Gloucester Shire Council

STRATFORD EXTENSION PROJECT – SSD – 4966

SUBMISSION BY GLOUCESTER SHIRE COUNCIL TO AN EXHIBITION OF THE ENVIRONMENTAL IMPACT STATEMENT AND DEVELOPMENT APPLICATION

January 2013

CONTENTS

1) INTRODUCTION

Gloucester Shire Council is the local government authority for the area in which the Project is proposed to be located. Council has sought to develop a comprehensive submission to address its concerns, and the concerns of the local community. In preparing this submission Council has drawn on the resources of its staff, members of the local community, and some limited external consultant advice. Council established a Working Group to discuss the Development Application and the comprehensive information contained in the EIS. A list of the people participating in this Working Group is attached as Appendix 1.

Council also sought discussions with representatives of several Government Agencies (the EPA, and the NOW) to assist in understanding issues related to noise, dust and water, and both the impacts on the community and proposed mitigation measures included in the proposal.

Councillors and staff received a briefing by representatives of Yancoal Australia Ltd on the 14th December 2012. Council has also held discussions regarding proposals it would seek to be included in a Planning Agreement associated with any approval that might result from this application.

Gloucester Shire Council's primary interest in this application relates to how, and if, this proposal should operate within our local environment, without causing unacceptable impacts on the community in terms of environmental, social or economic impact. Whilst the applicant has sought to address these issues in their EIS, their primary focus is on the extraction of the resource in a cost-effective and efficient basis. Council needs to consider their aspirations, and must seek to ensure that any impacts are either effectively managed or are mitigated to acceptable levels for the individuals affected, or the whole community well-being.

Council understands the imperatives of the applicant, and the benefits to the State in terms of royalties and resource production, but the major impacts of this project will be experienced in the immediate locality and the Gloucester area at large. Council has particular concerns for the community of Stratford and the surrounding rural landscape. They are being asked to endure ongoing impacts from this large-scale (in local terms) extractive resource activity in very close proximity to a small rural village, and the small-scale landscape of the Gloucester Valley which is historically and economically significant.

The Stratford village community were asked to accept a "boutique" coalmine on the subject land in 1995, which would operate for approximately 15 years. That mining has occurred, and has been extended, and is now subject to this further proposal for extension. Despite clear community expressions of concern (through the CCC, Council resolutions, and at public meetings) to oppose 24 hour activity so close to the village, this proposal now seeks to

return to 24 hour operation, and to mine up to 1 km from the village boundary. The EIS makes no mention of this fact.

There has been ongoing complaint by the community about the impacts of this historical mining, to which they say the ongoing response by the proponent is to “charm and disarm”. That is to say, their complaints are listened to sympathetically, but there is ongoing comment that there is no real result from these complaints.

Council's interests in this project are broad at one level and particular in another. Council is the roads authority for all roads providing access to the proposed development, and servicing the local community. There are particular concerns about the safety and suitability of the Bucketts Way to carry the increasing size and numbers of vehicles associated with ongoing and extended extraction of the coal resource proposed by this project.

Council recognises the economic contribution that employment of local residents and the engagement of local services brings to the local economy. The social and economic benefits of this proposal however, need to be carefully examined so that the community which is asked to bear the most impacts of the proposal might also benefit more fairly as well. Whilst there are jobs there are other negative impacts on other businesses through such things as loss of apprentices and general labour to the mines.

Council has relied on information contained in the EIS to inform its responses to the proposal. Where we can, we have sought to discuss the issues of concern in light of what is presented in the EIS, together with other information available (relevant standards, technical reports, consultants advice, etc) to outline our specific concerns. We have examined what the EIS says about impacts and proposed mitigation, and provided specific comments regarding specific proposals, and where possible or appropriate, have suggested either alternative mitigation or possible conditions of consent. We have not always been able to find answers and where such issues of concern are raised, we trust that the Department will seek to address and resolve these matters in its assessment, and in any determination of the proposal.

There are a number of significant issues that impact on our ability to respond effectively to this EIS on the many issues this project creates. These are discussed in section 4.

Council and our community also need to assess this DA in the light of other extractive resource proposals and approvals in the area. There will be significant environmental effects that are cumulative across the Shire for water, air quality, noise, transport and scenic amenity, and community well-being. There will also be significant combined effects on the industries of tourism, agriculture, health services and housing. Council expects that the assessment of this application will give consideration to these cumulative impacts as well has the specific coalmining project itself.

2) COUNCIL'S POSITION REGARDING THE PROPOSAL

Council recognises the valuable contribution made to be local economy by employment of local residents both directly in the mine and the through engagement of local support services to facilitate activity at the mine. It must be recognised however, that there are significant impacts on the local environment which are substantively felt by residents in Stratford Village and the rural locality around the mine.

The determination of this application needs to be based not only on the need for justification for the development itself, but also fundamentally on the potential environmental impacts and the ability to mitigate those impacts.

Of particular concern in this project must be the impact of noise on the local environment. The ongoing and increasing level of community complaint about noise impacts of the existing mining highlight this concern, particularly given the intent of this application to come closer to the village with mining activity. The noise impact has been modelled, though by using an old noise model. Models have significant margins of error. The impact contours generated in modelling the potential impacts of this project establish the significant contour line along the edge of Stratford village. Any inaccuracy in this line will mean that the impacts of unacceptable noise will affect a significant number of additional dwellings.

The model also relies on a large number of mitigation actions including the ongoing construction of bundling around haul roads and other noise generating aspects of the activity, getting dozer operators to keep their dozers in second or third gear, the introduction of “extra quiet” equipment and climatic conditions such as inversions and wind, not impacting more than has been modelled. There are many reasons why the model may be inaccurate.

On top of this is the intention to return to 24 hour mining, which has been consistently opposed in the community, in the CCC, and by Council. The Gloucester Valley is an extremely quiet location during evening hours with minimal land use activity of any sort occurring during night-time hours.

While local residents have complained of noise, they have also continued to complain of dust impacts in the village. Local residents are more regularly cleaning filters on water tanks than they believe should be the case. The potential health impacts on residents living close to mining activity are being increasingly documented, and are addressed in some length in this submission.

The proposed mine plan which leaves a series of embankments and three large voids that will fill with water of poor quality remains of significant concern. The historic mining at the site has left significant areas of embankments that are not revegetated, and remains a scar on the landscape for all travellers along our main access road, The Bucketts Way. The

acceptable approach to mining should require restoration of the landscape to generally pre-mining conditions. The proponent has argued that their proposal mine plan is most cost-effective from their point of view. They would have a number of pits concurrently being mined which enables the blending of coal product. However, the consequences in environmental terms, and the willingness and ability to effectively achieve an appropriately restored landscape at the end of mining, is a very serious concern to the community.

In light of these issues, there are five major concerns that Council has with the proposal as detailed in their application as follows;

a) The proposal to extend mining activity closer to Stratford Village; up to 1 km from the village boundary. Mining of the Roseville West pit is not considered justifiable given the level of impact on Stratford Village.
b) The final outcome of the mine plan being a series of embankments and voids as opposed to a general restoration of the landscape to more closely align with the pre-mining condition.
c) The intent of the mine to operate 24 hours per day.
d) The need for independent monitoring of conditions of consent
e) the long-term management and maintenance of the site after mining has concluded.

The justification for these core objections to the development as proposed, is contained in the substance of this submission. Council would not oppose continued extraction at the proposed site based on a mine plan that was modified to meet these core objections.

This submission contains a consolidated list of conditions Council would seek to see imposed on any approval granted in response to this application. If mining is to continue on this site, Council is also keen to ensure that there is better management of the impacts of that mining on its local community, than that which has occurred in the past. To that extent Council believes that independent monitoring of the impacts, revised processes and procedures around the CCC, and a better response to complaints raised by members of the community are needed.

There also needs to be essential upgrades to local infrastructure, particularly the Bucketts Way. There should also be significant community enhancement as a consequence of the project, especially in terms of environmental improvement projects and investment in Stratford Village to ensure a better future for the residents who live there.

Council believes some mining can continue to occur, but the benefits to the local community need to be tangible, given the scale of impacts on a small scale environment and community.

Whilst this submission focuses on this particular proposal, our discussions have also focused on the need to ensure there is an examination of the cumulative impacts of not only this mine but the other extractive resource activity in the Valley.

3) LAND USE AND COMMUNITY ISSUES FOR THE STRATFORD AREA

Introduction

The proposed open cut coalmine extension project needs to be understood in terms of the local land use context. Whilst there has been mining on this site of the scale proposed, the new proposal is significantly different in three regards;

- It is proposing to undertake mining much closer to the village of Stratford, which includes the public school, than previously carried out – only 1 km setback from the village boundary.
- It is proposing 24 hour operational activity.
- It is continuing to expand and operation that has major problems, have not been audited against approvals, and will not be addressed in this extension application.

Gloucester is a small scale community in a small scale and visually delightful scenic landscape of heritage significance. This section of the submission seeks to examine that context, so that any decision about this mine can give appropriate consideration to the potential impacts on the village and the broader community in which it would operate if approved.

a) Stratford Village

Stratford Village is the third largest population centre in the Gloucester LGA. It is located adjacent to the Bucketts Way to the west; and the Avon River, which runs north on the western side of the village and then turns east along the northern side of the village. The main North Coast Railway Line runs adjacent to the Bucketts Way, between the road and the river (see map 1).

There are 54 houses in the village and a range of community and commercial facilities which support the population, including;

- a primary school
- a community hall
- shop and service station
- Church
- Rural Fire Station
- playground and cricket oval

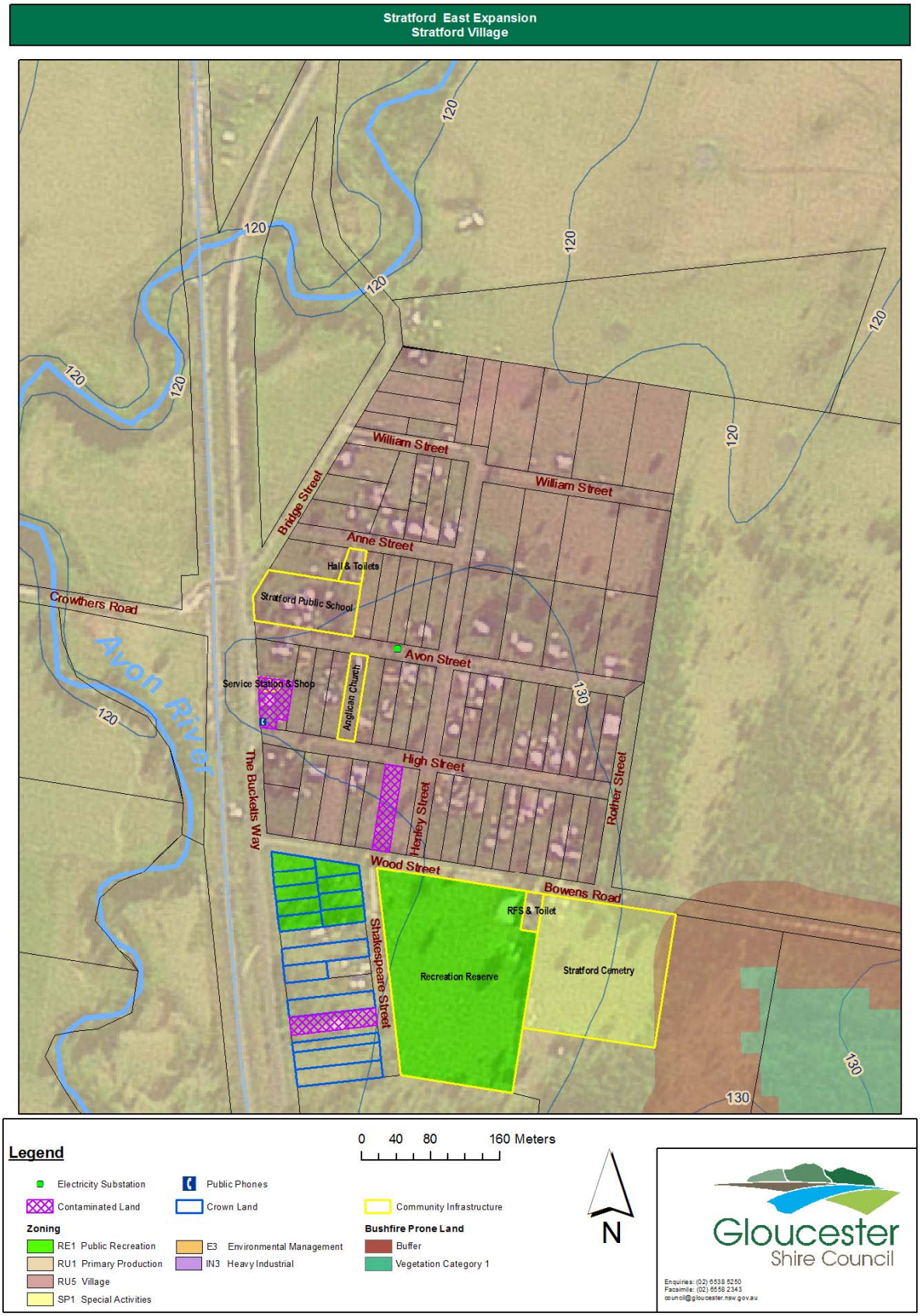
- cemetery
- vacant lots

In recent years (since 2007/8) Council has issued consent for 4 new dwellings, two of which have been constructed, and two which are yet to be constructed.

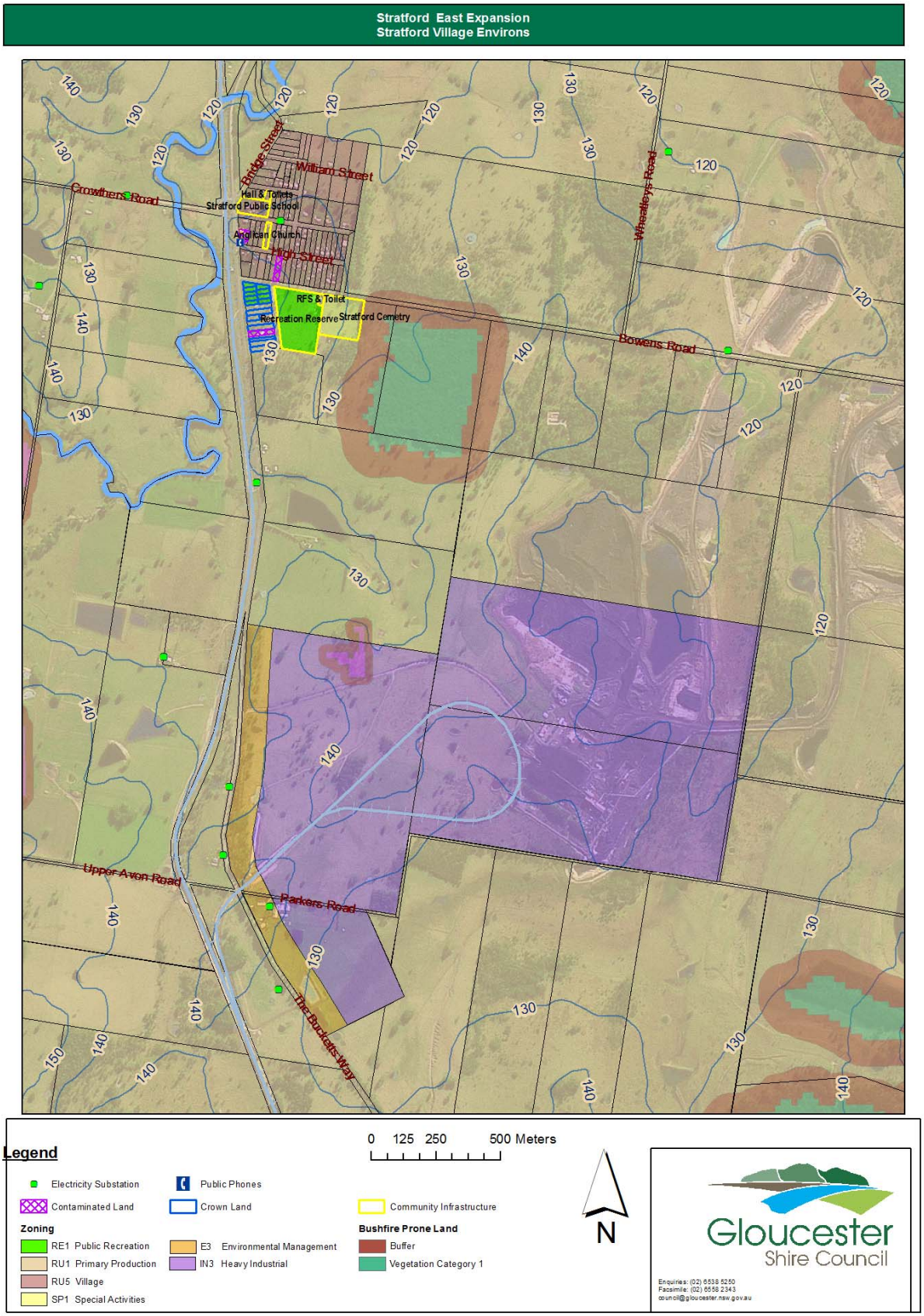
Stratford School is a two classroom complex and has a current enrolment of 15 students. A new library was constructed in 2009/2010.

Stratford Hall is regularly used for Preschool activities, and hoi. Other events held in the Hall include fundraising events, those organised by a country music club, community dances, community information meetings and private functions. The Primary School uses the Hall for larger school functions and rehearsals for performances, and Council holds an ordinary meeting of Council there once a year.

The Church is owned and operated by the Anglican community who conduct services on a monthly basis.



Map 1 Stratford Village



Map 2 Stratford Village and Environs

A "Boutique" Coalmine

In 1995 the residents of Stratford Village and its rural hinterland were told of a proposal to operate a "boutique" open cut coalmine on its doorstep. The mine was to operate for 8 years. As this mine was a "boutique" mine, small-scale, and only to operate for a short time, consent was granted and the community had to learn to live with it. The mine was granted an additional consent in 2003 and the current proposal now seeks to extend the mining activity for a further 11 years, closer to the village and to be operational 24 hours per day (with the exception of the Roseville West pit). Approval of this project would result in a total of 29 years of mining in this locality.

History of Complaints

The EIS recognises that there have been complaints about the impact of mining by the local community, but it paints a picture that the complaints are responded to promptly, and that because the activity of the mine generally/usually meets the required standards of the conditions of consent, there is not really much to worry about.

An examination of the complaint record however, shows a history of ongoing complaints of some significance. Over the last three years there have been 154 complaints! This is a significant number, especially when it should be recognised that there have been ongoing acquisition of properties around the mine by the company operating the mine, and therefore reducing numbers of properties that are able to complain.

The process of acquiring properties and requiring tenants to not complain does not overcome the human impacts of the mining activity. Many of the houses that are acquired are tenanted, but the impacts are not reduced. Council has mapped the location of the complaint history in the following map (see map following).

Map 3 Complaints October 2008 to October 2012.

There are clearly some difficulties in the standards relating to impacts that generate complaint. The community has clearly stated its ongoing disappointment about the response to its complaints. Community members state that they feel "charmed and disarmed" by the process. They lodge their complaint. It is sympathetically listened to "by the nice lady from the mine", and subsequent inquiry indicates that there is uncertainty as to why the noise or dust was significant enough to generate the complaint, or that the activity was "within required limits".

The community continues to express, politely and appropriately, its ongoing concern; but nothing changes.

The Future for Stratford

What is the future for Stratford Village? It is unfortunate that there has not been a focussed study on this question to guide future development of the village, or inform decisions such as the one needing to be made on this project.

Land in the village is currently zoned RU5 Village, which enables a dwelling to be constructed on a minimum lot size of 2000 m². There are a number of vacant lots capable of obtaining dwelling consent, including a number of Crown lots at the southern end of the village (see map one).

The minimum lot size for this village has been set to allow for on-site collection of drinking water, and on-site disposal of effluent. If water and sewer was reticulated to the village, most of the existing lots could be subdivided for an additional house to be constructed. Little new housing has been occurring over recent years because of the location of the mine. The village provides a focal point not only for the village residents, but also for rural landholders in the southern part of the LGA.

Council and the State Government recently zoned a significant area of land immediately south of the village for industrial purposes (see map three). The rationale for zoning this land for industrial purposes was an endeavour to provide an extended base to the local economy, for large-scale industrial and manufacturing activity. The approval of AGL's CSG field in the Gloucester Valley required a site for gas collection and distribution. AGL also propose a gas-fired electricity generation plant on land in this industrial zoned area. The availability of land, power, rail, road (and possibly large-scale produced water from the CSG production) creates a significant opportunity on this land. The land would provide additional jobs for the marginal economy of the valley.

Stratford has been living under the shadow of mining activity for over 17 years, without much benefit to show. If mining is to continue in the immediate neighbourhood, it is considered that enhancement of this village should be considered, to ensure its sustainability as a settlement into the future.

Consideration should be given to reticulation of water so residents can avoid the impact of dust in their drinking water. If sewer was reticulated, additional housing opportunities could be created. A planning study to address these issues, in consultation with residents and relevant authorities such as MidCoast Water, would enable informed decisions to be made. If approval for further mining is to be considered, then it would seem reasonable for this work to be funded as a condition of consent. If infrastructure upgrades are determined as advantageous and appropriate, then this work should also be funded as a requirement of the consent, as mitigation for the impact of the development on the village.

b) Gloucester LGA

Gloucester is a small District Centre servicing a large area of land between the New England/Northwest Slopes and Plains Area, and the Hunter and Lower Mid-North Coast. It provides critical district facilities to over 3000 km² of land in its LGA, and services a catchment beyond its boundaries for services such as retail, health, Police and Emergency Services. The main road corridors of the Bucketts Way (to the south and east) and Thunderbolts Way (to the north west) are increasing in significance as traffic routes. Gloucester is on the main North Coast Rail Line. A helicopter pad at the Gloucester High School, adjacent to Gloucester District Hospital, provides a key connection point for the Westpac Care Flight health services.

Whilst Gloucester has a significant role to play in servicing its community and areas beyond, it is also characterised by marginal land uses. Many businesses struggle on a daily basis. Many are lifestyle businesses, or businesses based on generational commitment, including farms, retail outlets and industrial and service outlets. While the mining contribution to the local economy is recognised in terms of local jobs, both directly in the mine and in service activities, it is also significantly different in scale, and it has the potential to overwhelm activity in other areas. More will be addressed in detail in section 4(g) regarding economic and social impacts, but it is important to understand the nature of local land use activity in considering the impacts of this decision.

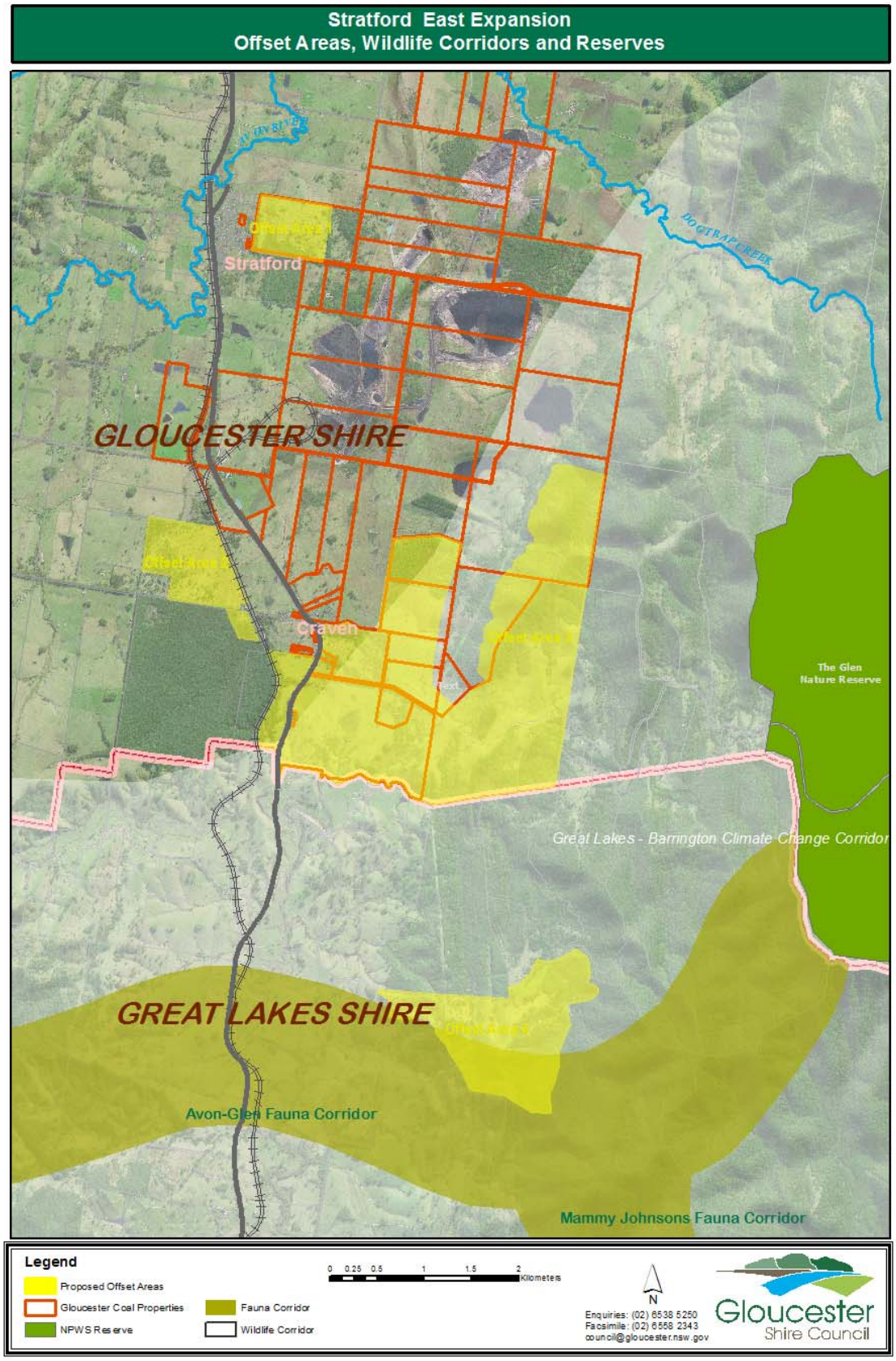
c) Cross Valley Wildlife Corridor

The portion of the Gloucester valley extending from Stroud Road to Craven has been identified as a regional wildlife corridor linking formal reserves and other forested public lands on the eastern side of the valley with those to the west, and providing habitat for a range of threatened and endangered species of birds, reptiles and mammals.

