the community in a number of ways including problems associated with impaired sleep, concentration and learning. The following section taken from a report outlining Best Practice for Noise, Vibration and Airblast Control by Environment Australia 1998 is a suitable for this analysis and is quoted verbatum.

> "The annoyance characteristics of noise are also subjective. Whether or not a noise causes annoyance mostly depends upon its reception by an individual, the environment in which it is heard, the type of activity and mood of the person and how acclimatised or familiar that person is to the sound.
>
> The NSW Noise Control Act 1975 defines offensive noise as noise which due to its level, nature, character, quality or the time at which it is emitted, is likely to be harmful or offensive to, or to interfere unreasonably with, the comfort of a listener. This definition again serves to highlight the subjective nature of response to noise and shows that there are factors other than loudness and intensity which may lead to a noise being found offensive. The effects of noise and vibration on the health of people exposed to excessive levels have been extensively documented. Investigations have found that prolonged exposure can adversely affect mental and physical health.
>
> In addition to effects on the body, noise and vibration also cause psychological reactions. The psychological response is determined by personal factors and by factors associated with the noise or vibration itself. The attitude or mood of the person, his or her environment, the degree of arousal or distraction and whether the noise or vibration is felt to be an invasion of privacy or disruptive (particularly involving concentration such as studying, etc) will dictate personal response. The importance of the task being performed, the relationship of the noise or vibration to personal activity, its predicability and how frequently it occurs will also influence the reaction.
>
> There are very specific ways that noise produces psychological effects. These are, essentially, interference with communication and concentration, sleep disturbance and in inspiring fear. These factors lead to irritability which is the first sign of the psychological impact of noise. The effect of noise on animals can be similar to the effects observed in humans. Noise can adversely affect wildlife by interfering with communication, masking the sounds of predators and prey, cause "stress" or avoidance reactions and (in the extreme) result in temporary or permanent hearing damage. Experiments have also shown that exposure to noise impulses

> throughout the night-time sleep period resulted in poorer daytime task performance by animals (see Fletcher & Busnel, 1978)."

As described above in the section on air quality, the air quality models are forecasting inversion layers generally in the local area of 41% and 69% in winter. It follows that the health impacts outlined by Environment Australia due to the potentially continuous nature of the noise particularly during winter may become significant.

It is very important that local people who may already be under stress due to seasonal or economic pressures are not pushed over the edge by mental health impacts of cumulative noise from the proposed mines in the Leard Forest.

## Recommendation

- Do a baseline survey of all residents health including mental health within the Maules Creek area prior to the commencement of large scale coal mining.
- Carry out ongoing long term monitoring of the health of all residents within the Maules Creek area to determine if there is any damage to human health including mental health.

## Key Issue and Concern - Ground Water and Surface Water

Mine water can contain a wide range of heavy metals and salts. If this water escapes from the mine area it could contaminate surface and ground water and impact on human health.

### Recommendation

- Develop a ground water and surface water monitoring/testing program to ensure zero impact to water quality in the area.

## Key Issue and Concern - Rain Water Tanks

It has been found that dust emissions from open cut coal mines have been a contributor to the contamination of rain water tanks. Drinking water can be contaminated with a range of heavy metals that impact on human health. Those heavy metals can cause acidification of the water in the tank which can lead to chemical reactions with the tank itself.

## Recommendation

- Regular monitoring of rainwater tanks of residents within the area.

## Key Issue and Concern - Compliance

Due to the concentration of mines in the Leards Forest Coal Precinct it becomes cost effective to locate a compliance group in the immediate vicinity.

For many years now Export Abattoirs have had AQIS Inspectors funded by industry levies located in each workplace for the purposes of ensuring product standards, humane treatment of livestock, environmental monitoring etc. There are a number of inspectors located in the plant per shift. It is time for this approach to be applied to other primary production.

As the mines are located in a forest with sensitive ecological values the MCCC believe that it is appropriate for monitoring and compliance to be improved to ensure consent conditions in any project approvals and operational standards contained in appropriate legislation and the Statement of Commitments are being met. In addition these officers can provide an oversight of blast events, aquifer interference events and the proposed air quality monitoring network across the entire area.

### Recommendation

- The DPI provide trained staff for an office in Boggabri with approximately 2 EPA compliance inspectors per shift per mine. The office should be provided with appropriate administration support.
- Establish user pays funding for each of the proposed mines.

## References

Australian Explosives Industry and Safety Group Inc. June 2011. *Code of Practice for the Prevention and Management of Blast Generated NOx gases in Surface Blasting.* http://www.oricaminingservices.com/uploads/Bulk%20Systems/COP%20NOx%20-%20Edition%201%20June%202011.pdf

Bridges Acoustics July 2011. *Acoustic Impact Assessment.* Appendix G - Creek Coal Environmental Assessment.