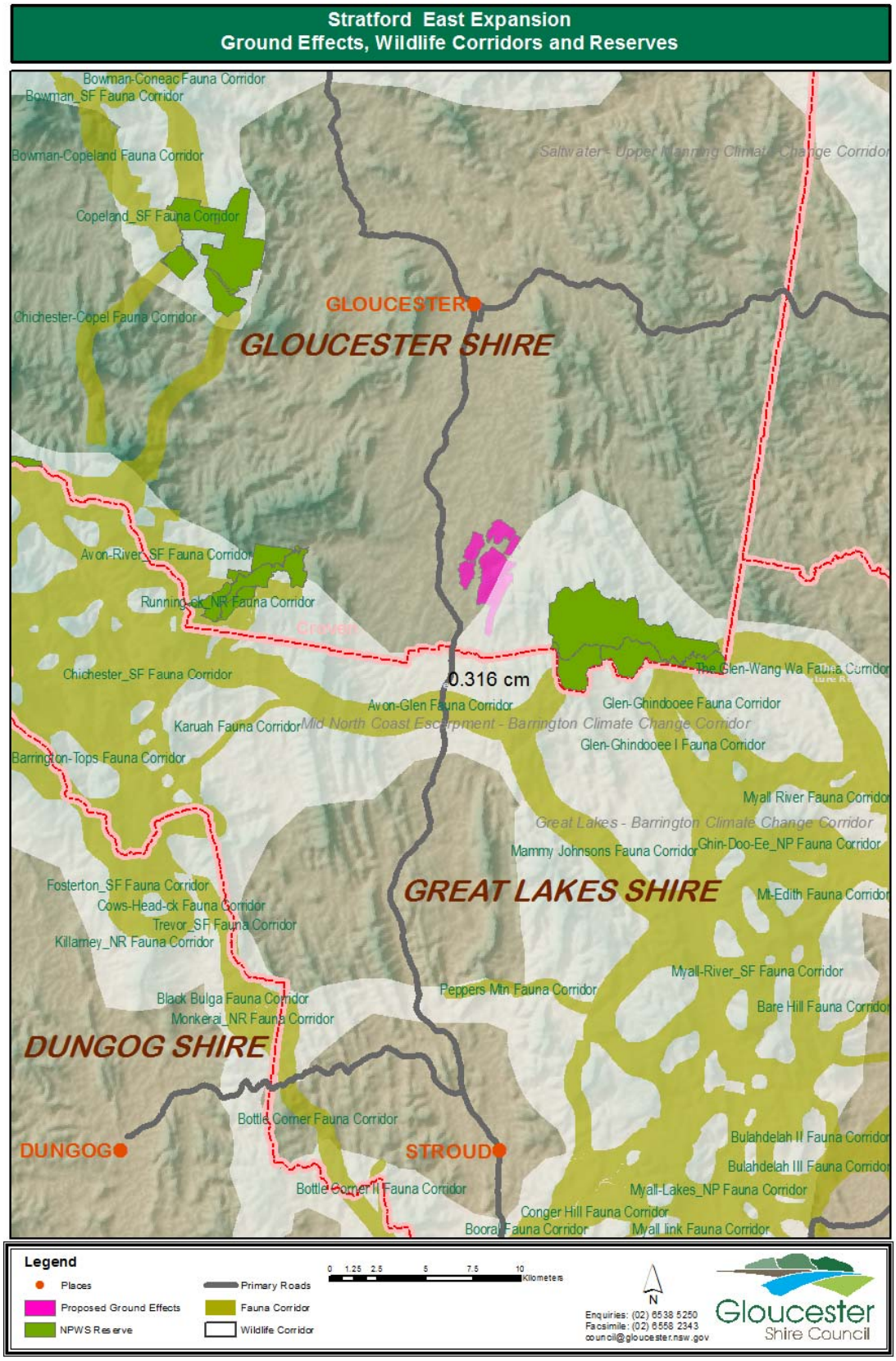
Within the regional corridor there are two sub-regional corridors. They are the Stroud Road Corridor located immediately north of Stroud Road village, and the wider Great Lakes – Barrington Climate Change Corridor (which is also known as the Craven Valley Wildlife Corridor) located south and east of Craven village (see maps 4 & 5).

Two of the biodiversity offset areas (areas 3 and 4) proposed in relation to the Stratford Extension Project are located within the wildlife / climate change corridor. Within offset area 3 are two lengths of the Wards River gorge which contains semi-closed riparian forest of particularly high conservation value. Connecting those two lengths of the gorge is an existing Voluntary Conservation area. Combined, a total length of about 1.75km of the Wards River would be included in protected areas if offset area 3 is established.

As discussed in later sections 4(h) of this submission, the proposed establishment of offset areas 3 and 4 would constitute a significant step towards re-establishment of habitat connectivity across the wildlife corridor and is supported.



Map 4 Offset Areas, Wildlife Corridors and Reserves



Map 5 Wildlife Corridors in Context

The source of Wards River is in The Glen Nature Reserve, the boundary of which is some 4.9km eastward along the river course. A length of river upstream from the offset / VCA areas crosses only a small number of private properties (one of which is owned by Yancoal) the opportunity may exist for eventual linking with the Nature Reserve through a continuous length of protected riparian habitat.

Council will explore that opportunity in consultation with Great Lakes Shire Council, landowners and the Local Land Services authority in the further development of the Councils' environmental management strategies.

Proposed conditions of consent

If the mine is approved it is proposed that the following conditions be included in the consent in relation to the village of Stratford;

1. Funding of $100,000 is to be provided for the preparation of a strategic plan and a DCP (a Stratford Village Study) for the village of Stratford and include, among other things, the feasibility of providing reticulated water and sewer to enable further development of the village.
2. Should the Stratford Village Study establish that reticulation of water and sewer is feasible, then the cost of provision of those services is to be provided by the proponent.

Impacts on Community Health

Stratford Mine has been operating for 17 years. It was sited only 1.5km from the village of Stratford which then had about 40 or so private dwellings including a Primary School. The adverse health effects of open cut coal mines has been known for many years but became linked to PM 2.5 fine particles as the most important cause in 1993 with the US Harvard Six Cities report. Thus the Stratford Mine has been operating for all its 17 years with this knowledge of the public health dangers associated with the granting of the licence to mine. After all these years surely the time has come to perform an audit of the extent of damage caused.

It was not until 2003 that Australia introduced an advisory PM 2.5 level. Gloucester Coal initially chose to not purchase a monitor that could measure this size of particulate, but has recently installed a device capable of measuring particles of this size. However it is of concern that the data from this more recent measuring has not been made available to the community. The partially enclosed nature of the Gloucester Valley has led meteorologist Martin Babakhan, to advise that the PM 2.5 particles, which stay airborne for long periods, would be expected to accumulate in the valley. Thus they could even be as high a level as PM10 particles which drop to the ground much more quickly.

The mine consent conditions for PM 10 particulates are set at an old 'acceptable' level. This is deceptively worded because the allowable levels are known not to be 'safe' levels. There is no entirely safe level of PM2.5 particulates, nor for lead in the water/air/domestic dust for young children.

The WHO Air Quality Guidelines for Europe 2nd Edition (2000) chart the mortality and morbidity to be expected at a PM10 level of 50microgms per cubic metre i.e. within the compliance levels that Stratford Mine operates under. One example is that there will be 4000 children with depressed lung function (below 85% of predicted level) for every 200,000 children. That is, 1 in 50 children will be made casualties of mining even if the mines stick to their limits. Stratford, like all other mines, does not keep completely within limits and fourteen PM 10 exceedances are recorded in this EIS in the period 2002-2011 and HVS sampling is only done one day in six. We should expect many more than one in fifty lung adversely affected children from a health audit of residents of mining at Stratford. The mine is applying to increase production and to come 250-400 meters even closer to the village. This level of damage is not acceptable to the community.

Stratford School domestic rainwater tank was found to have lead in it above maximum health guideline levels in 2004 but the community were not informed nor were they advised to check their own tanks. Filters and a correction of the acid pH was performed on the School rainwater tank and instructions given to the School on how to run the water before drinking it each morning. When Gloucester Council did testing of a few Stratford Village tanks in 2011 raised lead levels were found in two tanks. It is likely dust containing sulphur brought up from Duralie is contributing to the acidity which dissolves metals into the drinking water. It is unrealistic to leave the onus for having safe water entirely at the hands of house owners for such a complex and potentially dangerous public health issue.

4) THE MINE PLAN

a) Audit of Current DA

If this proposal is approved it will be the third development consent for basically the same site. It would therefore, be appropriate for an independent audit to be conducted of the previous two development consents to assist in the determination of this application. It is realistic for the community and Government to be informed (through the audit results) of the past performance of the applicant prior to an 11 year extension being granted. This audit should include:

- compliance with environmental licence conditions;
- progress with rehabilitation;
- plans for mine closure at the end of the current consent in November 2013;
- the quality of community consultation and involvement;
- production figures and royalty payments; and
- actual employment characteristics (local/regional/other).

It would also be useful for this audit to be provided to the first meeting of the new CCC formed following granting of consent, if consent is to be issued. This would inform all members of past activity at the mine and provide a basis for ongoing monitoring of future activity.

Proposed condition of consent

1. An independent audit of compliance with the conditions of consent for the previous mining be carried out and the results be presented to the first meeting of the proposed new Community Consultative Committee.

b) Embankments and Voids

The proposed mine plan leaves the finished site with a series of raised embankments and 3 final voids that will fill with water. Yancoal advised Council in its presentation on 14 December that this is the most cost-effective way for them to mine the site. It is not considered appropriate for social and environmental reasons, to mine coal and leave the landscape seriously altered in this way. There is no technical reason for this degradation; it may cost more to fully restore the landscape, but in environmental terms this is the most appropriate approach.

By contrast the proposed rocky Hill mine is designed without any voids in similar landscape and mining conditions, and it would be issued and that this was economic.

The raised embankments have the following problems:

- Natural land and vegetation is covered and the ecosystem destroyed;
- Agricultural land is covered with poor quality waste rock and its productivity reduced;
- Waste material from the mine is stored above ground in the embankment with potentially dangerous heavy metals, acid forming rock and coal reject material leaching into the surrounding areas;
- Until they are properly re-vegetated they are a source of dust and airborne chemical pollution;
- There will be difficulty in successfully revegetating the embankments;
- The artificial soil profile can erode and pollute other land and watercourses;
- In the case of Stratford the embankments are irrigated with saline water creating a new problem;
- Their high visibility detracts from the natural visual landscape;
- They change the surface water flow patterns and infiltration into the groundwater; and
- During construction they substantially increase noise pollution due to heavy machinery operating above the natural ground surface.

The permanent voids have the following problems:

- Surface and ground water regimes in the area are totally destroyed;
- The holes are up to 180m deep with the water levels continuing to increase for up to 200 years;
- The water in the void is polluted and unsuitable for any human, agricultural or environmental use
- The voids are a health and safety problem of a serious magnitude (78ha in area);
- Water collected in the voids comes from groundwater and surface water collection and effectively removes this water from the natural hydrological system;
- The voids are used as waste water sumps by the mining operation to avoid cleaning up any pollution and allowing the water to continue along its natural hydrological channels; and
- By surrounding the site with water exclusion banks and by using the voids as permanent storage, the mine is able to operate a policy of no discharge from the site contrary to the State Government policy of 'water harvesting'. As a result:
    - The exclusion banks take water from the mine catchment and add it to another catchment with subsequent changes in water flow, erosion, ecology and downstream water rights for landholders;
    - The no discharge policy means that the original water course is also changed; and

- These physical changes result in major, permanent degradation of a significant area of land (in the case of Stratford mine it is nearly 800ha).

Mitigation Measures

Mitigation measures proposed in the EIS are associated with spreading topsoil, lime and fertiliser on the embankments so that they can be planted to improved pasture or regenerated with native pasture or planted to trees and shrubs. While the technology to do this has improved over the last forty years, the following issues remain:

- The embankments can still leach soil and water pollutants because the soil profile is very artificial and porous;
- Improved pasture areas are irrigated with saline water and the salt accumulates in the soil or is carried in water to other areas and reduces plant growth;
- Erosion is a constant risk as the slopes are greater than natural and the ground cover is poor for many years (as is the case documented in the recent external audit of revegetation at Duralie Mine);
- The areas are visually un-natural for many years; and
- These embankments are expensive to build, shape, topsoil, vegetate, water and maintain.

There is no mitigation measures proposed for the voids in the proposal.

An Alternative Approach

The following principles should be used in a redesign of the mine and its operation;

- No pollution should be allowed to discharge from the site at any time;
- All surface water should be discharged from the site in the same quality and quantity that it entered the site or was temporarily diverted around parts of the site;
- There should be rigorous separation of various quality water in the mine site to enable clean water to be released to water courses during the mine operations in a manner consistent with the natural, before mining, hydrological regimes;
- Only groundwater collected in mine pits should be used within the site for coal processing and dust control;
- No waste material can be stored long-term above ground but returned to pits as they are progressively mined;
- All potential acid forming rock must be handled and stored using World's Best Practice;
- The area of voids must be minimised at all stages of mining;

- No void can be allowed to spill and to ensure that any excess water collected must be treated to a standard suitable for agricultural irrigation and provided to district farmers at a cost of 50% of the government fee; and
- No void can remain at the end of a rehabilitation period of two years after the close of mining.

All of these provisions are technically feasible.

The cost of implementing them is simply a part of the real cost of mining a public resource.

c) Roseville West Pit

The Roseville West pit extension involves the continuation of mining to the west and south of the existing pit. It is proposed that approximately 7.3 million tonnes of ROM coal would be mined from this pit extension. A perimeter bund is proposed to be constructed along the western edge of the pit to restrict access, attenuate noise, and screen views of the active open cut mining areas from Bowens Road and the Wheatleys Lane. At its nearest location this pit is approximately 1 km east of the village of Stratford and 40 m from Avondale Creek. At the end of mining this pit is proposed to remain as an open void 140 m deep, 65 ha in size and that is so saline that it cannot be used for anything, and gradually filling with water.

In its briefing with Council, Yancoal indicated that this pit has high quality coal which would be blended with other coal from the mine to produce a saleable product and hence was justified.

The community is significantly concerned with open cut mining activity this close to a village settlement. The potential health impacts are significant and it is unfortunate that there are no setback requirements specified in state legislation for open cut mines. It is interesting to compare recent discussions in regard to appropriate setbacks for dwellings from wind farms. A publication on the Department of Planning website (*Wind Turbines and Proximity to Homes; The Impact Of Wind Turbine Noise On Health)* which notes as follows;

> *"wind turbines should not be sited near homes, communities or other sensitive facilities (e.g. schools, and residential homes for special populations, such as the chronically ill aged. The Precautionary Principle should apply.*
>
> ***First, Do No Harm**"*

The document goes on to advocate minimum setbacks of up to 3 km, depending on the size of blades in the turbines.

The combined impact of noise, dust and ground vibration certainly question the wisdom of allowing the Roseville West pit to be included in any consent. The impacts are socially and economically unacceptable.

5) MINE IMPACT ISSUES

a) Noise and Blasting

Stratford Coal Mine - Current Experience

Noise disturbance from the Stratford Coal Mine's current operations is a significant problem for neighbouring residents.

Noise disturbance occurs over a wide area and would seem to be greater than that predicted by previous noise modelling. Despite mitigation measures taken by Yancoal, noise disturbance persists and judging from the steadily increasing number of complaints lodged (SEP EIS Appendix C Noise & Blasting Assessment Page 5 Figure 1), is actually getting worse.

In addition to the noise disturbance itself, two related causes of frustration for residents are manifest. Firstly, noise can be highly variable under identical weather and operating conditions viz. it can be noisy today despite having been quiet yesterday. Secondly, Yancoal is seemingly unable to identify the specific source(s) of noise disturbance or explain its variability.

Residents also find the Complaints Handling Procedures to be completely inadequate. The procedures are seemingly aimed more at 'managing' the complaint and the complainant rather than investigating the complaint to finality by identifying the noise source and implementing mitigation measures. There is rarely any explanation of investigative and corrective measures undertaken and inadequate follow-up with the complainant to assess whether the problem has been resolved. The complaint is simply noted, recorded and filed – another bureaucratic task to be completed.

Consequently many residents have become less inclined to lodge complaints or have stopped lodging complaints completely, not because the disturbance has gone away but because the entire, unproductive process simply adds an additional layer of unwanted stress. It is apparent from anecdotal evidence that the number of complaints recorded does not accurately reflect the full extent of noise disturbance experienced by neighbouring residents, a fact previously conceded by SCPL at a CCC meeting some years ago.

Stratford Extension Project – Environmental Impact Statement

Overview

Gloucester Shire Council commissioned Wood and Grieve Engineers (WGE) to undertake a review of the Noise & Blasting Assessment provided in the EIS. The WGE Report, which can be found at Appendix 2, underpins many of the observations and recommendations herein.

The concurrent operation of widely separated pits within the project area will result in a substantial increase in the area potentially affected by intrusive noise. Noise above the Rating Background Level (RBL) is predicted to occur over an area of some 80 km2.

The proposed return to 24-hour mining operations at the Avon North and Stratford East open cuts will greatly exacerbate the noise disturbance. Night-time noise levels in Year 7 are predicted to exceed the Project-specific Noise Level (PSNL) over an area of 49 square kilometers.

The data presented in the EIS is technically complex and confusing. It is impossible for a landholder to assess the actual extent of noise intrusiveness that will be experienced by them e.g. its loudness, timing and duration at their property.

There is no attempt to explain the relationship between the Intrusive and Amenity Assessment Criteria (Table 4-11). The EIS does not clearly state which of these criteria it is proposed be used to determine the PSNL.

The inclusion of Table 4-10, which simply presents a relative scale of various noise sources without explanation or attempt to relate this to the industrial noise assessment criteria, together with the statement on Page 4-50 that "hearing 'nuisance' for most people begins at noise levels of about 70dBA", is seriously misleading. Together these suggest that the noise impacts of the project will be relatively benign, a situation that does not accord with current experience.

Given that noise arising from Yancoal's current operations has such an intrusive impact on neighboring residents, it is completely unacceptable that an internal peer review has been offered as validation of the Noise and Blasting Assessment presented in the EIS. Nothing less than a comprehensive, review by an independent Acoustic Consultant should be accepted.

Recommendations/Proposed Conditions of Consent:

1. Noise & Blasting Assessment to be re-presented with noise impacts identified in terms that a layperson can understand. Actual noise impacts to be assessed for all landholders within the area above the RBL noise contour.
2. Noise & Blasting Assessment to be independently peer reviewed at Yancoal expense by a fully independent Acoustic Consultant.

The Noise Modeling & Assessment Criteria

The large number of complaints concerning intrusive noise, lodged by residents located in areas where noise modeling and monitoring for current operations predict noise impacts below the current PSNL, suggest that either the modeling is not a good indicator of potential noise impacts or the monitoring is not accurately recording noise levels.

It is understandable that residents therefore have no confidence in the noise modeling presented in the EIS.

At Page 4-52 it is stated "*In those cases where the INP project-specific assessment criteria are exceeded, it does not automatically follow that all people exposed to the noise would find the noise noticeable or unacceptable.*" This suggests a clear uneasiness about ability to meet the PSNL and an attempt to persuade the reader to the view that exceedances won't really be a problem. It would be equally valid to state that possibly all people exposed to project-specific noise which does not exceed assessment criteria may still find the noise to be noticeable or unacceptable.

The EIS claims that the predicted project noise has been comprehensively evaluated and assessed in accordance with the guidelines contained in the NSW Industrial Noise Policy (EPA 2000) (INP).

The INP acknowledges that *where a noise source contains certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest it can cause greater annoyance than other noise at the same noise leve*l (INP Page 28). This is well demonstrated by the Fletcher-Munson Equal Loudness Contours (Wood & Grieve Figure 1 and explanatory text Page 9). Refer also to (Leventhall G 2003 *Low Frequency Noise and Its Effects, A Review* www.defra.gov.uk).

Accordingly, the INP states that where a noise source does contain such characteristics, an adjustment is to be applied to the source noise level received at an assessment point before it is compared with the PSNL to account for the additional annoyance caused by the particular characteristic.

The characteristics of noise generated by mining operations include tonality, intermittent and low frequency noise. In fact the overall noise level experienced by neighbouring residents will be driven by low frequency noise, given that high frequency noise is well attenuated by air. There is no indication in the EIS that any investigation or assessment has been undertaken of the characteristics of noise that would be generated in the extended mining operations, and no indication that any relevant adjustment has been made to the noise data to account for additional annoyance.

If this has not been done the EIS fails to satisfy the Director General's Requirements.

In relation to low frequency noise in particular, no data is provided that uses C-weighted measurements. The use of A-weighting tends to significantly devalue the impacts of low frequency noise in particular. Although the use of A-weighted data is commonly mandated, the INP notes that C-weighting is more responsive to low-frequency components of noise within the audibility range of humans. The INP recommends that both A- and C- weighted noise levels should be measured and assessed over the same time period to determine whether an adjustment for low frequency noise should be made.

C-weighted measurements need to be taken at the same time as A-weighted measurements as it is not possible to convert measurements between the two.

The characteristics of noise generated by mining operations referred to above, typify a high proportion of the complaints made about noise from the existing SCM operations. The lack of C-weighted measurements in the current SCM noise monitoring program may go some way toward accounting for the discordance between predicted/measured noise impacts and the experience of neighbouring residents as recorded in the complaints register.

As no C-weighted data is provided in the EIS there can be no confidence that the predicted noise impacts of the extension project have not been underestimated due to the devaluation of low frequency components.

The operational noise modelling considers meteorological effects, surrounding terrain, distance from source to receiver and noise attenuation. It does not include any analysis of the indications of noise nuisance reported by residents through the complaints process beyond noting the number of complaints and complainants.

Notwithstanding the limiting of complaints through progressive acquisition of affected properties and application of compensation agreements that are prohibit lodging complaints, the location of residents who have reported noise nuisance provides useful information on actual noise impact, but that information has not been taken into account.

The EIS acknowledges that the typical meteorological conditions experienced in the Gloucester Valley dictate that wind and temperature inversions need to be factored into the modeling to assess the noise impact of the mine operations on nearby residents. It is not stated whether the Operational Noise Contours presented in Figures 4-16, 4-17 and 4-18 reflect these typical meteorological conditions.

Recommendations/Proposed Conditions of Consent:

1. Noise & Blasting Assessment to be re-presented, with comprehensive assessment of noise characteristics that will be generated by the project including presentation of C-weighted data.

24-Hour Mining Operations

The proposed return to 24-hour mining operations is strongly opposed within the community on the basis of predicted effects, current experience of noise from existing mining operations, and past experience of 24-hour mining that was discontinued following completion of mining in the Stratford main pit.

The EIS at Page ES-8 states "*Mining operations are currently approved to be conducted between the hours of 7:00 am to 10:00 pm, however, have historically …. been conducted up to 24 hours per day.*" This creates the false impression that the project is merely seeking to revert to 'normal' hours of operation. Consent for 24-hour mining operations was given for the original 'boutique' mine - the first industrial development in this rural environment - when this community had no prior experience of the actual noise impacts. Neighbouring residents found the stress and anxiety arising from the night-time noise disturbance to be intolerable. This was acknowledged by the Department of Planning and subsequent consent conditions did not allow night-time mining operations. The SCM has in fact, now operated under restricted hours for longer than it did under 24-hour operations.

Community opposition to 24-hour mining operations has been voiced throughout the public consultation process. The Community Consultative Committee and Gloucester Shire Council formally recorded their objections in 2011. A large public meeting held in Gloucester in April 2012 voiced overwhelming opposition and most recently, a public meeting held at Stratford on 22 November 2012 unanimously resolved to oppose a return to 24-hour mining operations.

Yancoal is attempting to push ahead with its plans in the face of this almost unanimous opposition, whilst simultaneously claiming to be a good corporate citizen. It is noted that Section 3 'Consultation and Community Initiatives' of the EIS does not make mention of this widespread opposition.

The Director General's Requirements stipulate that the EIS must include a detailed description of the development, including need for the development and justification for the proposed mine plan.

The bald assertion that measures such as restricting mining to daytime hours would not be economically feasible is not supported in the EIS by any information or analysis that would enable it's veracity to be assessed.

The lack of justification for the 24-hour mining proposed in the mine plan clearly does not satisfy the Director General's Requirements.

Recommendations/Proposed Conditions of Consent:

1. The proposed 24-hour mining operations should not be approved. This requirement is picked up in proposed condition one of this submission

Project-specific Noise Levels (PSNL)

The establishment of the PSNL is dependent on the background noise level (RBL). The INP adopts 30dBA as a default minimum RBL and this level has been deemed to be appropriate for the project. However, independent monitoring has shown the actual background noise level in the rural areas surrounding the SCM to be significantly lower. This will obviously have an impact on the PSNL and the sleep disturbance criteria identified for the project, which should in fact be lower than those presented in the EIS. (Wood & Grieve Pages 4 & 5). This has the effect of increasing the areal extent of the noise exceedance zone and the number of properties affected.

It is also noted that ENM, the software used for the noise and blasting assessment, is somewhat outdated and has been superseded by newer applications that are progressively being adopted because of their greater accuracy. There is some evidence to suggest that there are discrepancies in the predicted noise levels obtained with ENM and the more modern software. (Wood & Grieve Page 9). As the noise modeling presented in the EIS has relied on the ENM software, it is likely to have higher margins of error than could have been achieved through use of newer alternatives.

Concerns have been expressed about the amount of mitigation that will need to be undertaken to achieve compliance with the PSNL. Questions have been raised as to how realistic this is from both an operational and a regulatory perspective. The important point being that error margins increase with the number of specific mitigation measures to be undertaken.

It is apparent that there is a high likelihood that the noise impacts are being seriously under estimated. There is a default margin of error of 2dBA in the calculation of the PSNL. If the actual RBL is say, 28dBA and both the software and mitigation measures each result in a 2dBA discrepancy and if the low frequency understatement as a consequence of not taking C-weighted measurements is included, there is a potential total understatement of 10dBA.

Turning to current experience, if monitoring is accurate and the approved PSNL is not being exceeded as asserted in the EIS (Page 4-50), it is apparent that significant noise disturbance occurs at levels below the PSNL. This is likely to be a function of the overstated RBL and the low frequency character of the noise. The INP stresses that the PSNL should not automatically be interpreted as the conditions of consent and that community views should be taken into account in setting noise limits. In this instance, the strongly held community

view is that the PSNLs for existing operations at the SCM have been set too high, and there is a strong case for lower PSNLs to be applied to the extension project.

Recommendations/Proposed Conditions of Consent:

2. Noise & Blasting Assessment to be independently peer reviewed at Yancoal's expense by a fully independent Acoustic Consultant.

Blasting

As mining operations have moved progressively closer to Stratford village, there has been a large increase in the number of formal complaints about the impacts of blasting. Nine blast complaints were recorded in 2010, twenty-two in 2011, and forty-one in 2012 (up to October).

Yancoal proposes to limit the size of blasts in the Roseville West extension pit to MIC 400kg, but it is not possible to judge whether that may mitigate the impacts currently reported by Stratford residents as no information about current blast sizes is provided in the EIS.

The review of sections of the EIS dealing with noise and blasting conducted for Council by Wood & Grieve draws attention to the fact that the modelling of impacts of blasting in the proposed Avon North and Stratford East pits relies on data from blast monitoring points located west of the current operations. There are no blast monitors located near the proposed new pits, which will be excavated in strata that differ from those near the existing monitors. This introduces a level of uncertainty in the modelling that is not reflected in the predicted levels (and locations) of impacts.

The report by Wood & Grieve also notes that there is no reference in the EIS to the recommendation contained in the Australian Standard (AS2187: Part 2, 2006) that a lower Peak Vector Sum vibration velocity of 2mm/s be considered as the long term regulatory goal for the control of ground vibration. As the project will lead to blast-induced vibration impacts at properties not currently affected by blasting, it would be appropriate for the 2mm/s criterion to be applied to the new pits.

Even using the higher criterion of 5mm/s PVS, the blasting impact assessment indicates that vibration (and/or air blast criteria) would be exceeded at six private properties that are not party to a landholder agreement if blasts in the Avon North and Stratford East open cuts are above MIC 680 kg. To avoid this exceedance and the consequent impact on residents of those properties, the conditions of consent should preclude the use of charges exceeding MIC 400 kg in those pits.

Recommendations/Proposed Conditions of Consent:

3. Blast monitoring points should be established to the north-east of the Avon North pit and to the south-east of the Stratford East pit.
4. The ground vibration criteria applied to blasting in all pits should be a PVS of 2mm/s.
5. Blast size limits in the Avon North and Stratford East open cuts should be limited to MIC 400kg.

Mitigation

A considerable number of project noise mitigation measures are proposed (EIS Table 4-13). Despite these proposed mitigation measures, noise modelling indicates that operational noise will exceed the PSNL at 16 neighbouring residences, six of which are not subject to a landholder agreement concerning noise impacts (EIS Table 4-14).

The Director General's Requirements stipulate that when addressing reasonable and feasible mitigation measures regarding noise, vibration and blasting, the EIS must include *evidence* that there are no such measures available other than those proposed.

The EIS notes that although other more extensive noise mitigation measures may be technically possible, they are not considered by SCPL to be *feasible and reasonable*. It is conceded that, for example, some elevated night-time noise levels at some locations could be avoided by restriction of mining at the Avon North open cut and Stratford East open cut (in Years 6 to 11) to day-time only. However, those measures are rejected by SCPL on the grounds that they are not considered to be *economically feasible*. (EIS Page 4-54).

The lack of evidence in the EIS to support the assertion that mitigation measures beyond those proposed, such as restricted mining hours, are neither reasonable nor feasible clearly does not satisfy the Director General's Requirements.

As previously mentioned, concerns have been expressed about the amount of mitigation that will need to be undertaken to achieve compliance with the PSNL. Questions have been raised as to how realistic this is from both an operational and a regulatory perspective.

The modelling of noise impacts has assumed that the proposed mitigation measures are in place, however there is no discussion within the EIS about the timetable for their implementation. It is noted that mitigation measures currently being implemented as a consequence of a review of noise impacts undertaken in 2010 have taken three years to implement. If the proposed mitigation measures for this project are implemented over a similar time frame, then projected noise levels during the first years of the project will have been significantly underestimated. Revised modelling should be undertaken to identify the noise levels to which neighbouring residents will be exposed until the mitigation measures are fully implemented. (Wood & Grieve Page 9).

Similarly, the EIS does not indicate when, and under what circumstances, the new XQ vehicle fleet will be deployed. Will it entirely replace the existing vehicle fleet or will it be reserved for night-time operations only and be deployed simultaneously with the older fleet?

The achievement of the PSNL is heavily dependent on the development of an extensive network of 6m high bunds along haul roads, the rail loop and around waste emplacement dumps. Here again, the issue of the low frequency character of the noise is of vital importance as the larger wave length at lower frequencies makes this type of acoustic barrier less affective at attenuating low frequency noise. (Wood & Grieve Page 10).

For discussion of proposed mitigation at residences which are subject to intrusive noise above the PSNL, refer to the section headed Noise Exceedance Zones.

Recommendations/Proposed Conditions of Consent:

6. Yancoal to be required to provide evidence to support the assertion that mitigation measures beyond those proposed, such as restricted mining hours, are neither reasonable nor feasible.
7. This is the Yancoal to be required to provide evidence that mitigation measures will be implemented in time to enable the PSNL to be achieved from commencement of the project.
8. The XQ fleet must be deployed from project commencement at which time the older vehicle fleet should be retired.
9. Yancoal to be required to provide evidence to confirm that proposed noise bunding will attenuate low frequency noise.

Noise Exceedance Zone

The conditions of consent for the most recent development at SCM, the BRNOC, stipulate that Yancoal must ensure that noise the generated by the Stratford Mining Complex does not exceed the noise criteria at any residence on privately owned land, unless there is a landholder agreement. (Condition 6.4A - Appendix A2 of Appendix C of EIS).

However the conditions of consent also provide that if noise the generated by the Stratford Mining Complex exceeds the criteria by more than a specific level (5 dBA on private land outside Stratford & Craven villages) then Yancoal must acquire the property if requested by the landowner. (Condition 6.4B - Appendix A2 of Appendix C of EIS).

Condition 6.4B therefore anticipates that the noise criteria set in condition 6.4A will be exceeded. There is however no specified sanction on Yancoal such as requirement to modify the operation that is the source of the excessive noise if agreement cannot be reached on compensation, and the landowner does not want to sell the property.

This situation should not be perpetuated in the consent conditions for the Stratford Extension Project if consent is to be granted.

Properties "where intrusive noise emissions are predicted to exceed the project-specific criteria" are divided in the EIS into two main categories depending on the "degree of exceedance".

Properties predicted to experience intrusive noise levels <5dBA above the PSNL area are included in a Noise Management Zone, and properties predicted to experience intrusive noise levels >5dBA above the PSNL are included in a Noise Affectation Zone. Properties in the Noise Management Zone are further divided into two classes - exceedances of 1-2dBA being described as "marginal" and exceedances of 3-5dBA being described as "moderate". (It is not clear whether a property located between the 2dBA and 3dBA contours would be regarded as being marginally or moderately impacted).

The categorisation is proposed to be used in determining the company's obligations to affected property owners.

- No additional mitigation measures are proposed for residences where the modeling predicts intrusive noise impacts below the PSNL.
- For properties in the "marginal" sub-category of the Noise Management Zone measures beyond existing mitigations that would be taken by Yancoal would be limited to: noise monitoring in the project area; prompt response to complaints; and refinement of on-site management and procedures *where practicable.*
- For properties in the "moderate" sub-category of the Noise Management Zone measures to be taken by Yancoal would also include the implementation of "reasonable and feasible" acoustical mitigation at the receiver property, such as double glazing.
- Only for properties in the Noise Affectation Zone – i.e. those with exceedance >5dBA – would there be an obligation on Yancoal to negotiate agreements with landowners.

Yancoal does not propose the inclusion of an obligation to acquire any property at the owner's request - regardless of the level of exceedance of the PSNL - in the event that other mitigations are inadequate.

The development consent for the BRNOC imposes an obligation on Yancoal to acquire the land under specified conditions if requested by the landowner, in circumstances where intrusive noise exceeds the noise criteria by 5dBA. (Condition 6.4B - Appendix A2 of Appendix C of EIS). Similar criteria should be adopted for this project.

We consider the categorisation of properties according to degree of exceedance of the PSNL to be an unacceptable approach for the reasons listed below:

- The PSNL is determined to be the level which operational noise is not to exceed. It is in effect, a line in the sand. The EIS itself describes all exceedances as "intrusive noise emissions".
- Neighbouring residents currently report intrusive noise disturbance which periodic monitoring finds to be below the approved PSNL.
- As has already been discussed, there is a margin of error of 2dBA in the calculation of the PSNL and there appears to have been no allowance made for the low frequency character of the noise.
- While a 1 to 2dBA increase in overall sound pressure may not be noticeable to many people, the scope for underestimating noise impacts that was previously noted suggests it is highly likely that the actual impact will be greater. A difference of 3dBA corresponds to doubling the power of a noise source. This will be readily noticeable by most people and is a significant exceedance (Wood & Grieve Section 4.2.2 Pages 8 & 9).
- As the author of the noise assessments in the EIS noted at one of Yancoal's information sessions, the perception of noise disturbance is subjective. An increase of 5dBA above RBL may be tolerable to some, but others may find an increase of just 2dBA intolerable.

For these reasons, we strongly hold the view that there should be a single Noise Exceedance Zone. Residents within this Noise Exceedance Zone should all be subject to the same management procedures and entitled to receive the same mitigation measures. Furthermore, there should be severe and escalating penalties imposed on Yancoal for each breach of the PSNL.

The management procedures should include: on-site noise monitoring (including C-weighted measurement); prompt response to complaints; immediate cessation of activity that is causing the noise nuisance until the problem is rectified; and refinement of on-site mitigation measures to avoid a repeat incident.

The mitigation measures to which residents should be entitled include: acoustical mitigation such as enhanced glazing, insulation and air conditioning. Yancoal should also be required to negotiate a "compensation agreement" with residents in the Noise Exceedance Zone prior to project commencement.

Where homes are acquired they are done so on the basis of market value, which leads the affected landholders with and inability to acquire a replacement home in the Gloucester locality due to the low market value at Stratford.

Recommendations/Proposed Conditions of Consent:

10. There should be a single Noise Exceedance Zone. Residents within this zone should all be subject to the same management procedures and be entitled to receive the

same mitigation measures.

11. All residents to be given the right to be provided with acoustical mitigation (enhanced glazing, insulation, air conditioning etc.) and to enter into a compensation agreement with Yancoal. The this is the
12. Where intrusive noise levels exceed the PSNL by 5dBA or more, residents should be deemed to be within a Property Acquisition Zone where Yancoal must acquire the property upon the request of the owner.
13. Owners whose properties are outside the area where PSNL exceedance is predicted but nevertheless experience significant noise nuisance should be entitled to have on-site noise monitoring conducted, with the cost born by Yancoal. Should that monitoring confirm PSNL exceedance at that location, the property should be deemed to be within the Noise Exceedance Zone and the owner entitled to the additional mitigation measures available to properties in that Zone.

Monitoring and Compliance

There is no detailed discussion of noise and blasting monitoring presented in the EIS. The project environmental monitoring regime is summarised in Table 7-3.

There are currently no noise or blasting monitors in the south-east quadrant of SCM's operational footprint, nor does the EIS propose that any monitoring be conducted in this quadrant. Given that the Stratford East open cut will bring the scale, extent and intrusiveness of mining operations so much closer to neighbouring residents, this is a serious omission that must be rectified.

The transparency of process demands that a comprehensive monitoring regime be implemented that includes regular monitoring by a consultant that is independent of both Yancoal and the authors of the EIS Noise & Blasting Assessment (SLR Consulting Australia P/L). A further independent environmental audit should be undertaken as part of the annual review of environmental performance.

Recommendations/Proposed Conditions of Consent:

14. Combined noise and blast monitoring points should be established to the north-east of the Avon North pit and to the south-east of the Stratford East pit.
15. Consent conditions to require that a fully independent noise monitoring regime be implemented.

Noise Management Plan (NMP)

The existing NMP, which it is proposed be applied to the expanded operations, is deficient in that it places no onus on Yancoal's Environmental Officer to investigate and determine the *source* of noise that is the subject of a complaint. Examination of the complaints register from 1998 to 2012 reveals frequent instances where the source of the noise has not been

identified or where the suggested source does not accord with the description provided by the complainant.

Compounding this, the NMP does not require any systematic analysis of complaints that may identify anomalous factors that are not reflected in the noise modeling and the monitoring program. Patterns may emerge from analysis of location, time, and described character or the noise that could be applied in the design and implementation of mitigation measures. In this regard, it is important to note that operations at the SCM are variable. Some parts of the operation such as the CHPP operate most of the time and in a fixed location. However other activities that contribute significantly to noise levels, such as the stockpile dozer, operate on a highly variable basis. Operation of the stockpile dozer on various sides of the stockpile and at varying heights can lead to intrusive noise impacts over the duration of that activity at locations beyond those predicted by the modeled noise contours.

Recommendations/Proposed Conditions of Consent:

16. To provide for community input, the draft Noise Management Plan for the project to be presented to the Community Consultative Committee for comment before being submitted for approval.

b) Health - Air Quality and Dust

Overall View

Air Quality and Dust and the implications for health damage is one of the significant concerns of communities with an open cut coal mine sited close to them.

The Director General's Requirements specifically includes PM 2.5 levels for the first time for this mine. This indicates awareness of the critical importance of fine particles in causing health damage. This section follows with the instructing EPA Comment "Assessment of risk relates to environmental harm, risk to human health and amenity." The EIS then proceeds to describe in detail the measurement of dust since the mine commenced operations in 1995 and how it will increase and be monitored with the proposed new mines. It fails totally however to measure the extent of the health impact despite acknowledging the expectation of an impact. Health damage is of course the reason for doing the dust measurements. Stratford mine has been operating for 17 years adjacent to Stratford Village which contains a primary school only 1.5 km away.

A recent study of coal dust from the stockpile at Brisbane Port showed dust from that stockpile had blown to suburbs 4km away. Stratford Mine has a stockpile but the EIS estimates it is the source for less than 10% of the 760,000kg of PM10 dust it emits each year.

EPA Criteria and Legislative Considerations

PM 2.5 range of particles The discussion of the dangers from fine particulates is illustrated in Fig 4.1 which shows where the different sized particles are deposited and the critical site being the lung. It fails to comment on the illustrated fact that the large majority of particles being deposited in the lung are in fact ultrafine particles (PM 0.1) which are so small (like viruses) they can enter cells and cause genetic damage. This should have legislative implications because these particles are mainly arising from the 20 million litres of diesel fuel/yr being burned in the mining machinery. In order to contain this most damaging component of the PM2.5 range it is essential that vehicles are electric where possible and if not available they should have the most stringent emission control equipment that is inspected regularly. This should be a major focus of Pollution Reduction Programs not just PM 10 dust suppression by water spraying.

Deposited Dust The nuisance effects of deposited dust at Stratford include the fact that the acidity of the dust causes metal roofs, gutters and water tanks to go rusty within 12 months and water tank filters to become clogged up in three months. Whilst the EIS calls this 'acceptable' it is certainly unacceptable and a significant expense for which the Stratford residents are not compensated.

Content of Dust The mine reports to the National Pollution Inventory its 23 types of toxic emissions. It would be appropriate to list all of these. Of particular concern are the BTS hydrocarbons dissolved in the tank water, the PAH brain toxins emitted by heavy machinery (known to lower infant's IQ by 5pts), the heavy metals such as mercury, arsenic, cadmium, lead, copper etc which are dissolved by the acidic tank water. Legislation should be ensuring these are being monitored when the government licenses mining so close to a population base. The issue of whether dust is of agricultural or mining origin could be quickly resolved if monitors were used which collect samples of the dust which can then be sent off for analysis.

24 Hour Averaging of Dust Levels The consent conditions for dust levels are presented as annual levels and 24 hour averages. From a lung and heart disease point of view the annual average has some use since some conditions e.g chronic obstructive airways disease and hypertension are caused by progressive damage gradually building up and the extent is usually dependent on the background level. The other type of illnesses are the acute conditions e.g. acute asthma, acute heart dysrhythmic attacks which are triggered by peak levels of dust. The peak will trigger such an attack if present for just a few hours so that a 4hour average would be a lot more meaningful clinically than a 24 hour average which is likely to minimise and obscure the extent of the peak.

Domestic Air Filters Those with a demonstrated tendency to develop asthma should have the option of having a room cleaned and an air filter provided for at least one room.

Meteorology

The partially enclosed nature of the valley which is about 15km wide and runs north/south has already been mentioned. It amplifies sound effects from machinery and blasting and contains PM 2.5 particles for which data about the quantity of such dust is not available. The predicted PM 2.5 are 'Project Only' and omit cumulative contributions from other local mining and do not appear to take in the 'enclosed valley' element which will push PM 2.5 levels even further into health damaging effects.

Blasting Fumes

Blasting is a regular cause of complaints and blasting is to be increased from 3 to 5 times per week. The orange (Nitrogen Oxides) plume of wet or poorly controlled blasts is a health hazard which is being allowed to go unmonitored. By not measuring 1hour Nitrogen dioxide levels after blasting the mines don't take this danger seriously.

Best Practice Dust Control

The failure to give prominence to reducing highly toxic exhaust emissions by electric vehicle use when possible and the most stringent exhaust units has already been mentioned.

The adequate use of dust suppression by spraying haul roads at night time when dust can't be seen needs to be ensured as well as daytime when high dust levels tend to get reported. This can be monitored by the vehicle running record sheets being available for checking by the CCC as part of the consent conditions.

Coal Transportation

Measuring the dust emitted from trains along the rail corridor has been the subject of a recent ARTC study which confirmed rail wagons emit dust, and spraying the coal in the wagons with water before they leave the mine was shown to be no solution to this problem. The solutions are either to cover the wagons in the same way wheat is covered, or at the worst to wash down the exterior of the wagon and then spray an adhesive over the coal. Adhesive sprays may also have some use in reducing the dust from stockpiles. The adhesives may have their own health problems. Wagons which open from the bottom have a tendency to get dust into the doors which obstructs a tight resealing of the wagon and so wagons which are tipped are a better way of unloading the coal.

Spontaneous Combustion

The high sulphur content in some seams make spontaneous combustion a reality which has health implications. The incomplete cool burn results in particularly toxic products which are carcinogenic.

Domestic Rain Water Tanks

Stratford Mine has all its drinking water brought in but they do not supply it for the community. The history of rainwater tank contamination at Stratford Village is grossly misrepresented in selectively quoting the small Gloucester Council survey. As described in the overview the School tank water was the first to be checked and it was found to be consistently above the health guideline for lead. Copper was also of a raised level. The water was acidic and it was hypothesised the acid water was leaching both lead and copper from the roofing, guttering and plumbing, and the water standing overnight in the copper pipes and brass fittings was the most toxic. No attempt was made to see if mine dust was contributing to either the acid pH or the lead. The introduction of several filters and a calcium carbonate float has mostly corrected the problem. The water quality is monitored yearly now but they do not test for hydrocarbons. A local resident sent a sample of water from her gutter for testing and the lead level was several hundred times above the guideline level. This prompted a study of 101 domestic rainwater tanks in the valley, including Stratford, by Prof Damian Gore of Macquarie University. He found 16% of tanks were above the health guideline for lead and a differing 16% were above the health guideline for copper. Additionally 97% of tanks had water with a pH between 5 and 6. His equipment only measured heavy metals but he noted coal dust in many samples. There was not a relationship between lead levels and distance from the mine supporting the notion lead was

predominantly coming from old paint, lead flashing etc. Unfortunately at this point his funding was withdrawn and an official report was never written however individual households were sent their results with suggested individual remedial actions.

The contentious nature of this result triggered the small Gloucester Council study which had too few samples to have statistically valid conclusions. The current state of affairs is that a few Stratford people buy all the water they drink however many Stratford residents drink their tank water and are likely to have lead and copper levels above health guideline levels, and no-one has investigated the hydrocarbon level of tanks. Prof Gore verbally advised a check of hydrocarbons be conducted. No agency feels a responsibility to check and monitor and also run an education campaign. This dangerous situation should be the subject of a consent condition.

The presence of a consent condition officer is vital at Stratford so that complaints can be verified and action pursued. There are several in the Upper Hunter.

Health Damage from Current NEPM Levels

Scientific knowledge has advanced greatly since the current NEPM levels were set. It is now known that there is no entirely safe level of PM2.5 particulates, nor for lead in the water/air/domestic dust for young children. The current permitted levels thus result in both premature deaths and disability. The extent of this needs to be made clear to our community and a discussion about what is and is not acceptable.

The following landmark review article extract was released at the same time as this EIS. It summarises the health information which was already in the public domain and available to planners.

It reinforces the moral obligation of performing a health audit on the affected community before further mining is approved.

'Health and Social harms of Coal Mining – Spotlight on the Hunter'

Beyond Zero Emissions commissioned this report by Sydney University researchers (Colagiuri R et al) which reviews 50 international peer reviewed articles detailing the harms of open cut coal mining and power generation. Its key finding is that living near coal mines can cause serious harm to human health. It states,

Adults in coal mining communities have been found to have:-

1) *Higher rates of mortality from lung cancer and chronic heart, respiratory and kidney diseases.*
2) *Higher rates of cardiopulmonary disease, chronic obstructive pulmonary disease (COPD) and other lung diseases, hypertension, kidney disease, heart attack, stroke and asthma*
3) *Increased probability of a hospitalisation for COPD (by 1% for each 1,462 tons of coal mined) and for hypertension (by 1% for each 1,873 tons of coal mined)*
4) *Poorer self rated health and reduced quality of life.*

Children and infants in coal mining communities have been found to have:-

1) *Increased respiratory symptoms including wheezing and coughing; increased absences from school due to respiratory infections.*
2) *A high prevalence of any birth defect, and a greater chance of being of low birth weight (a risk factor for future obesity, diabetes and heart disease).*

The Summary of Social Impacts of the above report is provided in the social impacts section of this submission and the injustices it describes provides some of the causal material for the psychological health problems of coal mining which this report does not detail. The report argues for a 10km buffer zone until the relevant safe distance can be established for each new project. Clearly Stratford Mine was placed far too close to Stratford Village and should not get any closer.

No community should have to be victim to such a health damaging situation unless there were no alternatives and then very considerable compensation should be paid to anyone made to take such risks (as miners are). The Government legislates against passive cigarette smoking. Open cut coal mines create a similar scenario around the mine and share many of the same carcinogens etc. Mining coal at Stratford is not essential to the community but in their health is.

Conclusion of Health Issues

Air Quality, noise and psychosocial stressors have considerable adverse health ramifications which are described by the local medical profession. Neither the human misery nor the financial effects been adequately detailed in this EIS. It is nevertheless clear Stratford Mine was sited grossly inappropriately. It is an example of a mine that should be phased out, not expanded.

Summary of Recommendations

1. A health audit be conducted, and funded by the proponent, of residents living within 5 km of the mine site.
2. Monitoring of PM 2.5 dust particles be carried out in the village of Stratford and at the Gloucester Public Hospital, and reported quarterly to the CCC. The data collected is to be made available online and in real time.
3. The Department of Health be requested to oversight an investigation of domestic rainwater tanks in the village of Stratford, which is to be funded by the proponent, to test for heavy metal and hydrocarbon pollution.
4. The proponent is to offer funding for replacement of water filters for residents living within 1.5 km of the mine boundary.
5. The mine managers and contractors are to provide running sheets for the water tankers on mine haul roads to ensure dust suppression spraying is carried out in compliance with consent conditions.
6. Rail wagons transporting coal are to be covered to ensure dust suppression during transport.

c) Water

1) Surface Water Issue

Although surface and ground water issues are connected this section is considering mainly surface water and the groundwater issues follow.