Castelden WM, Shearman D, Crisp G, Finch P. Sept 2011. *The mining and burning of coal: effects on health and the environment.* Medical Journal of Australia. http://www.mja.com.au/public/issues/195_06_190911/cas10169_fm.html

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http://www.maulescreek.org/home/public-documents/BlastFumesI.pdf?attredirects=0&d=1

Hudon L. 1998. *Noise,Vibration and Air Blast Control.* Best Practice Environmental Management in Mining . Environment Australia. Dept of Environment. http://www.ret.gov.au/resources/Documents/LPSDP/BPEMNoise.pdf

Lockwood AH, Welker-Hood K, Rauch M, Gottlieb B. 2009. *Coals Assault on Human Health*. http://www.psr.org/assets/pdfs/psr-coal-fullreport.pdf

Mining Australia. September 2011. "*Blast Fume Events: Addressing a Noxious Issue*", http://www.miningaustralia.com.au/news/blast-fume-events--addressing-a-noxious-issue

PAE Holmes July 2011. *Air Quality Impacts Assessment.* Appendix F - Maules Creek Coal Environmental Assessment.

Robinson S. and Pakes M. *Urgent Reform of Coal Industry operating standards required*. http://www.maulescreek.org/home/public-documents/VanSteenisreportMurrayandSteve.pdf?attredirects=0&d=1

# Economic and Social Impact Assessment

## Key Issues and Concerns – Economic Impact

The MCCC asked Economists at Large to review the Tarrawonga Economic Impact Assessment produced by Gillespie Economics. The review found that the report contained "a number of very significant issues in the economic assessment, which, without being addressed, would render the assessment unsuitable to contribute to decision-making".

These issues are reproduced below and are fully discussed in Appendix 3.

- Scope of the assessment, particularly relating to:
  - Benefits accruing to Australia and overseas
  - Greenhouse gas emissions
  - Consideration of alternatives
- External costs and benefits.
- Health impacts
- Social value of employment
- Inappropriate use of input-output modelling in impact assessment
- Transparency of calculations

The report is typical of the previous two reports produced by Gillespie Economics for the Boggabri Coal EA 2010 and Maules Creek Coal EA 2011 with many of the same issues being identified. Like all proponent driven technical reports, the analysis attempts to minimise the impacts to the proponent and maximise the project benefits. Furthermore, the report does not meet the MCCC's requirements that "the project provide a Net Benefit for all the Stakeholders including the environment". This is at the heart of the problem with the planning system and the direction that policy makers, planners and decision makers are taking.

## Recommendations

- Underground Mining studies to the standard produced by Boggabri Coal in their EA be completed and released by Tarrawonga.
- Cost Benefit Economic analysis that compares the underground and open cut mining methodologies be prepared that outlines Net Benefit by stakeholder.
- That the concerns of Economists at Large regarding inconsistency of figures, inconsistency of scope and the consideration of external costs be remediated in the Economic Impact Assessment Report so that the report can become a means for effective decision making.

## Key Issues and Concerns – Social Impact Resilience Thresholds

The MCCC believes that certain community resilience thresholds are about to be breached due to the cumulative impacts of mining in the Maules Creek sub catchment. Each of the four components of community resilience is under stress.

1. The impacts to the eco system services provided by Leard State Forest,
2. Threats to physical and mental health,
3. Impact to community viability due to de-population arising from farm land purchases and
4. The uncertainty of underlying asset values and personal wealth.

The combination of the above with secondary feedback loops severely tests the foundations and resilience of the Maules Creek community. Many in the community are looking to exit the district and are frustrated that there are no buyers for their properties whilst others are only now starting to voice their concerns. Those who wish to remain or cannot exit are faced with a range of negative impacts for which there is no provision.

The Namoi Catchment Authority has utilised the resilience assessment methodology to conduct a preliminary assessment of the cumulative impacts of mining within the Maules Creek Sub catchment. While this assessment is still to be validated by modelling, the recognition by the CMA of potential conflict between multiple mines and critical thresholds within the catchment warrants further investigation. The Proposed Framework for assessing the cumulative risk of mining of natural resources in the Namoi Catchment, and the Critical Thresholds of the Namoi Catchment have been reproduced from publications produced by the Namoi Catchment Authority. The framework being adopted by the Namoi CMA is shown in Appendix 12 of the MCCC Submission for the proposed Maules Creek Coal Project.

## Recommendations

- Environmental and socio-economic net externalities beyond the project boundaries are real costs that will be imposed on the local community and need to be adequately addressed by the proponent.
- Resilience modelling should gain currency in the wider planning debate to ensure each project delivers a “Net Benefit for all the stakeholders”.

## Key Issues and Concerns – Maules Creek Community Fund

In addition to the impacts to property prices described above there are a range of external costs being borne by the community. Depopulation, loss of key people in leadership roles, uncertainty, stress etc are all secondary effects of mining in affected community’s as described in the section above concerning community resilience.

In order to rebuild the local community's resilience the MCCC is firmly of the view that a strategy to provide a "Net Benefit" to the local community is required. A level of provision sufficient to put the district on par or slightly above similar districts so that the proposed and existing mines can be excluded as a factor for people moving to or leaving the district. When this is done then a genuine "net benefit" to the community may have been achieved.

In order to "internalize" the external costs the MCCC has engaged Dr Ian Curtis, a Land and Ecological Economist to value the negative impacts to the community for the purpose of determining the level of provision that is required in order to get a net benefit from the project for the local community. Dr Curtis's report is contained in Appendix 10 and the key findings are shown below.

> *"The mining complex will impact by clearing all native vegetation, about 4700 hectares of land, some of which is a critically endangered ecological community.*
>
> *Accordingly the community of Maules Creek do not see any Net Social Benefit (NSB) accruing to them, or any tangible attempt to internalize what are significant negative externalities".*
>
> *"It is proposed that the Maules Creek Community be compensated, and the negative externalities internalized, by the establishment of two funds to be run for the lifetime of the mines and after. One fund to offset the environmental impacts, and the other to accommodate impacts to amenity, predicted detrimental changes to property prices and cumulative impacts."*

The purpose of the Community Fund is to capture benefit to the impacted community and its members with an emphasis on quality of life to offset impacts on the community, living standards, amenity and property values. The fund does not include compensation for serious environmental issues such as major disruptions to groundwater, impacts to human health or impacts to the native vegetation and habitat in The Forest.

A detailed overview of the proposed Maules Creek Community Fund is outlined in Appendix 9.

In order to manage the compensation for Community impacts the MCCC has developed the following principles;

## Principles for Community Fund

1. The objective of the Fund is to capture benefit to the impacted community and its members with an emphasis on quality of life to offset impacts on health, living standards, amenity and property prices.
2. The Community Fund be contributed to by all mines in the Leards Forest Coal Complex.
3. The contribution be paid annually apportioned by each companies impact.
4. The Fund be administrated by a trust with 5 trustees. 2 Mining, 1 NSC GM, 2 community.
5. Accounts to be administered by reputable accounting firm and independently audited.
6. Broad Objectives and programs to be determined by the trustees after scoping submission.

## Recommendations

- Among the Dept of Planning consent conditions the companies should make provision for the impacts to the environment and the local community by forming the Leard Forest Environmental Trust and the Maules Creek Community Fund.
- That clearly defined No Go Zones be identified by the NSW Dept of Planning and that these areas are adjacent to and include the Kaputar National Park, Leards Forest Conservation Area, Maules Creek, Middle Creek, Horesarm Creek and the Namoi River.
- A working group be formed to develop the strategic plans, guidelines, and rules for the Fund and the Trust. This would include a detailed analysis of the households and farm properties within the provision area.
- Trustees for both the Fund and the Trust be appointed.
- An Arbitrator be identified to resolve issues that arise for the operation of the Fund.

## Key Issues and Concerns – No Go Zones

As discussed above, the cumulative impact of the proposed mines in the Leards Forest will have a significant impact on the amenity, health and personal wealth of people in the area. Unlike the mining companies local people have no visibility as to what is planned in the district. A request for a departmental briefing as to proposed developments from the Minister for Minerals and Energy has been made (See MCCC Maules Creek Coal Submission - Appendix 6). The reasons discussed in this request are shown below;

1. The mining companies are able to cheaply pick off farmers who have no idea as to their situation.
2. Farms nowhere near the coal reserves are not selling to neighbours or new people moving into the district. Land prices no longer have any relationship to their productive capability.
3. No new farmers are moving into Maules Creek.
4. Landholders are unable to plan for the future. Investment in farm infrastructure and repairs is on hold and a wait and see game is starting to develop.
5. Mining companies share the information within their project areas that they deem is "appropriate", however areas outside their leases are typically not within their range of expertise. There are knowledge gaps as to where the resources are. We do not know what we do not know.
6. Fracturing is occurring in the community because some people no longer wish to live and work in a mining area yet others wish to remain. Stress and conflict due to uncertainty are not in anyone's interest.

For these reasons and in the absence of Departmental briefings, the MCCC has been calling for No Go Zones as we believe that residents are entitled to have some certainty in planning for their future. The letter in MCCC submission re the Maules Creek Project in Appendix 6 to the Planning Minister outlines the proposed No Go Zones in the area.