An Analysis of the Issue

- The EIS is dealing with an extension of an already extensively disturbed water site and further exacerbating the environmental problems. These include:
    - permanent and temporary diversions to prevent surface flows from entering the site;
    - containment of rainfall falling within the site so that it does not flow within the normal drainage lines to land below the mine
    - collection of large quantities of groundwater in mine pits and this is stored on site
    - saline water being collected from the pits and the coal washing plant and then irrigating rehabilitated pasture land with this salty water
    - a policy of no water leaving the site unless in drought circumstances meaning that large quantities of pollution are stored on site
    - it is unclear whether the mine is importing licensed irrigation water to its land or processes (See Appendix B 2.6.1 for surface water and A2.8 for groundwater).
    - water being stored in old mine pits to drown acid forming rock material in an attempt to reduce this pollution

- Water quality issues will occur both within the mine site and in the external Avon River system.
    - There have been changes in the quality of water in the catchment as a result of the existing Stratford mine approvals (Table B8) but it is stated that this will not worsen significantly with the new areas are to be mined.
    - Water quality of most storages within the mine site already exceed NSW, ANZECC and NHMRC Guidelines for salinity, turbidity and many heavy metals (Table B10). The EIS does not consider that this is an environmental problem because the mine has a policy that no water will leave the site.

- Monitoring is proposed

- Co-disposal of waste and pollutants occurs in some pits and dams.

Identification of concerns/problems/issues

Each of the following disturbances to the surface hydrology creates its own, and sometimes cumulative, impacts that would not be naturally occurring in the landscape.

- Eastern diversions take runoff and send it north and south of the site rather than allowing the water to proceed down its natural creek line. This type of diversion would not be approved in a farming or urban landscape but is licensed in a mine even though it changes the natural hydrology. As well as this, 27% of Avondale Creek and 16% of Dog Trap Creek catchments are excised from the Avon system such that this water is collected on site and never returned (Table B4).
- It is illegal to contain all water on a farm; only 10% of rainfall can be stored on site. This is known as a 'harvestable right' and is designed to ensure that water users down the river or creek can have access to natural water flows. This mine tries to argue that it should be exempt and the result will be that the downstream water regime is damaged. The Stratford East Dam and the Return Water Dam should not be exempt as claimed in Table B-11 because they are primarily for storing 'clean' water for irrigation, mine use, and possible drought supply downstream.
- The mine has licenses for storing water in its large voids but this is a permanent change to the landscape and the water system with unknown consequences for water quality and quantity. The voids are up to 180m deep, totalling 138ha in area, and will continue filling for at least 200 years. The voids will contain water too salty for normal agricultural use (up to 12,000uS/cm) and about 3 times the salinity of the groundwater flowing into the pits.
- Saline water is used to irrigate the rehabilitated pasture as a way of 'using' water and reducing storage. This will lead to salinisation of the rehabilitated land, reducing plant growth, and resulting in soil erosion. The purpose of the proposed irrigation appears to be to "dispose of excess water" (B3.1 point 7) and reduce water in the storage dam but no volumes are indicated (Appendix B3.2.6).
- The no discharge policy employed by the mine means that water polluted with silt does not leave the site but is collected in the Return Water Dam. However, the capacity of this dam has been reduced by about 30% in the last 10 years of operation. A further 11 years of operation, if this extension is approved, will result in a dam nearly full of mud and an environmental hazard. The ultimate disposal, storage or burial of this pollution is a major issue that has not been reasonably assessed in the EIS.
- Irrigation water licensed for irrigation or unlicensed for stock and domestic use on farms should not be available to the mine for use on its land as it is collecting so much water from its own activities. There is very limited water available in the Avon River system and this should be only for use by landholders who do not have the extensive surface water collection and groundwater extraction processes in use at

the mine. The water has a higher economic return when used with in agriculture in this location.

- Waste material from the Stratford East Open Cut contains acid forming rock and has to be treated. The proposed treatments (Appendix B3.2.3) are based on a degree of risk management that is unacceptable and a more proactive approach is required in order to prevent acid formation at all times.

Surface water quality concerns

- Most of the water quality parameters monitored showed that they exceeded Guidelines to varying amounts throughout the year and between years. This is for turbidity, nutrients, salinity and heavy metal pollutants.

Adequacy of surface water monitoring for quality and quantity

- It is apparent that there are already significant water quality issues in this catchment. What is not apparent is how much of this is natural, and how much is attributable to the various land users - particularly the mine. If there is no natural benchmark (as it seems), then at least a long term monitoring program needs to be conducted to assess trends and causes.

How might these issues be mitigated or addressed (as referenced in the EIS)

Proposed mitigation of surface disturbance and its impact on water

- There are no mitigating measures proposed for the diversions because they are simply accepted as a cost of mining this area. An existing, and to be enhanced, diversion to the east of Stratford East Dam will add 1.4.km2 or 84% to the size of the tributary catchment before the water is returned (B3.2.7) and the amount of water returned will be far greater. There may also be erosion impacts from this increased water. It also means that this water is taken from another catchment; both situations change the respective water environments in a negative way.
- It is also simply accepted in the EIS that the mine needs to have a policy of no discharge from the site to contain mining pollution and therefore exceeding the legal harvestable right is a presented as a justified action and no mitigation is proposed.
- No mitigation is proposed for leaving the large polluted voids at the end of mining. At the same time large waste rock emplacements above natural ground level are also left at the end of mining but these are partially mitigated by revegetation rather than the more environmentally sensible solution of using the waste rock to fill some of the void space.
- The EIS (Appendix B5.3) proposes to manage salinity build-up in the soil of rehabilitated pasture by irrigation scheduling to leach salt into the lower soil profile; it would be preferable to treat the water before irrigation and avoid the problem.

- Sedimentation in the water storage dams is managed by cleaning them out when required but there is no information about what will be done with the collected sediment or what happens to any chemical (heavy metal) pollutants that will be in the sediment from the mining operations or coal.
- The only mention of returning captured or extracted water to the river system is that water can be released for downstream use in a declared drought situation. Consideration would need to be given to the quality of water for this purpose. There is no mitigation proposed for the water taken out of the natural system for mine operations. It is simply stored as polluted water in the mine voids forever.
- The proposal is either to place Potentially Acid Forming (PAF) material in the mine pits and then eventually drown it with water or to 'seal' it in "out-of-pit emplacements" to prevent the formation of acid water that can leach and wash around the site. The rigor with which these measures will be implemented or monitored is not adequately addressed in the EIS.

Adequacy of any Mitigation Proposed

Problems with surface water mitigation measures

- All diverted water should be returned as soon as possible to its natural watercourse in the same quantity and quality. The diversions may be acceptable if point 2 below was implemented so that the Avondale Creek surface water regime was better managed. This issue is not addressed in the EIS.
- Water into the Stratford East and Return Water Dams should be better managed so that it is of suitable quality for release downstream and the licence for these structures should require water to be released into Avondale Creek equal in volume to 90% of the rain falling on the mine site per year.
- Void management is limited to predicting that they will not overflow and release highly saline water into the Avon River systems. The potential groundwater pollution from these massive volumes of water is not considered. The safety issue of these extremely deep holes is not considered. Alternative waste management practices such as filling voids with overburden rather than placing it in above ground embankments is not considered. Perpetual voids that will fill with saline water over 200 years is regarded as an *unavoidable consequence* of mining. However, the proposed Rocky Hill Mine aims to fill all voids at the end of mining.
- Irrigating with salty water is not best practice and could be avoided by treating the water prior to use. Even not using it at all for irrigation would be preferable as pasture production would be better in the long term.
- Sediment and other pollutants from mining and coal washing is trapped in Sediment Dams (SDs), now called Disturbed Area Dams (DADs), the exhausted mine pits and the Return Water Dam. This sediment contains coal, heavy metals, oils and hydraulic

fluids, salt and silt. When these dams are 30% full of this material it is to be removed to an unspecified location (Appendix B3.1.3).

- It is unacceptable for the mine company to purchase irrigation water from a limited unregulated source and reduce the volume for agriculture when it has excess production water from its own operations. It should even be considering how it could treat water so that it is of a suitable quality to be used by other water users in the Avon River system.
- All Potentially Acid Forming (PAF) material must be segregated during mining in the pit and treated to prevent Acid Rock Drainage (ARD) at all times. Placement of it above natural ground level is unacceptable as there is always a risk of acidic water draining from the emplacement and into the surface water system. All PAF material should be immediately treated with lime and placed in a situation where it can be submerged in water within 2 weeks to prevent oxidation, ARD, and pollution of the groundwater system.

Water Quality Mitigation Problems

- There is no reason (apart from cost) why the company should not be required to fully treat and release water back into existing water courses and leave behind a relatively natural landscape populated with vegetation communities that provide economic, environmental and social services to the community.
- Assuming the engineering challenges of reliably containing contaminated water and reshaping the landscape can be adequately overcome, two additional questions arise:
    - What will be the impact of long-term storage of large amounts of contaminated water in large, deep and unnatural permanent water bodies?
    - What will be the impact of reshaping the landscape using large amounts of mined material that contain water contaminating chemical compounds? A specific example of this is Potentially Acid Forming waste?

Neither of these questions is adequately addressed in the EIS but they must be before any approval is considered.

- The proponent suggests that adding 84% of area to the catchment will not significantly alter the flow characteristics and associated risks in the drainage feature. This is clearly irresponsible. It should be possible to predict what the effects of this action will be (additional flow and erosion) and therefore it should be possible to take pre-emptive action before the likely problems manifest.
- Changes to flows in the Avon River as a result of runoff and flow changes in contributing catchments and groundwater drawdown are mentioned as a potential impact but not discussed or mitigated.

- ***Suggested conditions to address the issues***

There needs to be a fundamental change to the conditions of mining such that the pollution generated is reduced and ameliorated rather than just contained. Hence:

1) The water Management plan shall include provisions to achieve the following;
    i. 90% of an amount of water equal to the water flowing through/or captured on, the site shall be returned to Avondale and Dog Trap Creeks.
    ii. Produced water from the mine pits must be treated to irrigation standards and returned to the local surface water system.
2) The mine plan is to be amended to ensure that the post mining landscape shall reflect the pre-mining landscape, and ensuring that potentially acid forming waste is effectively managed.

Suggestions for Monitoring of Impacts Relevant to the Issue

Re-examination of historical data from the 1994 EIS and the 1981/1982 sampling program is needed to examine any potential changes in water quality characteristics since the commencement of mining activities. Further recommendations may be necessary on the basis of this re-examination.

3) Independent monitoring of water quality and quantity for the life of the mine and for a specified period following mining at strategic locations including;
    - Within the mine site including outfalls from rehabilitated, partially rehabilitated and active waste emplacements;
    - all storages within the mine area;
    - any discharge points; and
    - upstream and downstream from the mine site in Dog Trap and Avondale Creeks, and the Avon River
4) Monitoring of salt in soil in all areas where irrigation is conducted.

Contributions that could be appropriate as a means of offsetting the impacts relevant to this issue:

1) Selling treated water for irrigation at below market price.

2) Providing venture capital for irrigation development by district farmers.

ii) Groundwater Issues

Major Concerns with Groundwater Modelling

There are major concerns with the approach and technical aspects of the conceptual groundwater modelling and therefore with the associated conclusions in the Main Report and Appendix A. These conclusions relate to both the current Yancoal expansion project, the cumulative impact of future Yancoal expansions and the cumulative impact associated with nearby coal seam gas (CSG) and coal mining projects.

Technical Issues Relating to Conceptual Groundwater Model:

5) Modelling the Gloucester Stroud basin is fraught with difficulties because of the structural complexity of the geology and the relationships between the aquifers;
6) The complexity is well known and is illustrated by the intensive exploratory drilling (see Figure in Attachment AD, Enclosure 1 of the EIS at the end of Appendix 1, which is a plan showing the location of the huge number of bores drilled during exploration.). This means that groundwater modellers have to make huge oversimplifications about the nature and hydraulic properties of the strata;
7) The degree of vertical connection between aquifers is an area of significant disagreement between groundwater consultants. Vertical connection is a critical issue in groundwater modelling with AGL arguing that the connection is minimal. The Yancoal consultants say they agree with AGL on this issue, but they clearly include vertical significant connectivity in their model. In Figure A-25 they also show the coal seams as nearly vertical, which can add significantly to vertical connectivity. As well, no models that we are aware of have even tried to consider the effect of the extensive shearing and faulting;
8) Clearly open-cuts up to 250 metres deep provide direct connection between aquifers to that depth. There are also major questions about the quality of construction and Government regulation of the huge number of exploratory bores and AGL's future production bores drilled more recently (with a significant number being fracked) as well as bores drilled since coal exploration started in the 1960s/1970s;
9) The model used for the Yancoal EIS appears to only consider periods of permanent base flow in watercourses as groundwater contours do not drop below streambeds. This is supported by Figure A-25 which shows the conceptual model including baseflows in the streams. However, the consultants accept elsewhere that the streams are ephemeral. Critical conditions for say, riverine vegetation and vegetation accessing groundwater when there is no surface

water, will be during drought sequences both within and between years and these are not assessed;

10) For impacts by Yancoal alone, no consideration is given to the future expansions of new open-cuts which can certainly be expected both to the north and south (at least);
11) For cumulative impacts due to the development of the AGL gas project and the Rocky Hill coal projects, no information is provided of the quantity of water abstracted. Figure A-52 shows CSG production bores strewn across the Yancoal mining lease and a few outside the lease area. It would seem likely that only Stage 1 AGL gas wells are included in the modelling.

Groundwater Model Outputs and Conclusions Drawn in EIS:

Notwithstanding the issues identified above, we have considered the model outputs. The outputs will be particularly affected by the assumption of permanent baseflows in the creeks and the overall vertical and horizontal hydraulic connectivity.

Section A6.1.6 refers to Figures A-57, which shows watertable contours for the project operating alone while Figure A-58 shows watertable contours for all 3 projects operating at the same time at the "end" of the current Yancoal project.

It appears that the maximum watertable drawdown for the project operating alone is around 70 metres in the Stratford East Open Cut. However the open cut will be 250 metres deep. Therefore the watertable at this time should reflect that depth. This anomaly cannot be readily understood.

Figure A-58 shows watertable drawdowns in the order of 170 metres close to Stratford Village. This is presumably partly the result of a concentration of CSG bores in this area. In Section A6.1.8 in the third paragraph it is stated "CSG activity would cause pronounced drawdown in the watertable between the Project and Stratford." The impact on Stratford bores will be up to 5 metres, not 1-2 metres as stated in the EIS.

In Attachment AD, the Consultant acknowledges that the drawdown for the Stratford project operating alone, will be up to 170 metres in the Stratford East Open Cut when the Layer 11 coal seam is being mined. Why this is different to what is shown in Figure A-57 and still short of the 250 metre depth of the open cut, is unclear.

Attachment AD also contains the most concerning drawdown contours of all for cumulative impacts. The last set of groundwater contours show a maximum drop of about 1700 metres centered just south east of Stratford with huge drawdowns over a very large area. It is not explained why this is different to Figure A-58 but it is likely that this very large drawdown is in the potentiometric head (pressure) rather than the watertable. Although not stated, this is likely to mean continuing drops in the watertable

as downward vertical flow is induced. The figure also shows that drawdowns on the western side of the area impacted is limited by a roughly north-south line just to the east of Stratford village. This seems very convenient but highly questionable. There is no proper review and discussion of these critical issues in the EIS.

No information about the impacts of such a drawdown is given in the Main EIS Report or Appendix A. Section A6.1.8 just states blandly that "Based on the modelling results, cumulative effects are expected to be substantially greater than would be produced by the Project acting alone" with the Main Report making a similar comment.

Conclusions:

- The veracity of the conceptual groundwater modelling used in the Yancoal EIS needs to be reviewed by Government regulators and independent experts;
- The cumulative impacts on groundwater of the Yancoal Project, the Rocky Hill project and particularly the AGL gas project, are highly significant. Related impacts on the ecology and other beneficial uses, such as private wells in Stratford, are therefore also potentially highly significant;
- The impacts related to the AGL gas project, as presented in this EIS, need to be taken up as part of the final approval process of conditions by Government regulators.
- As stated in Section 8 of our report on Cumulative Impacts, none of the proponents for the Yancoal expansion, the AGL gas project and the Rocky Hill mine, can adequately assess the cumulative impact because they are using different data and different models to suit their own purposes. There needs to be a comprehensive and integrated groundwater modelling study undertaken by an independent steering committee, before any further approvals are given.

Identification of Concerns/Problems/Issues

Groundwater issues are briefly covered in Section 4 of the Main EIS Report. However, all the detailed information on groundwater is located in Appendix A which was prepared by consultants Heritage Computing. Appendix A acknowledges and correctly identifies some of the "key potential groundwater related issues" as:

12) Potential groundwater related impacts (eg baseflow loss) on Dog Trap Creek, Avondale Creek and associated alluvium;
13) Potential cumulative groundwater impacts as a result of the AGL Gloucester Gas Project, proposed Rocky Hill Coal Project and the Stratford Expansion; and
14) Final void water management and development of groundwater sinks in the long term.

Other key issues not specifically identified are:

- Potential cumulative groundwater impacts related to incremental expansion of Stratford Mine;
- The efficacy of the groundwater modelling and the associated assumptions made by the Consultants; and
- Impacts on ecosystems depending on groundwater for survival.

The issues relating to **cumulative impacts** greatly affect our ability to respond effectively to the EIS on groundwater and many other issues. These issues will be considered first and then other issues relating to groundwater will be addressed.

The issues relating to the **groundwater modelling** also greatly impact on our ability to respond effectively to the EIS on groundwater issues. The details of the technical issues identified, the model outputs and the questionable conclusions drawn in the EIS are numerous and are provided in Appendix 1 at the end of this section on Groundwater Issues.

An **overarching issue** which there needs to be an awareness of before groundwater issues are addressed is **the complexity of the hydrogeology** in the Gloucester – Stroud area. To quote from the NSW Geological Survey's review of the area in 1991 (ie 22 years ago) as reported by Pell Consulting in February 2012:

"*The Gloucester Basin (technically the Stroud Gloucester Syncline) is about 55 km long with a width of 24 km at its widest point. The syncline is a fault-bounded trough; the structure is complex…. Coal seams in the trough are characterised by a considerable degree of lateral splitting, only 6 of the 20 or more seams can be correlated across the syncline. Faulting and folding have significantly reduced the potential for development of these resources."*

Pell's report goes on to talk about how the groundwater model for the AGL Gloucester Gas Project has had to be greatly simplified because of the complexity of the stratigraphy and the paucity of field data. He also criticises AGL for:

"Concluding that faults play no role in groundwater movement, and do not even displace the stratigraphic units in the model, is contrary to almost all experience in hydrogeology and groundwater engineering."

Some faults may be able to prevent cross flows from aquifers but certainly not shear zones. Heritage Consulting have had to make similar over-simplifications in their modelling, including not considering faults and shear zones. The main output of groundwater modelling is maps showing drawdown contours for the watertable and/or potentiometric (pressure) heads due to groundwater abstraction. Proper assessment of

the impacts of coal and CSG mining due to the pumping of very large quantities of groundwater is dependent on having confidence in the knowledge of the hydrogeology as represented through the groundwater modelling. We have major problems with these aspects of the EIS (as well as the work done by AGL and Rocky Hill) which significantly affects many of the comments on issues below.

The complexity of the hydrogeology is visually illustrated by Enclosure 1 of the EIS at the end of Appendix A, which is a plan showing the location of the huge number of bores drilled during exploration. It shows the immense difficulty the geologists had in unravelling the complex structural geology to assess the coal reserves and allow for mine planning. The advice I have from an experienced geologist who worked in this location, is that he knows of no other exploration programme that has drill holes so close together.

It is further illustrated by the massive investigations undertaken by AGL by drilling bores, testing fracking holes, 2D & 3D geophysical investigations and now a huge aeromagnetic investigation using a blimp. . The same geologist mentioned above has indicated that AGL probably neglected to consider the numerous shear zones in their initial investigations. As a result, they have needed to continually repeat their seismic testing to find blocks that can be drilled without contributing further to the huge cost of their drilling programme.

In **conclusion**, as stated in Section 8 of our report on Cumulative Impacts, none of the proponents for the Yancoal expansion, the AGL gas project and the Rocky Hill mine, can adequately assess the cumulative impact because they are using different data and different models to suit their own purposes. There needs to be a comprehensive and integrated groundwater modelling study undertaken by an independent steering committee, before any further approvals are made.

Issue: Cumulative Impact of the AGL Gloucester Gas Project and proposed Rocky Hill Coal Project

This issue relates to the expectation that the AGL Gloucester Gas Project, Rocky Hill Coal Project and the Stratford Expansion will all be in operation at the same time if approved. In the main EIS report, it is concluded that there will only be relatively small drawdowns in the vicinity of the creeks and that drawdowns in other areas surrounding the project will be acceptable. Appendix A attempts to address this issue, but the conclusions drawn in the EIS seem to greatly understate the significance of the issue.

As explained above, there are also major concerns about the efficacy of groundwater modelling generally. This issue is also dealt with in Appendix 1 below. However looking at the information provided in Attachment AD, the final set of groundwater contours

("Cumulative Projects – Layer 11) show huge drawdowns in potentiometric head over a large area with a maximum drop of up to 1700 metres centred just east of Stratford. The figure also shows that drawdowns on the western side of the area impacted is limited by a roughly north-south line just to the east of Stratford village. This seems very convenient but highly questionable. While the EIS very briefly mentions these huge drawdowns, it makes no attempt to even comment on associated environmental impacts. No information has been provided about the data used (for example pumping rates from CSG wells) to produce these model outputs.

It would also seem likely that only Stage 1 AGL gas wells are included in the modelling. The information provided in the EIS falls well short of meeting the Director General's Requirements

How these issues might be proposed to be mitigated or addressed, as referenced in the EIS

There is no consideration of how this issue will be mitigated or addressed in the EIS.

Suggested conditions to address the issues

No approvals should be given until Yancoal provides information on the proposed strategy to manage the cumulative impacts of groundwater drawdowns of this project in conjunction with drawdowns from the CSG mining and the Rocky Hill mine. At the very least, the Gloucester Gas Project and the Yancoal Extension should not be operating concurrently.

Issue: Cumulative Impact Related to Incremental Expansion of Stratford Mine:

This issue relates to the incremental expansion of Yancoal's Stratford Coal Mine (SCM). According to readily available geological mapping of the Gloucester-Stroud Syncline and Gloucester Coal's Annual Reports, the coal resources that may be mined in the valley are huge. Since the mine commenced in 1995, there have already been many expansions to the project.

Pumping of groundwater flowing into the coal mining open cut pits (that is, dewatering of the pits) to allow for mining activities, requires the extraction of large quantities of groundwater that will flow into the pits as they are excavated. This EIS only covers the impacts of the existing operation plus the new pits associated with the current expansion. The impacts of the extraction from shallow aquifers and therefore the watertable, together with the pumping from deeper aquifers intersected by pit excavation, will be widespread and is likely to have a significant impact on a range of beneficial uses of groundwater, including impacts on ecosystems which use that groundwater. Specific consideration of groundwater dependent vegetation is addressed below.

Again, it is not possible to properly assess the medium and long term impacts on groundwater when this EIS only covers the latest expansion. We can be sure that part way through the development of this expansion, there will be an application for more pits to the north and south of those currently proposed. Ongoing exploration is very briefly mentioned in Section 2.3 of the EIS. In fact, extensive drilling exploration has already been completed south of Pages Road and north to Fairbairns Road, which will connect up to the Rocky Hill development.

How these issues might be proposed to be mitigated or addressed, as referenced in the EIS

Incremental expansion is not addressed in the EIS. Yancoal may not have done detailed work on further expansion, but it is very likely it has considerable information available on the likely location of future open-cut pits at Stratford and Duralie. The potential for the Yancoal mined area to extend from Duralie to just south of Rocky Hill is high. This information should be provided so that the current expansion can be put into perspective with medium and long term planning.

Suggested conditions to address the issues

No approvals should be given until Yancoal provides information on likely future expansion.

Issue: Impact on Dog Trap Creek and Avondale Creek

The EIS states that the open cuts will be placed no closer than 40 metres to the creeks. This appears to be the plan to avoid any significant impacts from dewatering activities. The groundwater modelling indicates that there will only be small drawdowns in the vicinity of the creeks.

However, this is based on an analysis which appears to assume that average flows will always occur in the creeks, despite the EIS acknowledging that the creeks are ephemeral. During very dry periods, it would be expected that creeks would be dry for long periods with no base flow. Riverine vegetation is likely to be groundwater dependent at these times. Drawdowns due to mine dewatering are likely to cause the water table to drop well below the creek bed. It is difficult to believe that a 200 metre deep pit 40 metres from the creek, will not have a very significant impact on the creek.

This is even more likely when a future pit is excavated to the north as part of future expansions by Yancoal and/or the AGL wellfield is operating. This may have a major impact on the health of riverine vegetation which appears to be in reasonable condition for Dog Trap Creek. If vegetation dies and as proposed, there are periods of increased flows in the creeks due to increased catchment areas, major erosion of the bed and banks can be expected.

How these issues might be proposed to be mitigated or addressed, as referenced in the EIS

The EIS states that open cuts will be no closer than 40 metres from creeks. This is likely to be very inadequate. The EIS also identifies that more water table monitoring bores will be established near Dog Trap Creek and there are 3 photographic points. Additional photographic points should be established. However monitoring may not provide any warning of the sudden death of riverine vegetation. The EIS says nothing about what the proponent will do if the monitoring points indicate that vegetation is dying or the banks are eroding.

Analysis of the adequacy of any mitigation proposed

No further mitigation is proposed by the proponent. The mitigation proposed is inadequate because of the likely drawdown at the creek, as explained above.

Suggested conditions to address the issues

Regulated downstream releases have been effective in other areas where the natural flow regime has been altered. Artificial maintenance of the flow regime using treated water from the mine site should be considered.

This

The EIS goes to great lengths emphasize that impacts on alluviums and associated aquifers are minimal. There seems to be a narrow interpretation of alluviums adopted in the main document that only identifies relatively small areas along the creeks and Avon River. However Appendix A includes a D.I.I. plan of local geology (Fig A-8) that shows much larger areas of alluvium. The comparison of the two areas is shown in Figure A-6. The difference appears to be that the main report does not place much importance on the "shallow weathered bedrock (regolith) aquifer with associated colluvial deposits" as identified by consultants working for the Rocky Hill Mine project. Although salty in some areas of the mine site (which is probably a result of subcropping coal seams), many of these areas have fresh groundwater resources and soils suitable for agricultural production.

The EIS states that open cuts will be no closer than 40 metres from creeks. As explained, this is not likely to be adequate. Drawdowns and direct impacts from mining should be minimised in these areas. For the project proposed, this would require a complete review of the proposed project.

Analysis of the Adequacy of any Mitigation Proposed

No mitigation is proposed by the proponent except for the 40m buffer to the watercourse. The mitigation proposed is inadequate because of the likely drawdown at the creek, as explained above.

Suggested conditions to address the issues

Artificial maintenance of the flow regime using treated water from the mine site should be considered. However this would only go a small way towards protecting these alluviums.

Issue: Impact on Groundwater Dependent Vegetation

In Appendix E on Flora Assessment, Section 4.4 states that "no groundwater dependent ecosystems have been identified on or near the Project Area" based on the 2006 approach of the National Water Commission. In Appendix A Section A2.9, the same conclusion is quoted. However the Atlas of Groundwater Dependent Ecosystems, 2012, identifies 2 areas of vegetation with a "high potential for groundwater interaction" within 4km east of Stratford village in the area that will be affected by water table drawdowns.

Appendix E goes on to say that "all vegetation on the study area appears to be dependent on rainfall and surface flows". The Atlas identifies a number of areas that are considered to be "Inflow dependent ecosystems" ie rivers, springs, and wetlands "reliant on water in addition to rainfalls". Springs and lentic wetlands are normally expressions of the water table. Table 6 in the Appendix also lists some communities as Paperbark Thicket in the area. These communities, as well as riparian vegetation, will often be dependent on groundwater when rainfall and surface water are not available.

During very dry periods, all these ecosystems may well be dependent on groundwater. However as the water table drops due to pumping, groundwater is unlikely to be available. These communities have not been identified as groundwater dependent in the EIS and therefore the impact on these vegetation communities has not been assessed.

Analysis of the Adequacy of any Mitigation Proposed

No mitigation has been proposed in the EIS as both the areas that are likely to be currently groundwater dependent and those that may become groundwater dependent as a result of mining activities, have not been identified.

Suggested conditions to address the issues.

Yancoal should be required to review the whole issue of groundwater dependent ecosystems based on the information provided by the Atlas of Groundwater Dependent Ecosystems, 2012.

Issue: Impacts of Polluted Water in the Voids on Groundwater Aquifers

This issue has already been mentioned in the section on Surface Water Issues as have other issues which are related to groundwater quality. However the issue needs to be explored in a little more detail.

An analysis of the issue based on the facts contained in the EIS.

According to the EIS, the polluted water in the voids will remain at a level lower than the current water table. As well as this being a surprising conclusion intuitively for an area which will be subject to extreme rainfall events and flooding in the future, it is also inconsistent with the conclusions drawn in the EIS for the neighbouring Rocky Hill mine. One way or another, there are major concerns with leaving a void containing polluted water. The water will have a high salinity and contain numerous heavy metals.

If the water level in the voids is lower than the natural water table as predicted, then it will be a sink for groundwater as indicated. This will lead to the flow of groundwater from surrounding shallow aquifers over a very long period. This will reduce the availability of groundwater to other users. However, this is likely to be the outcome of dewatering activities by Yancoal and AGL in a shorter time-frame anyway.

However, depending on the relative timeframes, the water in certain voids is likely to be higher than the water table during dewatering by Yancoal, and particularly during the operation of the AGL wells. This means that the polluted void water will leak into groundwater aquifers over the period of AGL's operation, rendering the aquifers unusable for any future beneficial use.

Analysis of the Adequacy of any Mitigation Proposed.

Mitigation is mentioned in Table ES-2 of Appendix R but it is unclear whether it is talking about mitigating for high water levels in the voids or low water levels. However it does mention reducing the size of the void by backfilling the pit with waste rock. Refilling the pits would seem the best option for all situations. Final catchment watersheds will be critical whether the voids are left or not.

Suggested conditions to address the issues.

All pits and voids should be refilled with overburden as mining progresses. Final catchment watersheds must be designed and constructed to the satisfaction of the appropriate State government regulator.

d) **Traffic**

Bucketts Way

Due to public concern with the deteriorating condition of Bucketts Way, the three caretaker Councils (Great Lakes Council, Gloucester Shire Council and Greater Taree City Council) engaged Roadnet Pty Limited in 1999 to undertake a route development study of the Bucketts Way.

On the basis of input from the community and relevant agencies, and an objective analysis of the condition and safety data and the cost of works, it was found that the Bucketts Way:

1. Was of social and economic importance to the local and broader community;
2. Was carrying increased traffic as a result of the completion of the sealing of Thunderbolts Way in 1999. With the Bucketts Way, this offers a savings in distance of 68 kilometres (1 hour travel time between Newcastle and Uralla);
3. Has a poor safety record and is not capable of carrying significant increase in traffic (particularly heavy traffic) safely;
4. It is deficient in every important measure used for route condition assessment;
5. Requires expenditure of $43M over 5 years to address safety and condition deficiencies identified during the Study, with a further $23M over 10 years for pavement restoration;
6. Is significantly underfunded for maintenance;
7. It was identified that the road would eventually decline to an unserviceable state without increased expenditure.

As a result of this Study, a number of recommendations were adopted by the 3 caretaker Councils which included:-

- A Joint Policy for the management of the Bucketts Way;
- A Route Management Advisory Group to be established to oversee the upgrading of the route and make recommendations to the Management Committee;
- The Councils adopt the standards and target conditions proposed in the Study;
- That the Councils adopt a Joint Policy for action on securing additional funding for necessary maintenance and improvements on the Bucketts Way ;
- The Councils make strong representation to the State Government for additional funding; and
- The Councils make strong representation to the Federal Government for funding for the program of major works under the Roads of National Importance Program.

As a result of this concerted effort, the New South Wales Government, through the RTA, provided $6M in 2000/2001 for a 3 year program to commencement improvement to the pavement on Bucketts Way. A further commitment was also given by the Government to provide funding under the Blackspot Program to the amount of $2M.
In 2003/04 a further program of funding was commenced. This was provided through the Roads of National Importance Program and was for a total amount of $20M over the subsequent 4 year period.

In 2011, a further $16M was committed by the Federal Government for pavement improvement works between Gloucester and Taree on the Bucketts Way.

Thus, by 2013, a total of $44M has been committed by primarily the Federal Government but also the State Government, of the original $66M identified in the 1999 report. This then leaves a shortfall of some $22M as identified in the 1999 Program which, with CPI adjustments, now represents a program of works of approximately $33M.

Of this $33M, approximately $1.2M of uncompleted works remains within the Gloucester Shire area, including the construction of an overtaking lane estimated to cost approximately $800,000.

Until these identified works, especially the safety and condition deficiencies, are addressed, additional traffic on the Bucketts Way such as from increased mine development, will result in unacceptable increased safety risks for road users.

The EIS contains the following errors of fact:

- RMS and Council do not share 50% each towards maintenance. Regional roads are Council roads for which Council receives a funding subsidy for maintenance based on average vehicle numbers for the lengths of Road within the shire. This is currently $8,340 per km and is insufficient to cover even the minor potholing and heavy patching required to maintain vehicle safety.
- The Bucketts Way speed limit within Gloucester Shire has been reduced to 90 km/h and 80 km/h by the RMS due to safety concerns.
- The Bucketts Way varies in width between 6.5 and 7 m
- There are little or no shoulders for the full length of Bucketts Way
- The Bucketts Way has had NO upgrading works other than the Stratford mine access intersection constructed by Gloucester Coal at the commencement of the project in 1994. The Bucketts Way has had some lengths of pavement rehabilitation due to traffic loadings exceeding the design life and

consequent major pavement failures. This followed concerted lobbying of the Federal Government by Gloucester, Great Lakes & Greater Taree Councils.

- The Bucketts Way has very few overtaking opportunities and NO overtaking lanes for its entire length, leading to very high safety deficiencies.

Pavement Damage

The Bucketts Way was originally the Pacific Highway and was constructed to a minimal standard in the 1950s. With the opening of the bridge over the Karuah River at Karuah the highway was deviated away from Gloucester. The road pavement was rehabilitated in the late 70s early 80s. The pavement design was a minimum of 300 mm of "ridge gravel" with the top 125 mm lime stabilised. This equates to a 20 year pavement design for a traffic load of 1000 vehicles per day with a 5% heavy vehicle loading (50 HVPD) with no allowance for traffic growth.

The Stratford mining complex was first approved in 1994 with an initial approval for a nine year productive life. The Bowens Road North Pit commenced production in 2003 with the Roseville pit commencing production in 2007. The Duralie mining complex commenced production in 2003. Consequently mining traffic has had a significant and long term impact on the pavement life of the Bucketts Way.

Council undertook traffic counts along the Bucketts Way using a "vehicle classifying" traffic counter from 2001. The total vehicles and heavy vehicle percentages for all counts from 2001 to 2011 are shown in the table below

Year	Total	Heavy Vehicles	
2001	1075	201	18.7%
2003	1032	92	8.9%
2006	1380	147	10.7%
2009	1345	199	14.8%
2011	1604	183	11.4%
	Average		12.9%

Two things are obvious from the table: Firstly increased total traffic; Secondly increase in heavy vehicle traffic which directly correlates with the investigation and construction of the extensions to the Stratford and Duralie mining complexes.

The EIS provides no indication of the breakdown of the heavy vehicles types currently accessing this site or forming part of the proposed traffic loads. Heavy vehicles are normally assessed by their impact on the road pavement which is assessed as equivalent standard axles ESAs (see table below).

Vehicle	kN	ESAs	PLUS Bogie Tipper
ESA = 8.2 Tonnes or 80kN			
2 tonne car	0.035	0.0004	
Bogie Tipper	188	2.35	
Tandem Truck	133	1.6625	
Pig Trailer	160	2	4.35
Dog Trailer	160	2	4.35
Super Dog Trailer	215	2.6875	5.0375
Quad Dog Trailer	270	3.375	5.725
Articulated Tri-Axle Vehicle	369	4.6125	
Articulated Quad-Axle Vehicle	409	5.1125	

Due to a lack of information provided within the EIS, it is proposed in this submission to assess the impact of heavy vehicles using an average figure of 2.8 ESA's per heavy vehicle trip (as per Austroads Pavement Design Guide 2004).

The Bucketts Way pavement design in 1980 was adequate for the design traffic existing and foreseen at that time. With no increase in heavy vehicles the pavement would have continued with a reduced level of service for a number of years past its design life (2000).
With a dramatic increase in heavy vehicles (as illustrated in the table above) the design life of the pavement is shortened considerably leading to pavement failure as has been increasingly experienced in recent years.

Council has had pavement investigation and design work carried out by the Snowy Mountains Engineering Corporation (SMEC). This work reveals a pavement design requirement for the current level of heavy vehicle traffic more than double that currently in place. This is illustrated by the calculated design traffic or 1980 and 2012 as illustrated in the following table:

Year	Current AADT	% Heavy Vehicles	Average Growth Rate	Cumulative Growth Factor	Design Traffic
1980	AADT=1000	5%	=1%	5.504751	1.41E+05
2012	AADT=1600	13%	=4%	29.77808	3.17E+06

The cost of carrying out pavement rehabilitation to the pavement design as required by current traffic loadings is in the order of $1M to $1.3M per kilometre.

Council undertakes regular traffic counts (using a vehicle classifying counter) on most roads within the Shire. The traffic count for the Bucketts Way in 2011 was taken during the month of April. The counts as collected by Council differ markedly from those submitted by Halcrow and contained within the EIS (see table below).

Table 4.1 – Average Weekday Traffic Without Project (vehicles-day)							
	SMC Light Heavy		Background Non-SMCA		Total Traffic		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
Existing 2011							
GSC 14 day Count Stratford Shop 2011					1815	246	2,061
The Bucketts Way North of SMC	234	9	1,696	251	1,930	260	2,190
The Bucketts Way South of SMC	115	30	1,696	251	1,811	281	2,092
The Bucketts Way South of Parkers Rd	115	30	1,696	251	1,811	281	2,092
GSC 14 day Count Shire Boundary 2011					1,421	183	1,604
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	132	24	156
SMC Access Rd	349	39	43	15	392	54	446
Bowens Rd	22	2	30	5	52	7	59

Council's analysis of the situation concludes that;

- Utilising council's counts it would show that the mine is currently responsible for 9/246 or 3.7% of heavy vehicles to the north of the mine site and 30/183 or 16.4% of heavy vehicles to the South of the mine site.
- The EIS claims that heavy vehicle traffic from the mine will increase to 11/246 or 4.5% of heavy vehicles to the north of the mine site and 36/183 or 19.7% of heavy vehicles to the south of the mine site.
- The Bucketts Way from the shire boundary to Phillip Street has well exceeded its design life and is desperately in need of rehabilitation. As stated earlier the cost of rehabilitating this Road is in the order of $1M to $1.3M per kilometre.
- The length of the Bucketts Way from the mine entrance, south to the shire boundary is 4.12km. The cost of rehabilitating this length of Road is $5.36 million of which 19.7% or $1.055M is the proportion attributable to mine traffic.
- The length of the Bucketts Way from the mine entrance to Phillip Street Gloucester is 15.13km. The cost of rehabilitating this length of Road is $19.67 million of which 4.5% or $0.885M is the proportion attributable to mine traffic.
- Total contribution required = $1.94 Million.

Proposed Road Closures

The project proposes a number of Road closures and Road openings to realign the local roads to enable mining activity to proceed. Council, as the roads authority, will need to you separately consider such closures before consent is to be granted.

Bucketts Way Traffic Safety

As stated earlier the Bucketts Way has very limited overtaking opportunities and no dedicated overtaking lanes anywhere along its length. With the proposed development of the mine and doubling of the number of full-time employees on site this deficiency will be fully exposed particularly during peak times and change of shifts.

To overcome this deficiency it is proposed that the mine be responsible for the provision of overtaking Lanes to the North and South of the mine access.

The overtaking lanes to the South would be in both directions ie both northbound and southbound and constructed on that section of Road between Woods Road and Upper Avon Road.

The overtaking lanes to the north would be constructed either side of Broad Gully Bridge with the northbound lane to the north of Broad Gully bridge and the southbound lane to the south of Broad Gully Bridge.

Other Roads Usage and Condition

The Stratford Mine complex is the majority user of the following roads:

- **Bowens Road**
    - This Road has been cut in two by previous mine operations which created a diversion via Wheatley's Lane and Wenham-Cox Road which adds approximately 3 km to the length of travel for property owners to the east of the mine wishing to travel South along Bucketts Way
    - The proposed additional diversion of Wenham Cox Road in this EIS does not redress this inequity
    - A better solution would be to continue the proposed diversion of Wenham Cox Road in a South Easterly direction along Dog Trap Creek to rejoin Bowens Road where it crosses Dog Trap Creek (approximately 6.9km from Bucketts Way).
    - To improve the safety of the intersection of Bowens Road (Wood Street) with the Bucketts Way it should be upgraded to provide a protected right hand turn lane.
    - Any deviation of Bowens Road will require council approval before it can take place. Council should withhold approval until it is satisfied that the proposed

realignment and the quality of construction overcome the deficiencies as mentioned above.

- **Wenham-Cox Road**
    - Traffic utilising Wenham Cox Road has increased dramatically since the diversion of Bowens Road
    - Sections of Wenham Cox Road either side of Wheatley Lane are not considered suitable for any increase in traffic. The road requires upgrading immediately including the provision of 1.2m shoulders and table drains.
    - The intersection of Wenham Cox Road and Bucketts Way is currently substandard and traffic increases on both Bucketts Way and Wenham Cox Road are now considered to render an unacceptable risk to motorists.
    - It should be upgraded to provide protected right hand turn and left hand turn lanes immediately.

- **Wheatleys Lane**
    - Traffic utilising Wheatleys Lane has increased dramatically since the diversion of Bowens Road.
    - With the proposed diversion of Bowens Road/ Wheatleys Lane the speed along Wheatleys Lane will increase considerably rendering the Road unsuitable for the traffic it carries (being typically only 5m in width with no shoulders with reduced width adjacent to trees and drains). This road should be upgraded to a full 6 m 2 lane road with adequate shoulders.
    - The intersection of Wheatley's Lane and Wenham Cox Road also requires urgent attention for the above reasons.

Maintenance Costs for Local Roads

Current road rehabilitation costs are $25,000 per annum per kilometre.
Current routine maintenance costs for local roads are $5,000 per annum per kilometre.
The total maintenance costs for local roads is therefore $31,000 per annum per kilometre.
It has been acknowledged that the Mine contributes in excess of 50% of local traffic on Bowens Road, Wenham Cox Road and Wheatleys Lane. Assuming a conservative 50% of mine traffic on these roads, the contribution to maintaining roads in this area is $15,500 per kilometre per annum.
Wenham Cox Road comprises approximately 3.6 kilometres, Wheatleys Lane 1.6 kilometres and Bowens Road approximately 0.5 kilometres, a total local road distance of 5.7 kilometres.

Therefore, the total annual mine contribution for maintenance for local roads is:-

5.7 kilometres x $15,500 per kilometres = $88,350.

Regional Road Maintenance Costs

The costs for Regional Road rehabilitation is $50,000 per annum per kilometre.
The cost for routine maintenance on Regional Roads is $15,000 per kilometre per annum.
The total maintenance costs for Regional Roads is therefore $65,000 per annum per kilometre.
The report identifies that approximately 20% of traffic south of the Mine intersection can be directed to the Mine (this represents approximately 4.3 kilometres within the Gloucester Shire Council LGA). The study also identifies that approximately 4.5% of traffic north of the Mine intersection can be attributed to the Mine operation (this represents approximately 35.7 kilometres within the Gloucester Shire Council LGA).
Therefore, the total annual contribution for Bucketts Way that can be attributed to the Mine can be calculated as follows:-

4.3km x (0.2 x $65,000) + 35.7km x (0.045 x $65,000) = $160,323

Therefore, the total annual road maintenance contribution that can be allocated to the Mine operation is $160,323 + $88,350 = $248,673 per annum.

Temporary Road Closures

Where it is necessary for roads to be closed temporarily due to nearby blasting, adequate notice of the closures must be provided to affected residents.

Notice of proposed closures should be published one week in advance in the Gloucester Advocate and on the SCL website. A minimum of 24 hours notice of any *additional* closures must be advised to affected residents by phone or email.

As Glen Road is a through road providing tourist access to The Glen nature reserve and to Bulahdelah via Waukivory Road, a permanent sign should be placed at the Glen Rd / Waukivory Rd intersection advising traffic entering Glen Rd at that point that the road may be closed at a point before the Bucketts Way exit.

SUMMARY

Should the Stratford Extension Project be approved the following works and contributions should be applied to any approval granted:

Contributions by way of a Planning Agreement

1) The mine contribute $1.94 million towards pavement rehabilitation of the Bucketts Way between Philip Street Gloucester and the Shire boundary to the south;
2) The provision of overtaking lanes to the South of the mine for both northbound and southbound traffic between Woods Road and Upper Avon Road,
3) The provision of overtaking lanes to the North of the mine for northbound and southbound traffic either side of Broad Gully Bridge; and
4) Annual maintenance payment to Council to the amount of $248,673 (2013 $) indexed annually by the CPI.

Roadworks Required as Conditions of Consent;

1) The proposed diversion of Wenham Cox/Bowens Road be realigned generally in a South easterly direction from the entrance to 350 Wenham Cox Road to join Bowens Road at a point 6.9 km from the Bucketts Way junction;
2) The Bucketts Way - Wenham Cox Road junction be upgraded to provide protected turning lanes for right-hand and left-hand turn in the Bucketts Way;
3) The Bucketts Way - Bowens Road (Wood St) junction be upgraded to provide a protected right hand turn lane in the Bucketts Way;
4) The pavement be widened and obstructions removed in Wenham Cox Road to provide 2 Lane traffic in both directions for its full length;
5) Wheatley's Lane be upgraded to a 6 m two Lane Road with adequate shoulders for its full length;
6) The intersection of Wheatley's Lane and Wenham Cox Road be widened to provide adequate turning space for large vehicles;

Conditions required for traffic management outcomes;

7) Notice of proposed closures to be published one week in advance in the Gloucester Advocate and on the SCL website. A minimum of 24 hours notice of any additional closures to be advised to affected residents by phone or email.
8) As Glen Road is a through road providing tourist access to The Glen nature reserve and to Bulahdelah via Waukivory Road, A permanent sign should be placed at the Glen Rd / Waukivory Rd intersection advising that the road may be closed at a point before the Bucketts Way exit.

e) Agriculture

Analysis of the issue

- Appendix K of the EIS provides a reasonable analysis of the existing/past agriculture across the mining site as at the time of this DA. There is no information on the before mining situation for agriculture at the proposed site or for other lands owned by the mining company.
- It provides information on landform, soils, land capability and suitability in order to address lost land potential, possible areas of Strategic Agricultural Lands and future land use. Some of the conclusions in this aspect are questionable.
- The overall contention is that land is at best of moderate quality for agriculture. This is supported by the consultants' report, where a lot of emphasis is placed on deficiencies and not much on potential. Indeed, reading the report it seems remarkable that anyone has been able to ever generate an income out of agriculture in this area.
- There is a section on water collection, extraction and usage. Use of agricultural irrigation water for mining is a concern.
- The coal mining and processing project will disturb approximately 690ha, rehabilitate 300ha and "sterilize' approximately 380ha for biodiversity offsets; amounting to a permanent loss of at least 770ha of agricultural land. This loss could be greater if the rehabilitated grazing land is of a poor standard as is the case found by the recent independent audit at Duralie mine.
- Appendix P provides an economic analysis of agriculture. Some of the values used in this calculation are not correct.

Identification of concerns/problems/issues

- Loss of dairy production on mine owned land has not been discussed. This would change the significance of agriculture at the site and economic analysis.
- The land/soil data is comprehensive but some of its interpretation is questioned:
    - The whole mine area is mapped as Land Capability Class IV or above in Fig 10 but this is from air-photo interpretation by DPI. However the EIS authors have varied this by field investigations as shown in Fig 11 thus demonstrating that the regional mapping as published for Strategic Agricultural Land (SAL) is not accurate enough for site specific decisions.
    - From the Consultant's report, NSW Ag Suitability Mapping gives significant areas of Class 3 (Fig 12) while Suitability Mapping for this EIS lists no Class 3 (Fig 13). Does that mean that existing mine activities (including rehabilitation) have significantly altered Land Suitability since NSW Mapping was done?

- Figure 9 shows soil landscape units mapped from EIS field work. This shows substantial areas (more than 20ha) mapped as Alluvial Plains (Variants A and B) that have land slope <3%. This low slope would put this land in Capability Classes I, II, or III and needs to be considered for SAL.
- Soils in the Alluvial Plain Variant A unit are dominantly Kandosols which have been classed as moderately fertile in the SAL policy.
- Therefore, based on information in the EIS Appendix K, there is Biophysical Strategic Agricultural Land in the proposed mine area because it meets the criteria for soil fertility, land capability, reliable water, and size.
- Section 2.1.7 of Appendix K states that "based on the available mapping information" the Project does not have to be concerned with SAL. This is not consistent with the SAL Policy that states in Chapter 11 that "as the maps …are at a regional scale, the applicant would be required at the gateway stage to verify that the project site does meet the criteria…"
- Figure 4 shows state (DPI) mapped SAL just west of the project area so it is realistic to suspect that there is SAL in the project area, in the offset areas, or land owned by the mining company.
- Section 2.1.4 lists a broad range of constraints to agricultural activity due to soil condition. Many of these are easily rectifiable as is clearly articulated in the rehabilitation section of the report.
- Good, modern, land management practices are showing that this land can be highly productive if not covered with waste rock dumps or irrigated with saline water.