> "The MCCC is proposing that should these projects obtain planning approval, mining activity should be limited to the Leards Forest area. The areas adjacent to the Kaputar National Park, Namoi River and Maules Creek catchments and aquifers and farmland be placed in a "No Go Zone". This No Go Zone would exclude any further mining activity such as coal mining or coal seam gas extraction."

Unfortunately, many of the reasons forecast in the letter to the Planning Minister are being played out with Aston Resources buying up or indicating they will buy up large tracts of farmland, while other community members voice their wishes to exit the district.

## Recommendation

- Departmental briefings at the Maules Creek Hall to advise local people of what future exploration leases, expressions of interest and planned developments are known.
- Delineation of specific No Go Zones in the area. Departmental consultation at the Maules Creek Hall to identify these No Go Zones.

# Soils and Land Use

## Key Issues and Concerns

The Environmental Assessment does not adequately address several important environmental issues relating to soils and land use. Due to changes in Available Water Holding Capability, slope and topsoil/subsoil depths it is unlikely that the rehabilitation program will return the Native Vegetation in the project area to that currently exists post mining.

SoilFutures Consulting Pty Limited has reviewed the Tarrawonga Coal Environmental Assessment in respect of these concerns. Appendix 6

## Project Recommendations

- A detailed sub-soil management plan should be provided to ensure the land can be returned to its pre-mining soil capability. i.e. the depth of the soil needs to be returned to a sufficient depth to meet the criteria for a particular land capability. In other words maps of required soil depths would be needed which include subsoil placement between the regraded spoil and topsoil materials
- Post mining slope of the rehabilitated land needs to be returned to that of the slopes pre-mining in order to retain the existing land capability.
- It is inappropriate to apply a topsoil suitability for topdressing method to subsoils and that the amount and volume of subsoils to be moved, potentially stored and then put back, needs to be stated.

# Rehabilitation and Final Landform

## Key Issues and Concerns - Final Void Options.

The position of the MCCC is that the final void is a long term impact on the district and should be closed. The land capability in the area of the final void should be returned to its current value. The final land form is an opportunity to add value to recreational possibilities for the future residents of Maules Creek.

The Maules Creek Community is very concerned that the company is proposing a scenario to leave the final void open. When questioned at the highly informative community open day we were advised that this was due to simple economics. This is not "Leading Practice" and is not in the best interests of the district.

As described in the Ground Water Study, the final void is a evaporative pump effectively draining ground water from the district in perpetuity. i.e. forever. This evaporation from the void represents a significant cost to our district which will compound over time. The value of this water over many centuries is not able to be calculated as forecast impacts to the climate will likely reduce rainfall and increase evaporation thereby increasing the value of this water to the community.

The toxic nature of the final void is a major impact to the health of the ecosystem. The lake which will contain heavy metals and salts would kill or damage wildlife when drinking from the water. Wildlife would be more vulnerable in dry times as other water sources dry up.

Despite the assurances provided in the EA the water in the final void would be a potential source of contamination to the environment. No one expected the recent floods in the local district and the floods in Queensland to impact on those mine sites but it did. Untreated mine water was discharged into the environment and was an ecological disaster.

A dramatic example of a unplanned environmental release of mine water can be found in this YouTube video. http://www.youtube.com/watch?v=ts464rI9H5s&noredirect=1 .

As further evidence of the ridiculous nature of these assertions, Boggabri Coal has applied for and been granted a change to their license by the EPA in 1 day without public consultation, to pump water from the mine site into the environment with its final destination being the Murray Darling Basin.

The precautionary principle dictates that this void should be closed.

## Recommendations

- The final void should be closed.
- The land capability in the area of the proposed final void should be returned to its current value.
- Funds should be retained in trust sufficient to close the final void.
- The Aquifer Interference License should not expire at the conclusion of mining after the final void is closed. Funds should be retained for monitoring of the groundwater levels sufficient for a minimum of 400 years.
- Tarrawonga Coal should use a impervious membrane to ensure that there is no potential for salts or heavy metals to concentrate in the soil above the standing water level.
- Detailed investigations should be conducted and appropriate works undertaken to ensure that there should be no potential for salts or heavy metals to get into the ground water.
- The final landform should be engineered in such a way as to maximize social, recreational and educational opportunities.

# References

Sinclair P, Barrett C and Williams RM, Impact of Groundwater Extraction on Maules Creek – Upper Namoi Valley, NSW Australia, Nov 2005

Anderson, M.S. 2008. *Investigation of surface water groundwater exchange in Maules Creek Catchment.* Presentation to the IAH , 9 Sept, 2009. WRL UNSW Sydney.

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