- Economics of the losses to agriculture are summarised in Section 3.3 and based on information in Appendix P but there are some incorrect assumptions.
  - Section 3.2.1 states that dairy land will be lost to production although the amount is not mentioned and this fact is not considered in the economic analysis.
  - The loss of agriculture production is indicated to be $0.341m from land resources plus $0.044m from water resources for a total of $0.385m per year.
  - These agricultural land losses are detailed in Attachment 2 of Appendix P and are based on the land being used for beef production with a Gross Margin (GM) of $134.81/ha/yr. This is a serious underestimate as NSW Agriculture (DPI 2012) estimates the GM for weaners at $137/ha/yr and growing out weaners at $255 and growing out steers at an average of $210/ha/yr. Using the average for steers would increase the agricultural losses by 50% to $0.77m per year from this mine.

- However, this does not account for the losses to NSW and using the ABS multiplier of 2.178 the annual losses become $1.7m
- Table A1-7 indicates that 1070ha of beef production would employ 1.8 persons but as the mine has purchased at least 10 farms it has put 10 farmers out of employment. This would have a state-wide impact of 18 persons unemployed (ABS multiplier of 1.828) through loss of agriculture on the mine site and related land.

- The section on cumulative impacts is skeletal at best. There are four major projects in the pipeline for Gloucester. This project is expected to have a 1% impact on agricultural land and others are not considered to be of greater significance. Therefore cumulative impact is not considered significant in the EIS. However, stock agents report a decline in stock sales as a result of the loss of farming enterprises due to land purchases by the mines. This fact is supported by reductions in animal sales through the Council owned cattle saleyards.

How might these issues be mitigated or addressed (as referenced in the EIS)

- None of these detrimental effects of agriculture in the LGA are addressed in the EIS.
- It is simply stated that coal mining is a more efficient use of resources for the state and should therefore be approved.
- As a general principle there should be no net long-term loss of agricultural production. There seems to be an implication that the development can go ahead as long as the impact is not significant. Significance depends on resolution. A loss of $1.9M agricultural production in perpetuity may not seem significant to Yancoal, but it would be very significant to a farmer, a group of farmers, or even a community of Gloucester's size. Why should Gloucester pay that price? Just as the mine needs to develop biodiversity offsets, it needs to develop economic offsets for the damage it is likely to cause to the local economy. It is not sufficient to remove the debate to the State or even Region level to determine the significance of impacts. They must be resolved at the community and sub-community level as it is there that the costs and benefits are most apparent.
- The following two paragraphs seem to be implying that mining improves soil condition. This mine should have before and after measurements and should be able to quantify past impacts as a model for projected future impacts. They have not done this in a systematic way. They have simply presented some data, and a couple of photos of happy cattle.

  The soil testing pits located in existing the Stratford Mining Complex rehabilitated areas had a wide range of soil conditions for plant growth, ranging from areas with low water holding capacity associated with rock close to the surface, to areas with much higher water storage capacity and favourable subsoil pH

associated with excellent deep root growth that was not seen in most of the "natural" soil profiles under pasture (Attachment A).

The flat areas on the Stratford Waste Emplacement were observed to have similar, and in some cases better, soil conditions than that observed in the "natural" soil profiles under pasture on the Project site (Attachment A).

- The EIS claims that groundwater modelling indicates no expected deleterious effect. An ongoing monitoring and mitigation strategy should be implemented to demonstrate effects.
- There is a 2.7% maximum predicted reduction in contributing catchment over the project but no discussion of how this water impact is to be addressed?

Analysis of the Adequacy of any Mitigation Proposed

- The Agricultural Economic Analysis needs to be revised using more realistic data on beef production from NSW Agriculture and including the loss of dairy production
- The rehabilitation of agricultural land needs to be addressed as two plant community types:
    1) Grassland – improved pasture or native grasses/legumes (and potentially to include saltbush species trials)
    2) Woodland – using native species

There is inadequate attention paid to composition and structure of either community. Plant communities are so much more that floristics (a collection of species). Those species have a horizontal and vertical structure. In natural communities these are based on a range of environmental and historical factors. The ultimate function of the reinstated communities will be largely determined by the design and implementation of rehabilitation. It is better that they serve multiple functions (as natural woodland does) rather than just providing cover for a rehabilitated site.

Suggested conditions to address the issues

The condition in the previous section on water, to require contribution to maintenance of natural flow, will assist the agricultural outcomes.

1) All rehabilitated pasture land in the mine area should be brought to improved pasture status within 5 years and leased to district landholders. This would assist in compensating the district productivity for sterile land in the mine and offset areas.
2) No existing pasture land should be rehabilitated for biodiversity offset. Except for the proposed re-vegetation of cleared land to re-establish linkages in the Craven Valley wildlife corridor in offset areas 3 & 4 - which is supported - only non-agricultural land should be used to offset destruction of vegetation by mine development.

3) The intended vegetation community function for rehabilitated areas should be specified. The community composition and structure that will deliver this function should also be clearly specified. The company should retain responsibility for the land until the specifications have been met.

Suggestions for monitoring of impacts relevant to the issue

1) Any areas irrigated with mine water should be monitored for salinity of the soil.
2) Ground water in all bore sites identified by EIS to be monitored and any changes be rectified or compensated.

Any contributions that could be appropriate as a means of offsetting the impacts relevant to the issue

There is significant potential for the rehabilitation areas to augment agriculture in Gloucester through the development of innovative agricultural industry. Large scale ameliorative works are beyond most farmers, but exactly what this project proposes. These works could easily be designed to facilitate new, high productivity, high value industries, rather than simply restoring a farming baseline. The funding of a feasibility study and assistance in facilitating innovative industry development would contribute to offsetting any loss in traditional agriculture. An annual contribution for the life of the project is proposed for establishment of an agricultural development fund as compensation for the loss to local agricultural industry. This fund could be used to;

- train farmers in new technology for improved production,
- research and develop new agricultural industries, and
- Investment in community-based agricultural facilities.

Specific contributions regarding agriculture are as follows;

1) Clean irrigation water at 0.5ML/ha should be provided to neighbours at 10% normal cost charged by the Office of Water to compensate for boundary impacts on surface and groundwater resources.
2) Mine site managers must undertake rigorous pest plant and animal plans and implement this to the satisfaction of Council.

f. Socio-economic Assessment

Within the narrow confines of the Stroud Gloucester Valley, the cumulative impacts of open-cut mining and Coal Seam Gas extraction constitute a major concern for the community. The Director General's Requirements (DGRs) stipulate that an assessment be made of the economic costs and benefits of the Proposal, both to the local community and the State of NSW.

The DGRs also list a series of social and economic assessment requirements (EIS Attachment 1 page 4). Surprisingly the Executive Summary of the EIS only mentions one of these points – the questionable 250 on-site personnel and 714 direct and indirect jobs in NSW. None of the social issues are mentioned in the Summary; a fact that surprises the community. This section of the submission addresses Council and community concerns regarding the information in sections 4.16 (Regional Economy) and 4.17 (Employment, Population and Community Infrastructure) of the EIS Volume 1, and that presented in Appendix P (Socio-Economic Assessment).

In formulating its assessment, the Council committee has had input from two economic consultants; one a local community member and the other from Melbourne. The full report by the local economist is attached (McCalden, 2013), and the report by Campbell (2013) will be attached to a submission by the BGSPA. Both economic consultants consider that the EIS contains substantial flaws such that in its current form it is not adequate for government decision making on social and economic grounds.

The Director General's environmental assessment requirements DGRs) state as the first point that the "EIS must include a detailed description of the development including [among other things] justification of the proposed mine plan, including efficiency of the resource recovery…" The EIS for this project does not do this.

21.5Mt of coal will be mined in 11 years if approved at an annual ROM production of up to 2.6Mt (p2-13). This is less than the current approved operations of 3.1Mtpa of ROM (p2-1) at the Stratford Mining Complex using a workforce of 125 people (pES-1). Yet the proposed new project will require a doubling of the workforce with "up to 250 on-site personnel" (ES-1). Clearly the new project will be only half as efficient in recovering coal as the existing project. Unfortunately this number of 250 people employed is used in later economic analyses leading to incorrect assertions for local and regional benefits that state the project will deliver "an average annual stimulus of some 714 direct and indirect jobs in NSW" (pES-1). In a contradiction on page ES-6 the EIS says that these 250 direct and indirect jobs will be "in the Newcastle region". Some of these statements are incorrect.

It is proposed that these employees will support the mine operating 24hours per day 7 days per week (pES-5) which is not the case for the current approval with a higher ROM tonnage.

Clearly again the new proposal is less efficient that the existing mine but this is not discussed in the EIS. It is surprising that a benefit cost analysis has not been undertaken to demonstrate the need for, and efficiency of, 24hr mine operations compared with the current approval.

Table 2-2 (p2-26) indicates that 157.9Mbcm (bank cubic metres) of waste rock (overburden) will be moved to recover the 28.6Mt of ROM which will in turn yield 21.5 Mt of coal. The relative efficiency of this operation that moves 7.33 bank cubic metres to gain 1T of coal is not discussed either in terms of engineering or economic efficiency. A recent analysis by Citi Research (July 2102) indicates that the cost of production for Yancoal in the Gloucester Basin is about $93 per tonne whereas its Moolarben mine (near Mudgee) operates at about $40-45per tonne. One reason for this would be that the overburden strip ratio at Moolarben is only half that at Stratford (Yancoal website). Over all operations, Yancoal operates at an average production cost of about $80/t which places them in the upper end of the 2nd quartile of cost for production in Australia (Citi Research, July 2012). The low efficiency of the Gloucester operation is not discussed in the EIS even though it is a DGR.

Regional Economy

The region chosen for the EIS analysis (p 4-135) is a combination of Gloucester and Great Lakes LGAs, with no rationale provided for this. As there are no real economic links between these two LGAs it makes the regional economic analysis illogical. Even if the 'region' was conceived because 21% of employees reside in Great Lakes it is illogical because 37% reside in Taree LGA and 25% in Gloucester LGA according to company figures provided to the CCC in June 2011. Therefore, the economic contribution figure presented in Table 4-39 (p 4-136) are meaningless and distort the analysis of costs and benefits. Statements like "the retail sector is the most significant for regional employment" (p4-135) is incorrect when it comes to Gloucester where retail is about 10% , mining 5%, tourism 8% and agriculture is about 19% (Buchan 2010 report to Council).

Therefore, the potential regional benefits are questioned because of the base data used. They are also questioned because of the use of Input-Output (I-O) modelling that is becoming unacceptable in economic studies due to its use of lack of supply side constraints and use of fixed input prices (ABS 2011). Even if I-O modelling was appropriate then the data used needs to be accurate and this is not the case as section 3.3 of Appendix P makes two incorrect assumptions in the analysis of Project operation; firstly in paragraph 2 that there will be 250 people directly employed; and secondly in paragraph 1 that production will increase above historical levels (see discussion above on both of these points).

The EIS fails to provide sufficient background information to enable independent checking of the outcomes claims from I-O modelling at both the regional and state levels. As quoted

in the paper by Campbell (2013) "I–O models lack resource constraints and fail to capture significant welfare (consumer and environmental) impacts. They always produce a positive gain to the economy, however disastrous the event."

A simple reality check shows the inaccuracy of the modelled information. If the mine employs 125 people and 40% of these reside in the Gloucester Shire this equates to 50 people, and if their average income is $150,000 pa then household income in the Shire (appropriate region) is $4.6m per year not the $24m reported in section 4.16.2. The

End of Project Life

Section 4.16.3 on mitigation of socio-economic issues at end of project life provides no data and no analysis. For the EIS to say that a plan "would be developed" in a one paragraph statement (which is repeated in section 5.6) is a grossly inadequate assessment. Planning for mine closure in 11 years, or less as coal prices decline, needs to start now to enable alternative economic developments to commence. This section is unacceptable and does not fulfil the DGRs that require "a detailed description of the measures that would be implemented to minimise the adverse social and economic impacts of the project".

A realistic socio-economic analysis would include various scenarios for the mine to end in say 5 or 10 years due to economic circumstances and the mitigation required for a controlled exit. Current economic conditions in the coal industry and the inefficiency of this mine discussed above means that the company has probably undertaken such analysis but in the EIS it simply states that "cessation of mining would result in a contraction in regional economic activity" (page 4-136). It then goes on to suggest that new mining resource developments in the region would buffer against the economic impacts even though no such mines have been approved.

Workforce Demand

Section 4.17.2 on the potential impacts on workforce demand and population contains some very theoretical discussion and assumptions. It estimates that the cumulative workforce requirements of the Stratford project, the AGL Gas project and the potential Rocky Hill project is 315 people of which 10% will already reside in the region but it is expecting a direct population increase of 291 people to Gloucester Shire. This is twice the population increase from 2001 to 2006 and is not a "relatively small increase compared to the total population" as claimed on page 4-139.

The projected population increase will have considerable social implications which are not adequately addressed and certainly not mitigated. For example, it is stated that housing will be insufficient but says more workers will live outside the Shire; this is contrary to the prediction for economic benefits in the shire. The EIS also acknowledges that rents and property prices will increase and this will impact adversely on lower income groups but it does not propose any solutions.

The EIS states that “the impact of skills shortages in the region is likely to be negligible. Again this is a concept that was not discussed with the Council or the local business sector who are suffering through a loss of apprentices to the mine. One reason for this is that the mine does not train any apprentices but recruits them from other industries after they are trained.

Human Health

Under the heading of Community Infrastructure Effects, the EIS (p4-139) indicates that there will be increased demand for public health facilities but that “increased populations result in the provision of more health facilities”. This concept does not reflect the real situation for health services in rural areas; Gloucester currently does not have enough medical practitioners to service the existing population and clearly this issue was not discussed with the health sector in the development of the EIS. Given that it is widely acknowledged that General Medical Practitioner services in Gloucester are already overstressed, failure to address this concern constitutes a serious failure in the EIS.

It is unacceptable that there is no other consideration of health impacts from coal mining in the economic analyses of this EIS. As discussed in sections5 (a), (b) and (e) of this submission there are considerable health impacts due to noise, air quality and psychological issues associated with living, working or going to school in close proximity to a coal mine. These problems will only increase if other mines are approved within kilometres of this project, as mine seek approval to operate 24hours per day, and as the area of mining is regularly extended over decades.

The DGRs require an assessment of “potential impacts on local and regional communities, including: increased demand for ….health services…” This EIS has not undertaken such a study and has not proposed any mitigation measures for impacts that are inevitable for the community.

As stated by Campbell (2013): “With long-term, empirical evidence linking significant health impacts to coal mining, it is important that the costs associated with impacts are included in consideration of this project. Clearly these are costs that accrue to the local and NSW community and should be included in the assessment.”

Quantification of Benefits and Costs

Although the DGRs require a “detailed assessment of costs” the EIS does not do this because in Appendix P section 2.4.2 many of the costs for environmental and social impacts have simply been included in the capital costs of land. This is because it is assumed that the cost values can be reflected in the opportunity cost of purchasing the land by the mine. This assumes that the impact is negated by purchasing the affected land, the cost is internalised, and there are no future costs.

For example it is stated that “the present value of foregone agricultural production is reflected in land prices”. This assumes that the only impact on agriculture occurs within the properties that the mine company has purchased. As discussed in section 5(f) of this

submission there are impacts on agriculture beyond the mine boundary; these costs are more significant when the cumulative impacts of several mines are considered.
Similarly it is assumed that there are no costs to the community or to individuals for the impact of noise or air quality problems beyond the mine boundary or the land purchased by the company. This is unrealistic as discussed in sections 5(a) and (b) of this submission.

In the case of flora and fauna it is assumed that the impact cost will be offset by land purchases. This fails to consider the efficacy of the biodiversity offsets being proposed or the long-term costs to someone of managing the land that is to be "secured in perpetuity".

Road transport costs are reported in the EIS as being "insignificant" yet a study by Council and presented in section 5(d) of this submission calculates the costs to Shire roads attributable to this project will be approximately $0.25mill per year.

The costs of any mining impacts on human health, the health service industry, and the tourism industry are not considered at all in Table 2.3 of Appendix P but as discussed in section 5 (e) and (h) of this submission there are real impacts. There is no valuation provided for the impacts on community welfare, housing, education, emergency services or amenity because, although these are discussed as issues in section 4 of the EIS, the company does not propose any mitigation measures and hence there are no values considered for these costs. These omissions are unreasonable if the benefit cost analysis is to be used to make judgements and approvals on this project.

On the other hand the benefit cost analysis includes a beneficial value for the "non-market value of employment" (page 13 of Appendix P). Even the EIS says that the inclusion of this value may be contentious in the context of a fully employed economy which is the case in Gloucester with unemployment at 4.9%. Campbell (2013) "call(s) on Gillespie Economics to desist from including this discredited value in their work". Studies have been undertaken in other areas to quantify the non-market value of the environment or the community amenity but these have not been considered in this EIS.

The benefits attributed to the value of coal sold are contentious because they do not reflect current prices and downward trends in world market prices. The sensitivity analysis presented in section 2.6 and Attachment 3 of Appendix P indicate that the project benefits are highly sensitive to a 20% reduction in the value of coal and coal prices have fallen 20% since the analysis was undertaken. This unprofitability is perhaps reflected in the fact that the Stratford mine is currently not operating.

Conclusion

The large number of inaccuracies and omissions in the assessment of social and economic impacts mean that the analysis needs to be revised before the project can be assessed for approval.

g) Tourism

Considering the importance of tourism to the local economy of Gloucester it is a major omission in the EIS that the impact of mining on tourism is not considered in the EIS. At a meeting with Gloucester Shire Council in May 2012 the issue of potential impacts on tourism was raised and this is recorded in Section 3.1.4 of the EIS where it says the matter is dealt with in Appendix P. However, no such analysis exists in the EIS.

Figure 4.1 in Appendix P lists employment by industry groups in Gloucester but no information is presented for tourism. The text in section 4.2.2 says that the important industries are agriculture (approximately 18%), mining (approximately 5%) and manufacturing (approximately 9%). The ABS Resident Population Data (2006) does include information on tourism and related industries but the EIS ignores this information. A report for Gloucester Shire (Buchan 2010) uses this data and estimates that tourism related industries employ about 153 people or nearly 9% of jobs in the Shire. A recent survey by the Gloucester Tourism group has estimated that currently 214 people are employed in tourist related activities.

Tourism generates over $30m annually within Gloucester Shire as published by the State government agency Destination NSW (2011).

The Gloucester region's tourism value is directly linked to its scenic value, and the region has long been recognised for its beauty. Gloucester has an unbeatable brand positioning of being the closest town to Barrington Tops. This unique selling proposition is immensely strengthened by the World Heritage listing of this National Park in 1985, with flow-on effects to all other parks and conservation areas in the region. Access to the Barrington Tops and Gloucester Tops National Parks is through the Gloucester valley and the scenery of the valley is an integral part of the tourism experience. There are over 65 tourist related accommodation properties in Gloucester and throughout the valley. These are impacted by mining in two ways:

- A number of properties are directly impacted by their proximity to the mine; and
- On many occasions there are no vacancies due to occupancy with mine related personnel.

As much of the tourism to Gloucester is related to the environment (camping, walking, adventure) the industry is dependent on maintaining a pollution free environment. Therefore, mining impacts such as poor air quality, reduced visibility, water pollution, loss of habitat, noise, increased heavy vehicle traffic and the landscape scar of overburden dumps are detrimental to a sustainable tourism industry. The negative image of mining in the valley will last long after the short term coal mine exploitation is finished.

h) Flora and Fauna and Proposed Offsets

Concerns

Clearing and further fragmentation of woodland and forest habitats in the project area would occur progressively over 11 years. The two new open cuts would effectively remove or limit connections to the extensive forested areas east of the project area, which in turn link to The Glen nature reserve and other reserves farther to the south. This break in local habitat connectivity would act as a barrier to dispersal and migration of some fauna.

While SCL's consultants considered that these impacts are unlikely to result in the loss of entire local populations, they concluded that the small size and isolation of the remnant habitats in the project area would increase the risk of local species loss for fauna that utilise them, particularly species with low mobility.

That impact would persist until vegetation becomes established in the offset areas, biodiversity enhancement area and on the post-mine landforms.

Until proposed plantings on currently cleared offset areas (which comprise around half of the proposed offset areas) mature, there will be a substantial net loss of habitat for fauna requiring mature trees for nesting & feeding. Loss of tree hollows will be one of the most direct and significant impacts of the proposed clearing. Forest areas proposed to be cleared in the south-west corner of the Avon North open cut and at the southern end of the Stratford East open cut have tree-hollow densities of 10 -20 per ha, and more than 20 per ha in places. These are among the highest densities that occur in the project area and proposed offset areas.

Of the 33 species listed under the TSC Act and 6 under the EPBC Act that are considered by SCPL's consultants to be likely to be affected by loss of known or potential habitat due to the mine expansion project, the Squirrel Glider *(Petaurus norfolkensis)* is the most likely to be significantly impacted.

The Squirrel Glider is heavily dependent on the presence of tree hollows, and is likely to be seriously affected by the removal of some known habitat areas and a temporary increase in isolation of some other known habitat areas.

The EIS predicts that the impact of habitat loss and fragmentation is not likely to result in the loss of the entire local population but, as the Glider is currently persisting in only a few relatively small patches, survival of the local population is at risk.

Mitigation Proposed in EIS

It is proposed to offset the 97.7ha of native vegetation that would be removed for the project with 490 ha of "similar" native vegetation in the immediate surrounds and 435 ha of

cleared agricultural land that would be restored to native woodland.

Four separate offset areas are proposed, all of which are located within about 5km of the project area.

To replace lost hollows, a nest box placement program is proposed by SCL. The program would be designed to specifically target Squirrel Gliders, but would include additional nest boxes suitable for other species of arboreal mammals, birds and bats.

Adequacy of Proposed Mitigation

SCL's aim to locate offsets close to the areas of lost habitat is supported because it will assist in replicating the original composition, increase the probability of colonisation and better incorporate localised habitat characteristics and ecological processes.

Similarly, the objective of restoration of habitat and biodiversity across the Craven Valley wildlife corridor, primarily through establishment of offset areas 3 and 4, is supported. However the current poor environmental condition of much of that area will make achievement of the objective slow and difficult. (Note that the descriptors Craven Valley Corridor and Barrington – Great Lakes Climate Change Corridor refer to the same sub-regional corridor).

Of the four offset areas proposed for the Stratford extension project, areas 3 and 4 are located within that corridor. Along with existing VCA areas in or bordering the corridor, those two offset areas will significantly enhance the condition and long-term viability of the wildlife corridor.

The value and viability of one of the proposed offset areas (area 1) however is very doubtful. This area is small, adjacent to the Stratford urban environment, poorly connected to other habitat areas and lies outside the recognised Craven Valley wildlife corridor. Proposed offset area 1 has a tree-hollow density of less than 6 per ha.

Other factors that diminish the adequacy of the proposed offset areas include the presence of some eight or nine houses within the areas; an existing electricity easement through one of the offset areas (area 3) and a new easement to be created in the medium term; and the expected development of 6 gas wells in offset area 3 during stage 1 of AGL's Gloucester CSG project.

There are some eight or nine residences located in the proposed offset areas, the occupation of which will potentially diminish the capacity of the offset areas to compensate for loss of biodiversity and habitat in the project area. The EIS does not provide sufficient information about how the implications of the presence of these residences would be handled.

If the residences were to be maintained and occupied, they would need to be excluded from the area that would be subject to a conservation covenant. Measures to control their potential impact on the offset areas would need to be implemented and monitored. Issues to be addressed would include the potential for impact of domestic dogs and cats on native fauna, and activities of occupants in the surrounding offset area that may affect disturbance-sensitive species

Development of AGL's coal seam gas infrastructure, scheduled to occur within the next 1-2 years, will impact the proposed offset areas. The maps showing indicative locations of AGL coal seam gas wells suggest that one well would be located in Offset area 1 and five wells in offset area 3 in stage 1 of the AGL project. Each of those wells would be sited on a gravelled and fenced pad, powered by a diesel compressor and serviced by a gravelled access road. Though not noted in the EIS, offset area 4 and part of offset area 3 are located in AGL's stage 2 area which is scheduled for later development. Additional wells may be developed there as part of that stage of the AGL project.

Part of proposed offset area 3 is likely to be cleared for the planned new Transgrid electricity transmission line easement. Although the final position of this line has not been decided, the corridor within which it will be built transects offset area 3. The easement through offset area 3 could comprise an area of up to 35ha (60m x 5km). Although Transgrid may in turn be required to set aside areas as offsets for the transmission line project, they may be far removed from the SCL project area, and so would not offset the local net impact of vegetation clearance associated with the project.

Offset area 1 is a relatively small area (40ha) located beside the Stratford village. It is bounded on its northern side by extensive cleared farmland, by Stratford village to the west, and is separated by Bowens Road from a smaller area of uncleared vegetation on its southern side. These characteristics will contribute to significant edge effects that diminish the area's suitability as an offset. Further, this offset area's small size and poor connectivity with larger areas of remnant native vegetation raise doubts about its long term viability, particularly as a habitat for species with limited capacity for movement between widely separated areas. It does not provide connectivity between valley floor habitats and the wooded range to the east. This Compounding its small size and poor connectivity is the proximity of the Stratford urban environment which presents a significant risk of predation on fauna in the offset area by domestic cats and dogs.

The habitat in offset area 1 is comprised largely of young regrowth grassy woodland and young regrowth dry sclerophyll forest. The area contains 8 ha of cabbage gum open forest which has been cleared in much of its former range, but larger areas (22.9ha) of this vegetation type also occurs in proposed offset areas 2 and 3. Offset area 1 also contains a substantial number of planted exotic trees *(Pinus radiata).*

As no threatened fauna species are dependent on cabbage gums exclusive of other locally occurring Eucalypt species, the loss of hollow-bearing trees rather than loss of trees of a particular species would be the more significant faunal impact of clearing for the extended project.

Offset areas 1 and 2 area recorded in the EIS as containing less than 3 hollow bearing trees per 0.5ha. By comparison, offset area 4 and parts of area 3 contain 3-10 hollow-bearing trees per 0.5ha.

Offset areas 2 & 3 are connected by a large VCA on property 44 west of Craven village. Offset area 4 adjoins extensive areas of largely undisturbed vegetation, but is not connected to offset areas 2 & 3 by land over which there is any certainty of maintenance of high biodiversity. However a property (ex Allman, property 61) that practically connects offset areas 3 and 4 is owned by SCL. Extension of offset area 3 to include part or all of that property would achieve near-contiguity of offset areas 2, 3 and 4.

Suggested condition of consent

1. The proposed offset area 1 should be rejected as it is not appropriately located and is unlikely to be of enduring viability. An alternative area within the Craven Valley corridor with better linkages to other offset areas, and with a higher tree-hollow density, should be identified from the survey data prepared for the EIS. Any land identified for inclusion in such a corridor should have a minimum width of 500 m and include preparation of a fire management plan as part of the overall Biodiversity Management Plan.
2. Monitoring undertaken as part of the Biodiversity Management Plan must be undertaken in an adaptive management framework that provides for changes to be made in response to identified under-achievement of objectives.
3. In addition to lodging the proposed conservation bond to ensure availability of funding for implementation of the biodiversity offset strategy, SCL should be required to nominate additional areas that would be used as supplementary offsets in the event that monitoring finds that habitat restoration in initial offset areas has not achieved long-term viability and functionality of biodiversity.

Recent Australian research (E.J. Pickett et al. / Biological Conservation 157 (2013) 156–162) has concluded that habitat offset aimed at achieving and detecting no net loss of biodiversity can only be successful where the offset ratio is large, monitoring is long-term, robust and precise and funding is available to substantially increase the amount of habitat if monitoring indicates that this is necessary.

Suggested condition of consent

4. A higher offset ratio should be required. This is necessary to compensate for the generally low densities of hollow bearing trees in the offset areas, the long time lag that will occur in the establishment of replacement habitat; uncertain utilisation rate

of artificial nest boxes; uncertainty of success of development of offset habitat; and the impacts on the proposed offset areas of houses, power transmission easements and planned coal seam gas infrastructure.

SCL indicates that it will make an arrangement for the protection in perpetuity and management of the biodiversity areas (or equivalent) within 12 months of grant of Development Consent (s4. p95).

Suggested condition of consent

5. If the project is approved, the conditions of consent must preclude the implied scope for substitution by SCL of different areas for those identified in the EIS without full scrutiny as part of an amended EIS.

It is indicated that a voluntary conservation agreement (VCA) pursuant to Section 69B of the National Parks and Wildlife Act 1974, or a similar arrangement, would be sought in relation to the offset areas.

The proposed offset areas may not meet the criteria for declaration of VCAs, which are primarily directed at the protection of areas of high conservation value. Nevertheless the covenants applied through VCAs provide an appropriate benchmark for the protection measures that should apply to the offset areas, regardless of what mechanism might be used to secure their long-term protection and management.

Suggested condition of consent

6. The arrangements made concerning the protection and management of the offset areas should provide specific protections no less comprehensive and restrictive than those that apply generally under VCAs.

Land clearance is a key threatening process under the EPBC Act, and clearing of native vegetation and loss of hollow-bearing trees are listed as key threatening processes under the TSC Act. The AMBS report prepared for the EIS acknowledges that hollow-bearing trees can be considered a restricted resource given the long time periods involved with the ontology of hollow development.

Most of the area of native vegetation that would be cleared for additional surface development, some 97.7ha, consists of wet sclerophyll forest, dry sclerophyll forest and grassy woodland. The proposed offset areas include larger areas of these forest types, but most have a far lower density of hollow-bearing trees than occurs in some parts of the areas proposed to be cleared.

Until new plantings on currently cleared offset areas (which comprise around half of the proposed offset areas) mature, there will be a substantial net loss of habitat for fauna

requiring mature trees for nesting & feeding.

Regrowth in areas cleared or disturbed prior to 1960 will be halted by clearance within the project area, and habitat in areas to be newly planted will not progress to comparable condition for at least 50 years.

In Australian eucalypt forests and woodlands, most trees do not form hollows until they are about 100 years old and 120-180 years is required for trees to develop hollows suitable for hollow-using fauna, (220 years or more is needed to develop large hollows). (See for example Gibbons P and Lindenmayer DB (2002) *Tree Hollows and Wildlife Conservation in Australia*, CSIRO Publishing.

While it is acknowledged in the EIS that the nest box installation program is unlikely to compensate for the direct loss of large hollow-bearing trees, it is suggested that it is "likely to assist in the short to medium-term with the replacement of potential roost/nesting habitat for some species until existing regrowth vegetation becomes sufficiently mature to develop hollows." (App. F, p93).

However as most of that regrowth vegetation is only 50-60 years old or less, the development of hollows can be expected to take a further 50 or more years, so habitat supplementation by installation of nest boxes would need to be maintained over that timeframe for a persistent net reduction in biodiversity to be avoided. The predicted duration of the East Stratford project is only about ten years and there can be no confidence that installed nest boxes will be maintained for at least 50 years beyond that.

The EIS indicates that nest-boxes would be used to replace lost hollows at a ratio of 1:1.

However the AMBS fauna assessment presented in the EIS refers to published research that has found varying degrees of success in utilisation of nest-boxes by squirrel gliders. - Utilisation of nest boxes by squirrel gliders has been found to be only 20% - 50% after 3 years. Accordingly, AMBS recommended that a minimum of two nest boxes suitable for the Squirrel Glider be installed for each potential nesting hollow that is removed.

More generally, other Australian researchers have found that information is lacking to demonstrate the value to hollow-using species of installing artificial hollows to compensate for hollow-bearing trees lost through clearing. (See for example Goldingay RL and Stevens JR, *Wildlife Research 2009*, 36, 81-97)

This lack of demonstrated effectiveness of nest box programs, and the practical difficulties of maintaining the placed nest boxes over a period extending some 50 years or more beyond the project timeframe, highlights the inferiority of nest-box placement compared to the alternative of avoiding clearance of areas with high tree-hollow density and including more areas with at least moderate tree-hollow density in the areas to be offset.

Suggested conditions of consent

7. More areas with at least moderate tree-hollow density should be included in the offset areas.
8. Where placement of nest boxes is required as a supplementary measure, that should occur in the more mature areas of forest and woodland in the offset areas prior to any clearance in the project area.
9. The number of nest boxes to be installed in the offset areas relative to potential nesting hollows removed should be at a ratio of 2:1

The flora surveys presented in the EIS, and tables comparing areas of vegetation to be cleared with areas to be offset, are deficient in that they focus on vegetation type and community (eg "dry sclerophyll forest", but provide no information on the age structure of the vegetation. This information is essential to assess the areal extent and quality of potential habitat for hollow-dependent species such as the Squirrel Glider and Brush Tailed Phascogale *(Phascogale tapoatafa).*

Lack of this information in tables such as that comparing impacted habitat with habitat conserved in offset areas (Table F26) gives the misleading impression that a hectare of high tree-hollow density vegetation such as that proposed to be cleared in parts of the project area is comparable to a hectare of low tree-hollow density such as is found across much of the proposed offset areas.

The targeted management actions to mitigate impacts on the threatened Squirrel Glider include retaining and planting future hollow-bearing trees and installing & monitoring nest boxes in the interim (App4, p110). As "the interim" may be fifty years for semi mature trees already present, and a hundred years or more for new plantings, this is not a realistic proposition.

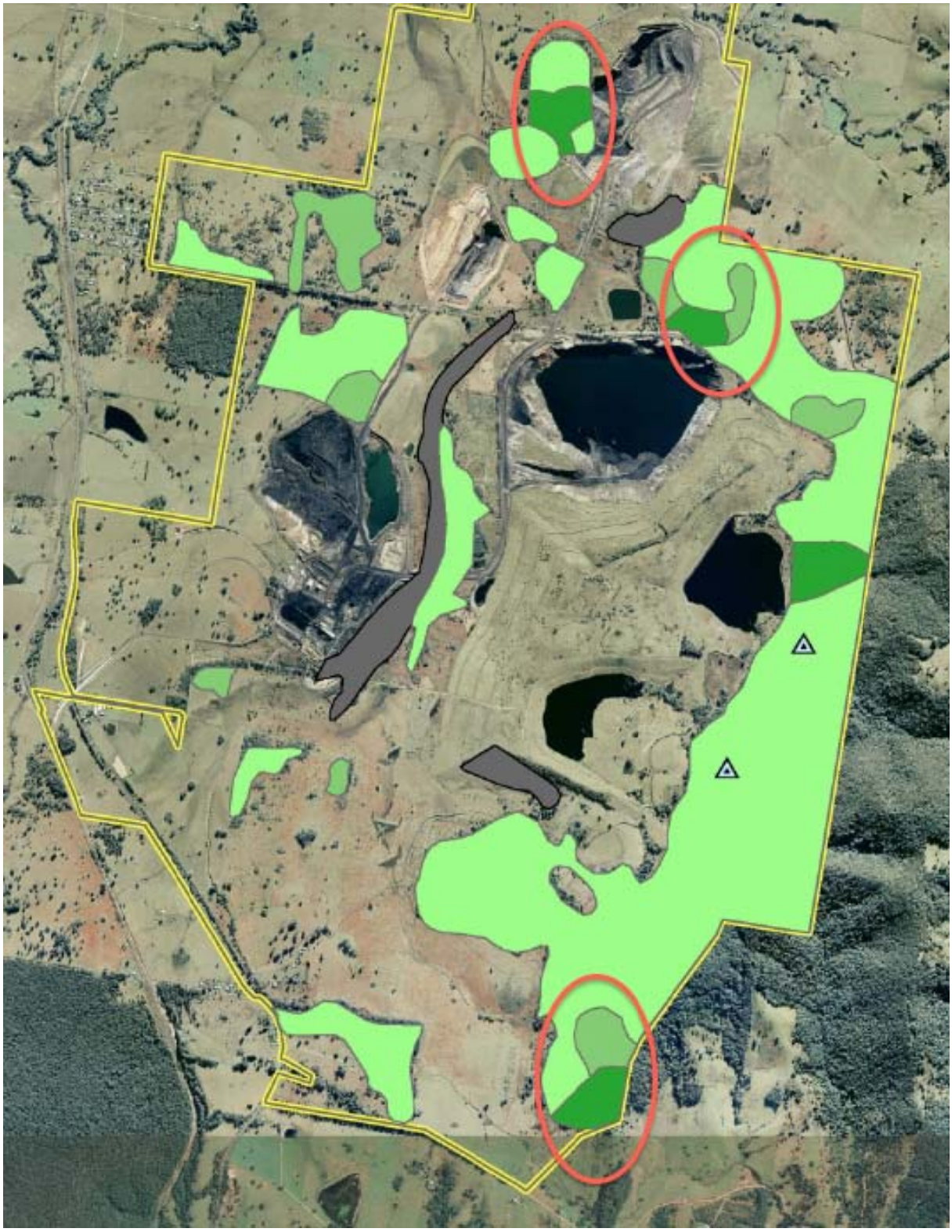
It is asserted in the EIS (App F p116) that the density of tree hollows in the proposed offset areas is at least comparable with that in the project area. This comment relies on the AMBS survey information shown in Fig 21 App F, but is contradicted by the information presented in Fig 9 App F (Ecobiological survey). For instance, AMBS map at Fig 21 shows the area of the proposed Avon North open cut to have one of the lowest densities of hollow bearing trees, while the Ecobiological map shows the same area to have one of the highest densities of tree hollows.

The work by Ecobiological (2010) provides more detailed data on of tree hollow densities in the expanded project area. (App F, Fig 9). This shows that while the majority of the forest and woodland areas in the project area have low densities of tree hollows – less than 10 per hectare – in several places densities of 10 – 20 per hectare were recorded, and in four

distinct areas the densities were found to exceed 20 per hectare. These are among the highest densities that occur in the project area and proposed offset areas.

Although the two surveys used different criteria (AMBS hollow bearing trees per 0.5 hectare, Ecobiological tree hollows per hectare), AMBS concedes that Ecobiological's estimates are "likely to be more accurate" for the project area due to their inclusion of a greater number of survey points (App F p56).

The use of AMBS' maps rather than the more accurate Ecobiological maps, to indicate the location of areas of high density of tree hollows relative to the proposed new open cut pits (Fig 21) masks the extent of the loss of tree hollows that would occur under the proposed mine plan. A comparable map using the more accurate Ecobiological survey data was not provided in the EIS, but has been compiled for this submission and is presented below (maps 6).



Map 6. Location of areas of high density of tree hollows within the project area (Source Appendix F, Fig 9).

Circled areas will be partially or completely cleared under the proposed mine plan.

On the basis of maps presented in the EIS it appears that one of the four areas found by Ecobiological to have among the highest densities of tree hollows in the project and offset areas has since been largely cleared for the Bowens Road North cut-back.

Two of the remaining areas with the highest density of tree hollows identified in the expanded project area are the forest / woodlands on the western edge of the proposed Avon North open cut and the southern end of the Stratford East open cut.

The first of these will be at least halved in size by clearing for development of the Avon North pit, and the remainder cut off from connecting wooded areas until replanting undertaken as part of the eventual site rehabilitation matures. For that extended period, it's viability as a habitat for threatened species including the Squirrel Glider and Brush-tailed Phascogale will be very limited.

It is acknowledged in Appendix F (p61) that the small size and isolation of remnants such as this will increase the risk of local species loss for fauna that utilise them, particularly species which have low mobility. The likelihood that placement of glider poles in the narrow sliver of land between the Stratford Main Pit and the Avon North open cut would provide an effective linkage to this isolated remnant would be very low, particularly if the Avon North pit were to operate 24 hours per day using night-time flood lighting.

The second of the three remaining areas of high tree hollow density will be partly cleared for the Stratford East open cut. As that area will remain as an open void at the completion of the project this will be a permanent loss.

The consultant's report on impacts on fauna concluded that while the nest box installation programme is likely to assist in the short to medium-term with the replacement of potential roost/nesting habitat for some species until existing regrowth vegetation becomes sufficiently mature to develop hollows, it is unlikely to compensate for the direct loss of large hollow-bearing trees. (App F p 93).

Suggested conditions of consent

10. The statement in the EIS that there is no intention for Yancoal mining or exploration activities to occur within the biodiversity offset areas should be strengthened in the consent conditions, with acceptance of the offsets being made conditional on the preclusion of future mining or exploration by Yancoal or any other party in the future, in the offset areas.
11. Because of potential difficulties in securing an adequate covenant over offset areas within mine lease areas, the expanded mine lease area should not extend over any part of the proposed offset areas.
12. The Avon North open cut should not extend into the forest / woodland area identified by Ecobiological as having more than 20 tree-hollows per hectare.
13. A wooded corridor at least 50m wide should be retained between the Stratford main pit and the Avon North open cut to preserve connectivity between the high-value

remnant habitat north of the Stratford main pit and the forested areas to the east. Without this, the potential existing corridor identified in the EIS (App F, Fig10) would be severed.

14. The haul road from the Avon North open cut should not cut across the link between the forest remnant west of the pit and the forest remnants to the east. It should be routed along the southern edge of the existing Bowens Road North open cut. As currently proposed, it would sever the potential existing corridor identified in the EIS.
15. The Stratford East open cut should not extend into the forest / woodland area identified by Ecobiological as having more than 20 tree-hollows per hectare.
16. Night-time mining should not be approved in the Stratford East and Avon North open cuts because of the impact on nocturnal threatened species utilising the native vegetation remnants within and adjacent to the expanded project area.
17. The number of nest boxes to be placed in offset areas to compensate for losses due to clearing or isolation of habitat should be supplemented by additional boxes to provide habitat for fauna likely to be displaced from areas adjoining the expanded mining area due to disturbance from noise, lighting and blasting for the duration of the project.
18. The draft Biodiversity Management Plan and reports on the biodiversity monitoring program should be provided to the CCC for comment before being submitted to the regulatory agency, and the biodiversity management reports should be included among the publically available environmental monitoring reports posted on the SCL website.

i) Non-Aboriginal Heritage

The social and economic value of the valley's heritage landscape

The Stroud-Gloucester Valley's heritage landscape underpins the Valley's way-of-life, its agriculture and its tourism industry. An understanding of the Valley's heritage significance, including its scenic qualities, is of the highest importance in gaining an understanding of its social/economic base.

The Gloucester Valley and Gloucester township serve as a tourism destination centre in their own right and as a base for areas further afield, including the World Heritage Barrington Tops. Tourism currently contributes $30M annually to the local economy based on overnight stays (figures per Destinations NSW, formerly Tourism NSW) but does not take into account day visitors and overseas visitors, so the total value would be in excess of this.

The Stratford Extension Project has the potential to continue to erode significance of this landscape value. The result will be that the Valley's special significance will be permanently lost and its local economy and lifestyle irreparably damaged. The damage that can be inflicted on the local economy may potentially far exceed any perceived benefits from mining expansion.

The valley's heritage landscape significance is widely recognised

Claims made in the Non-Aboriginal Assessment that the Valley's landscape significance has not been recognised or acknowledged by Gloucester Shire Council and Great Lakes Council are incorrect. Gloucester Shire Council recognised the Valley's significance in the commemorative publication *"The Vale of Gloucester"* (1953). The Vale of Gloucester was among the first cultural landscapes to be formally identified in Australia when it was listed by the National Trust of Australia (NSW) in 1975 and nominated for entry on the Register of the National Estate in 1976. This nomination was supported by Gloucester Shire Council but, for unknown reasons, the Australian Heritage Commission failed to assess the nomination and it remained as an Indicative Listing until the Register was discontinued in favour of the National Heritage List on 1 January 2004.

The Gloucester Local Environmental Plan addresses natural and scenic conservation by way of the Environmental Protection Scenic, Scientific and Wildlife Habitat Zones. Relevant among these is the Zone 7(d) Environment Protection (Scenic) zone that surrounds the Gloucester township and corresponds approximately to the area known as The Vale of Gloucester.

Great Lakes Council has similarly recognised the Valley's significance in a number of planning documents, particularly but not limited to those relevant to Stroud in the Valley's

south. The lack of entry onto the Great Lakes Local Environmental Plan may be partly due to the general lack of experience and expertise in assessing landscape areas but mainly because the Valley is divided approximately equally between the two local government bodies.

The documents listed following allow for a fuller understanding of the Valley's cultural landscape significance, but in particular they should be considered as they are referred to the National Trust listings 1975, 1981 and 2009 and The Stroud-Gloucester Valley: A Heritage Landscape Under Threat, 2009.

The documents, including the National Trust listings, are;

- the Gloucester Shire Council's commemorative publication *"The Vale of Gloucester",* Eve Keane, Gloucester Shire Council, 1953;
- the National Trust of Australia (NSW) listing 1975;
- the National Trust of Australia (NSW) revised listing 1981;
- the National Trust of Australia revised listing 2009;
- the nomination to the Register of the National Estate 1976;
- nomination to the National Heritage List 2010, 2012;
- provision of the Environment Protection (Scenic) Zone in the Gloucester LEP;
- *"The Stroud-Gloucester Valley: A Heritage Landscape Under Threat",* BGSP Alliance Inc., 2009.

Assessing the Valley's Landscape Heritage Significance

The term 'cultural heritage landscape' denotes that the landscape's essential character is that of a cultural landscape rather than a natural landscape. The term does not preclude such a landscape from also having natural significance and notes that natural significance may contribute to a cultural landscape's cultural heritage significance. The landscape significance of the Stroud-Gloucester Valley depends on its particular blend of cultural and natural elements, including buildings and sites that record the AA Company's venture, later agricultural and forestry development, remnant vegetation systems and communities, views over the largely cleared valley floor and the archaeologically significant bordering ranges.

The Stroud-Gloucester Valley should be assessed as an integral, whole landscape; it should not be viewed only as a number of items or areas within the larger landscape. Development that takes place in any part of the landscape ultimately impacts on the whole of the landscape from a scenic and heritage consideration. Without a 'whole of landscape' approach, the component vistas, buildings and historical sites that make up the whole, even if they are protected individually, will become detached items in a disjointed landscape. The significance of the landscape will therefore be lost.

The Director–General's Environmental Assessment Requirements

The Director General's Requirements for the EIS in regard to heritage and visual assessments were as follows;

Non-Aboriginal Heritage

- *a Historic heritage assessment (including archaeology) which must:*
    - *include a statement of heritage impact (including significance assessment) for any State significant or locally significant historic heritage items; and,*
    - *outline any proposed mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures);*

Visual – including:

- *a detailed assessment of the:*
    - *changing landforms on the site during the various stages of the project; and*
    - *potential visual impacts of the project on private landowners in the surrounding area as well as key vantage points in the public domain, including lighting impacts; and*
    - *a detailed description of the measures that would be implemented to minimise the visual impacts of the project;*

Addressing the Environmental Assessment Requirements Non-Aboriginal Heritage

The Director-General's Environmental Assessment Requirements are broad and inclusive rather than specific and limiting. The first requirement is that the environmental assessment must consider the impact on all items of State and local significance. The scope of the assessment is defined by the word 'all'; it is not limited by confining assessment to those items listed on the State Heritage Register, the State Heritage Inventory, the Local Environmental Plan or any other document or specific source.

The proponent's Non-Aboriginal Heritage Assessment acknowledges the breadth of this requirement by undertaking an exhaustive assessment and analysis of items in and adjacent to the project area, whether formally listed on the SHR or SHI, acknowledged by other informed sources or not previously identified in any way. However, having done that, the Non-Aboriginal Heritage Assessment then selectively argues that the Valley's landscape significance does not have to be assessed because it is not listed on any statutory planning instrument.

Addressing the Director-General's Environmental Assessment Requirements Visual

The visual assessment requirements are similarly broad. The requirement to assess 'potential visual impacts of the project on private landowners in the surrounding area as

well as key vantage points in the public domain' shows that the assessment is to be broader than only assessing the visual impact from private properties in the project area. The requirement to include views from vantage points in the public domain indicates that scenic vistas should be assessed from publicly accessible viewing points and that its impact on scenic vistas should be assessed.

Overview of the Applicant's Non-Aboriginal Heritage Assessment.

The proponent's Non-Aboriginal Heritage Assessment as described in Appendix J covers 37 pages plus a bibliography, plus a further eight pages in Attachment 1. This provides a document of 47 pages which appears to provide a detailed assessment of heritage matters that are relevant to the project area.

However, a considered review of the document reveals that the critical parts of the report that address cumulative impact, mitigation measures and conclusions cover only three pages in total. Our concerns with the assessment are as follows;

Perceived Deficiencies in the Non-Aboriginal Heritage Assessment

(The numbered headings refer to the headings used in Appendix J Non-Aboriginal Heritage Assessment)

'3. Other Heritage Studies…' (pages 14 & 15)

Pages 14 & 15 refer to various information sources and documents but restrict its critique of the documents to those documents that refer to the Valley's scenic heritage significance, which it attempts to dismiss as having no relevance. These issues are addressed further below in the review of section "9 CONCLUSIONS" but comment is made here regarding the apparent bias displayed in section 3.

National Trust Citations and The Stroud-Gloucester Valley… (page 15)

The failure to acknowledge the highly persuasive value of a heritage listing made by the National Trust of Australia appears to understate its significance. The comment (last paragraph page 15) that that neither the National Trust citation nor *"The Stroud-Gloucester Valley & The Vale of Gloucester – A Heritage Landscape Under Threat"* 'articulate in any way' the potential heritage values of the Vale of Gloucester landscape in relation to the project area is difficult to accept.

These documents refer to the Valley's scenic-heritage qualities sufficiently for the Assessment to understand the qualities in relation to the project's impact. Further, it creates an impossible burden for the Non-Aboriginal Heritage Assessment to postulate that it is the duty of these documents to envisage every possible development in every possible area, and then assess the potential impact of those future unknown developments. This is

clearly a part of the Non-Aboriginal Heritage Assessment's function and the document fails overall because of its failure to undertake that function.

'4. Heritage Survey of The Project Area' (page 16)

While considering that there are a number of errors and omissions in the survey of items, for example Stratford Public School and residence, this part of the EIS is reasonably adequate.

The deficiency is the failure to assess the role of these items in the total landscape. Had this been done, the Assessment might have then progressed to acknowledge the scenic-heritage significance of the project area within the Stroud-Gloucester Valley. The Assessment almost addresses this critical quality when, in Attachment 1 at A-5, it addressed the significance of the Craven Village, only to move on without addressing its relationship to the broader landscape and the broader landscape to the village.

'6. Assessment of the Potential Impacts of the Project on Non-Aboriginal heritage' (page 34)

The deficiency of the Assessment is epitomised by Sections 6 to 9, which address the project's impact, its cumulative impact, the development of mitigation measures and the conclusions to be drawn from the whole document, yet total just three pages out of the document's 47 pages. A number of issues arise from this but comment in this submission is confined to those matters relating to the scenic-heritage landscape significance of the project area and the valley.

Glen Road and the former Glen Road Railway (page 34)

The fifth paragraph in section 6. (page 34), notes that the realignment of the existing 132KV electricity transmission line would have the potential to impact on the remnant landforms associated with the Glen Railway. The paragraph concludes with the assertion that the Glen railway would be avoided in the design of transmission tower sites. The potential impact is not described or quantified and no details or recommendations are given as to how the impact will be avoided.

The Assessment does not address the impact on the landscape when viewed from Glen Road or that Glen Road serves as access to the Glen Nature reserve, the Craven State Forest and the Waukivory Road.

Dismissing the Need for a Landscape Assessment (page 35)

Paragraphs 10 to 13 deal with the Stroud-Gloucester Valley, including the Vale of Gloucester.

These four paragraphs contain a number of errors of fact and draw incorrect assumptions in order to dismiss landscape scenic-heritage significance. Paragraph 10 acknowledges that a landscape analysis has not been part of the Non-Aboriginal Heritage Assessment but that it is possible to indicate the likely impact of the proposal on the basis of the values identified in the trust citation'. However, no analysis of the Trust citation or the landscape values of the project area and immediate surrounds is provided.

Contradictory Comment in Section 6 (pages 34, 35)

The EIS directly contradicts the earlier statement made in section 3, page 15, that neither the original National Trust citations, the updated National Trust citation nor *"The Stroud-Gloucester Valley & The Vale of Gloucester.." articulate in detail the potential heritage values of the Vale of Gloucester landscape in relation to the project area*.

Misinterpretation of the National Trust Citation (page 35)

Page 35 (paragraph 11) makes an erroneous statement about the National Trust citation when it claims that the citation states that *'the current settlement pattern of small villages along the Bucketts Way reflects AA Company origins'*, and then goes on to denigrate the supposedly incorrect statement. The National Trust citation does NOT make such a statement. The National Trust citation notes that '*the scattered townships and villages along the route of the Bucketts Way follow the early development pattern of the Australian Agricultural Company along the Valley floor'*.

There is a clear difference in meaning between the Trust's statement and the Assessment's interpretation of it. The Trust's statement must be acknowledged as being correct because the Bucketts Way follows the original AA Company route with only minor variations. The present villages, whether of nineteenth or twentieth century origin follow the early development pattern of the AA Company.

Failure to Understand the Components of the Heritage Landscape (page 35)

The claim made at paragraph 12 seems confused in its purpose. There is no conflict of heritage significance regarding the appearance of the landscape before European settlement and its present-day appearance. Issues such as changes brought about by Aboriginal burning, the degree of clearing during the AA Company's occupation, the degree of clearing during the Company's small settlement era (c.1860-1902) and the degree of clearing since that time all contribute to the landscape's significance today. They are not matters that compete or conflict with each other in any way.

The section concludes (last paragraph page 35) with the dismissive claim that it is 'not warranted to make any further assessment of potential impacts on landscape values'. It attempts to justify this claim by noting a separate visual assessment has been presented in

Appendix O. However, that assessment is equally dismissive of assessing landscape visual significance.

'7. Assessment of the Cumulative Impact of the Project' (page 36)

The Assessment provides seven lines only in its dismissal of this critical area. It claims that *'consideration has been given to the potential cumulative impacts of the Project on Non-Aboriginal heritage values in the context of other major developments in the region'* but provides no details of how this was done.

Failure to Assess Cumulative Impact (page 36)

It concludes with the claim that in view of matters raised in Section 2 to 6 of the report, there would not be any cumulative impact. No relevant matters were raised in Sections 2 to 6 of the report and such claim is unjustified. The failure to assess cumulative impact of the Stratford Extension when combined with the other multi-faceted coal and gas project in the area remains a most serious deficiency that undermines the integrity of the document.

'8. Development of Mitigation Measures' (page 36)

This critically important section attracted barely half a page in the document. Again, the landscape was not mentioned in any way other than matters relating to Craven Village. The Assessment notes the possibility that some buildings may not be occupied for extended periods and recommends that a brief statement of intent or master plan be developed to guide maintenance of the village area. No details are provided as to how this will be implemented.

'9. Conclusions' (page 36)

The conclusion addresses only three issues; the Stratford railway, Craven Village and the cultural heritage landscape values of the Valley. Comment is directed to this last matter.

Further Dismissal of the National Trust Listings (page 37)

The Assessment in conclusion dismisses the National Trust listings (1975, 1981, 2009) because they are not statutory listings. This is illogical given that the DGR's specify that all items of State or local heritage significance should be assessed, it does not limit the requirement to items on the State Heritage Register or the State Heritage Inventory. The Assessment acknowledges this throughout by assessing items in and near the project area that are not statutorily listed but then seems to use this as reason to ignore the site's heritage landscape significance.

Secondly, the National Trust of Australia, although not a statutory listing process, is widely acknowledged as being highly authoritative and its assessments highly persuasive. Giving

due regard to that, it is difficult to understand why the Assessment readily dismisses the Trust citation.

Failure to Acknowledge Relevant Documents (page 37)

The dismissal of the document, *"The Stroud-Gloucester Valley: A heritage landscape under threat…"*, page 37, is an attempt to ignore the Valley's heritage landscape significance. Section 9 repeats the claim made in page 15 that neither the National Trust citation nor the Stroud Gloucester Valley… articulate in detail the potential heritage values of the Vale of Gloucester landscape in relation to the project area.

This is incorrect; the Stroud Gloucester Valley is a 41 page document that includes assessment under State and National criteria, some of which is directed to landscape significance. It also includes 48 photographs, 19 of which are directed solely to the Valley's landscape.

Copies of this document have been given to the Department of Planning and Infrastructure and were available to all consultants. It has been widely referred to and forms the basis of the National Trust's 2009 listing for the valley. Council considers that the failure to refer to it and give due weight to it is not acceptable in the assessment of heritage impacts.

Overview of the Applicant's Visual Assessment – Appendix O

The Visual Assessment comprises 47 pages plus tables and figures. A reasonably comprehensive assessment has been provided in considering views from selected properties but assessment of the visual impact on the area's landscape has not been made and attempts to assess or justify the cumulative impact are inadequate. This submission addresses the matters relating to assessing the visual impacts on the heritage landscape.

Relevant Assessments Excluded from Consideration

A noticeable omission of both the Visual Assessment and Non-Aboriginal Assessment is the exclusion of the work *"The Stroud-Gloucester Valley, A heritage landscape under threat"*, BGSP Alliance Inc, 2009. This document, which totals 42 pages, is the most substantial heritage assessment of the Stroud-Gloucester Valley so far undertaken.

Perceived Deficiencies in the Visual Assessment

(Numbered headings refer to the headings used in Appendix O – Visual Assessment) This submission's main concern is that, like the Non-Aboriginal Assessment, the Visual Assessment appears determined from the outset to disregard the Valley's and the site's landscape heritage significance. The following review provides further detail concerning the perceived deficiencies; the numbered headings refer to those used in Appendix O.

'2. Review of Previous Visual Assessments' (page 5)

This section provides a review of visual assessments undertaken in and near the project area as part of the environmental assessments for other existing and proposed projects in the area. The purpose of the review is not clear. Our basic concerns are that those assessments are considered as inadequate when undertaken and that there is an undue emphasis of reliance on tree plantings as a visual control.

As noted elsewhere in this submission, the Valley's landscape significance depends on substantially open views. The landscape requires proper assessment with due weight given to its total character before screening plantings can be considered as a suitable mitigating procedure.

'3. Existing Landscape and Visual Setting' (page 7)

The dot-point description of the landscape at 3.1 page 7 both commences and concludes on premises not agreed with by Council or the community. It commences by asserting that '*scenic quality, particularly in modified landscapes, can also increase as the patterning of vegetation increases'*. This statement does not apply to the valley.

Higher Viewing Points Not Considered (page 7)

The description concludes (last paragraph page 7) by claiming that the views of the Stratford Mining Complex are limited due to the topography and the presence of scattered vegetation that partially or wholly screens potential views. This needs to be quantified and expanded because there are a number of higher viewing points from which the site is very obvious - these should have been assessed. More disturbingly, it again indicates that the excessive use of tree plantings will be seen as the 'quick-fix' for the visual impact, rather than undertaking a proper visual assessment as the initial procedure. It will be a tragedy for the Gloucester Valley's scenic significance if it is to be viewed through the tunnels and walls of trees like those now evident in parts of the Hunter Valley.

Inadequate Understanding of the Valley's Landscape Character (page 10)

The brief overview of 3.3 Landscape Character Significance, page 10, provides an inadequate understanding of the Valley's landscape significance and it is difficult to understand how a satisfactory visual assessment could be developed from it, even allowing for the incorrect claim that the Non-Aboriginal Heritage Assessment has provided an assessment of visual impacts.

'4. Project Description – Visual Character' (page 12)

The Visual Assessment notes at page 12 that some aspects of the project have the potential to create 'a greater impact on the landscape character' but does not fully explain this, despite listing those works and providing detailed maps of their locations.

'5. Assessment of Potential Visual Impacts' (page 21)

Despite discussion about methodology and visual modification (page 21), the Visual Assessment does not address the project's impact on the Valley's scenic landscape qualities. The comment in 5.1.2 Visual Sensitivity (page 22) appears to be directed towards the argument that the observer adapts to the change and therefore can accept more change. This fails as an assessment technique because it fails to quantify impact and fails to identify when that impact reaches an unacceptable level.

Tree plantings Inappropriate (page 23)

Section 5.2.1 Sensitive Visual Settings, page 23, again professes that tree plantings are the 'one-size-fits-all' approach to visual impact. The Visual Assessment remains badly compromised by this approach; the impact should be assessed before deciding what the appropriate means to deal with the impact are.

Regional Setting (page 28)

Page 28, 5.3.1 Visual Impacts – Regional Settings is meaningless without quantification and further description. The question is asked, what relevance does Dungog have to the project area? - it is previously mentioned on page 8 as being in the Regional Setting. The relevance of Regional Setting within the Impact assessment needs to be explained and justified.

Visual Sensitivity (page 38)

Perhaps the statement of most concern in the EIS is at page 38 where it somehow concludes form Table 5 that '*Given the moderate level of visual modification associated with the Project coupled with the low level of visual sensitivity of users of Glen Road, a low level of potential visual impact would be expected'*. The visual assessment avoids assessing sensitive, high impact areas or giving reasonable assessment of impact.

The Assessment Fails to Assess the Visual Impact on the Valley's Landscape (page 41)

The heading 5.5 Stroud-Gloucester Valley Incorporating the Vale of Gloucester, page 41, again dismisses the landscape significance of the area without regard to undertaking an assessment. The dismissal of visual impact fails to advise the extent of the impact during the mining operation, the duration of the impact or the duration and impact of the rehabilitation process.

Cumulative Impact not Assessed (page 41)

Page 41, 5.6 Cumulative Impacts, raises some of the most serious concerns about the Visual Assessment when it fails to undertake its own assessment but relies on incomplete or inadequate previous assessments. The most salient example is the reliance placed on the Gloucester Gas Project Environmental Assessment (AECOM AUSTRALIA 2009). Under review, that assessment became the reason for much legal discussion but eventually was not pursued because merits review rights were not available. The considered opinion was that it fell well short of the required standard as a merits issue, yet is cited in the Visual Assessment with approval.

Responsibility to Assess Cumulative Impact (page 43)

It is the responsibility of the Stratford Extension Project EIS to assess cumulative impact. This most critical component of environmental assessment must be considered by the ultimate development, it cannot be assessed by using previous individual assessments.

The Assessment's conclusion, page 43, that '*based on the review of the above and the existing area of the Stroud-Gloucester valley incorporating the Vale of Gloucester (Section 3.3), no significant cumulative visual impacts are anticipated to arise from the coincident development of the Project, approved DCM and Gloucester Gas Project, proposed Rocky Hill Coal Project, or proposed Stroud to Lansdowne Project should these be approved'*. It is difficult to understand how the Visual Assessment came to this conclusion.

Tree Barriers as Visual Screening (page 44)

Section 6.2 Visual Screening, page 44, again illustrates the emphasis that will be placed on tree planting as the 'panacea for all ills'.

Overview of the Deficiencies in the Non-Aboriginal Heritage Assessment and the Visual Assessment

The Non-Aboriginal Heritage Assessment included in the EIS draws erroneous conclusions about the landscape's significance, denies the extent to which that significance has been recognised and downgrades or dismisses documents that address the landscape's significance.

The Visual Assessment similarly fails to address the landscape's significance, draws incorrect conclusions about the impacts of the project and relies on inadequate past assessments as a substitute for undertaking current assessment.

Readers are referred to the reviews of these assessments that follow further below in this submission. However, the significant deficiency is that a full and proper assessment of the Valley's landscape significance and the project's impact on the landscape has not been

undertaken in either the Non-Aboriginal Heritage or the Visual Environmental Assessments. Visual assessments from major viewing points and major access routes such as the Bucketts Way have not been undertaken, despite these being a basic and minimal component of a heritage landscape assessment. It follows that if the landscape's significance and the project's impact have not been assessed, satisfactory mitigation measures cannot be put in place.

Tree Tunnels not an Appropriate Mitigation Technique

The disturbing issue that is materialising in the Gloucester Valley by way of the Gloucester Coal and Gloucester Resources Limited projects is the reliance that is being placed on the mass planting of eucalypts along roadways, including major access routes, and to shield views from individual properties. This is the only mitigation measure addressed in the project's heritage and visual assessments; that in itself is an unsatisfactory approach but its deficiencies are compounded by the complete lack of consideration as to how such plantings can best be used.

In this regard, the tree tunnel effect that now mars much of the Hunter Valley's scenery appears set to destroy the Gloucester Valley's scenic landscape qualities by replacing the views across the valley floor and to significant geological features with tunnels of eucalypts. The impact and unsuitability of this approach can already be judged by the section of the Bucketts Way immediately north of Craven where young plantings on the eastern side of the road already obscure the view across the valley. Further north, mass plantings are already underway by Gloucester Resources Limited in the expectation that tree planting is the only mitigation measure that must be undertaken and will guarantee project approval. The cumulative impact of this 'whole of landscape quick fix' has not been undertaken and a thorough assessment is being resisted by mining projects.

It is critical to preserving the Valley's scenic heritage qualities that the practice of mass roadside tree planting be critically reviewed.

Other Mitigation Measures not Considered

The environmental assessments do not consider any other means of impact mitigation. For example, mullock heaps and coal stockpiles are already a major visual impact on the landscape and are set to worsen. This issue is addressed immediately following in the recommendations but it is critical that environmental assessments develop more suitable means of treating mullock heaps and coal stockpiles, and of mitigating their impacts.

Aboriginal Cultural Heritage Assessment

Following discussions with Norma Fisher, representative of the Mookibakh Aboriginal Traditional Owners, it was decided that this submission does not make any recommendations regarding the Aboriginal Cultural Heritage Study. However, that that

should not be interpreted as meaning that the Aboriginal Cultural Heritage Study is considered to be ideal.

Historical evidence shows that the Stroud-Gloucester Valley was a rich food source and that it supported a considerable Aboriginal population. Aboriginal land management created the open, grassy apple woodlands that Robert Dawson enthused about and were a major reason behind the Australian Agricultural Company's decision to retain the western half of the Port Stephens Estate (the Stroud-Gloucester Valley) but to exchange the eastern half for land on the New England Plains.

Although there has been a continuing Aboriginal presence in the valley, much knowledge of sacred sites, areas of spiritual importance, areas of material or 'commercial' significance and sites of conflict with the Australian Agricultural Company has been lost. Localised archaeological assessments have been undertaken in relation to coal and gas applications but there has been no comprehensive archaeological/historical assessment of the valley. As such, there is a pressing need to undertake such a study in order to provide a level of guidance to the site-specific, pro-development surveys that have been undertaken to date.

A number of concerns were noted upon reading the Aboriginal Cultural Heritage Assessment
and the two major concerns are noted here. First, the explanation on page 19 that removal of vegetation and modification of soil has reduced the potential for archaeological remains to survive is simplistic and dismissive. A better understanding of agricultural practices would have produced a different statement. First, as empirical evidence of many years will show, Aboriginal artefacts may remain undiscovered in shallow cultivation situations for many, many years. Second, some land clearing practices preserve the Aboriginal archaeological evidence. For example, land clearing by ring barking does little to disturb archaeological evidence. Subsequent burning of the stumps or modern machinery removal may still leave much evidence undisturbed, and even have value in preserving archaeological material.

Insufficient details were provided regarding the level of supervision/policing should relics be located in areas not so far identified. Without further development of this crucial requirement, the reader can only conclude that findings may be disregarded.

Other areas of error or concern were noted, although not necessarily of major concern. For example, page 19 advises that the January average daily maximum temperature is 34 degrees Celsius and the July average maximum is 0.3 degrees Celsius. These figures are inaccurate; moderately so for January but without any context at all for the July figure. The average annual rainfall is also noted as being a little deficient when compared to long term averages for the area. At this stage nothing appears to depend on these figures and mentioning them may appear unnecessary in the circumstances. However, such errors undermine the integrity of the document and undermine the reader's confidence in the document.

RECOMMENDATIONS

The overarching recommendation is that the Non-Aboriginal Heritage Assessment undertakes a full and proper assessment of the project's impact on the project site and on the valley's heritage landscape significance. Having done so, it should consider in the fullest possible manner the measures that are appropriate to mitigate the impact to an acceptable level.

It is not this submission's duty to undertake that assessment or to prescribe the procedure by which it should be undertaken, that is the proponent's duty. However, the following matters are raised to provide guidance and as being illustrative of the deficiencies in the Assessments undertaken.

Recommendations

1. The Non-Aboriginal Heritage Assessment of the landscape should be commenced by undertaking a full and proper review of all relevant documents and attaching due weight to them, rather than taking the selective and dismissive approach evidenced in the EIS.

2. A full and proper assessment of the visual impact on the landscape should be made from a representative pattern of locations in the immediate area and the broader area, but placing emphasis on those sites that offer wider views over the land, particularly where those views are representative of the Valley's heritage landscape significance. This critical assessment should take note of best overseas practices being used in Europe and the US, where features such as viewing angles, elevations, and distance diminution, visual mass of the impacting development and a much expanded range of mitigation techniques are taken into consideration. The following viewing sites are illustrative rather than exhaustive examples.

- The view to the north from Glen Road, which provides access to The Glen Nature Reserve and to Bulahdelah via Waukivory Road; will view the project's southern limits, including the Stratford East open cut and the Stratford waste rock emplacement. The waste rock emplacement will be raised by 45m to a final height of 196mAHD.
- The view from the Bucketts Way to the east, approximately 800 metres north of Craven. The view includes current mining infrastructure and although the roadside plantings are not very advanced, gives an insight into the impact that strip plantings bordering roads will eventually have on views across the valley floor.
- The broad view to the east from the Bucketts Way at Stratford, approximately 600 metres north of the railway underpass, at the entrance gate and cattle grid to the property number 3796, will view mine excavations, waste rock emplacements and infrastructure. That view can be further appreciated from the Bucketts Way by travelling along the next 400 meters to the north as the road crests a low hill.

- The broad view to the east and south from the Bucketts Way intersection with Gloucester Tops Road will reveal the cumulative impact of the Stratford Extension with the proposed Gloucester Resources Rocky Hill project (if that project is approved). Extensive views of both these projects will merge into the one continuous landscape disfigurement of mining, stockpiles, waste rock emplacements and infrastructure.

3. Extensive strip plantings of trees along the Bucketts Way and other access road will have a significant impact on the Valley's heritage landscape qualities and must not be allowed to become the standard approach to mitigating visual impact. The EIS should have identified techniques that allow the landscape vistas to be retained. This may involve placing selective screen plantings closer to the sites that need to be screened and designing plantings so that distance views and vistas are retained by way of viewing corridors and open unplanted sections. As a guide, plantings should be site specific and at some distance from access routes so that the all-obscuring wall-of-trees effect does not result.

4. Visual impacts on views from individual properties should be mitigated by more suitable placement and design, rather than relying on walls of trees. When used to mitigate the visual impact from surrounding properties, tree plantings should be on mine property rather than on the affected property.

5. Maintenance plans should be provided for all proposed tree plantings. Some existing roadside plantings in and near the area already have an untidy, neglected appearance. Maintenance plans should embrace issues such as basic care, removal of rubbish, removal of weeds, pruning and thinning and eventual removal if they are excessive or their function is no longer required. In this regard, the duration of all mitigating measures should be considered and their long term impact assessed with a view to establishing ongoing maintenance and possible partial or total removal as circumstances require.

6. The visual impact of supporting infrastructure (as opposed to mine excavations, waste rock emplacements and stockpiles) should be carefully assessed from viewing points and access routes, both close and distant. In some instances, partial visibility of the structures may be less intrusive than the 'wall of trees' effect.

7. Full consideration must be given to all aspects of the size and placement of waste rock emplacements and coal stockpiles, including the levelling and back-filling of voids to minimise their visual impact.

j) Lighting

Currently, the impact of night-time lighting on residents in proximity to the SCM complex is largely limited to that arising from the CHPP, product stockpiles and train loading facilities.

The EIS predicts that should 24-hour mining operations be approved as part of the mine expansion project, the intensity of the glow produced by night-lighting is likely to increase and there may also be an increase in night-lighting from mobile equipment and vehicle-mounted lights.

Night operations on the East Stratford waste rock emplacement would require positioning of light sources on the emplacement at much greater height than any existing light source at the SCM. This would likely lead to a significant change in the area, and the number of residences, affected by night glow and direct visibility.

Lighting for night operations on the East Stratford waste rock emplacement and for mining in the Avon North and Stratford East open cut pits would also impact movement and foraging by nocturnal fauna in the adjoining habitats, including those proposed to form part of Offset Area 3.

Mitigation Proposed in EIS

SCPL would minimise light emissions from the project by select placement, configuration and direction of lighting so as to reduce off-site nuisance effects where practicable.

Establishment of a permanent visual barrier at the western edge of the Roseville West Extension pit and use of temporary bunding on top of the Stratford waste emplacement during Year 7 of the project would also minimise direct views of light sources during night-time mining operations.

Other measures to mitigate potential impacts from night-lighting would include:

- Compliance with AS 4282: 1997 - Control of the Obtrusive Effects of Outdoor Lighting
- Restriction of night-lighting to the minimum required for operational and safety requirements.

The only mitigation measure specified in relation to minimising impacts on fauna is the use of unidirectional lighting fixtures.

Adequacy of Proposed Mitigation

The Director General's Requirements stipulate that the EIS must provide a detailed assessment of the potential visual impacts of the project on private landowners in the surrounding area as well as key vantage points in the public domain, including lighting impacts.

The assessment of potential lighting impacts is very limited, and insufficient for potentially affected landowners to judge the likely impact on their property. No mapping of the area that would be impacted by light from night operations has been provided.

The DGRs also stipulate that a detailed description of measures to minimise the visual impacts of the project, however the description of measures that would be taken to minimise the lighting impacts is very cursory. Combined with the limited description of potential impacts, the descriptions of the proposed mitigation measures are not adequate for potentially affected landowners to judge their likely effectiveness.

Suggested conditions of consent

1. Prior to consideration of the development proposal, the proponent should be required to provide detailed information on the potential lighting impact of the project, including mapping of the area that would be impacted by light from night operations.
2. To minimise the effect of direct and indirect light nuisance on properties in proximity to the project area and adverse impacts on nocturnal fauna in adjacent habitats, the conditions of consent should preclude night-time mining operations.

6. Rehabilitation

The Rehabilitation Strategy describes site activities and the progress toward environmental and rehabilitation outcomes. Yancoal has reviewed its existing Stratford mine closure and rehabilitation objectives, rehabilitation practices and biodiversity offsets.

It is anticipated that a Rehabilitation Management Plan would be required and that rehabilitation and revegetation monitoring would be conducted.

Yancoal proposed to develop a Final Void and Mine Closure Plan, which would include the mine closure strategy. The mine closure strategy would be developed in consultation with GSC, GLC, DP &I and the local community.

Identification of Concern/Problem/Issues

The rehabilitation outcomes are not adequately addressed.

A Rehabilitation Management Plan has not been completed. A Rehabilitation Plan cannot be assessed if there is none.

How rehabilitation is to be carried out, the desired outcome and the time frame for monitoring after mine closure are not specified adequately.

A Final Void and Mine Closure Plan has not been completed. This plan is crucial to the rehabilitation strategy as rehabilitation occurs after the mine has closed, and needs to be completed prior to approval of the EIS.

The objectives of rehabilitation do not completely align with the strategies.

The Analysis of the Adequacy of any Mitigation Proposed

Mitigation measures are:

Minimisation of erosion and re-instatement of pre-mining land capability-

- Three large remaining voids in the landscape post mining will not minimise erosion onsite or re-instate pre-mining capability.
- Infrastructure to remain on site post mining must be catalogued prior to mining commencement to assess the final impact on the land capability.
- Erosion and sediment controls are to be periodically updated and reviewed. It is not stated whom would review and at what time intervals- needs to be an independent reviewer.

The generation of a final rehabilitated landform consistent with landforms in the area

- The final planned landform is not consistent with the original landform of the area- three large voids in the ground are not present in the original landscape. Further, the voids will contain contaminated water.

Provide a landform suitable for grazing, forestry and fauna habitat enhancement

- The criteria for ecosystem establishment does not address planting, monitoring and responsibility over the long term in order to restore the landscape back to its original form.
- A number of issues, such as ecosystem establishment and development are reliant on the Rehabilitation Management Plan, which has yet to be written.
- Leaving three large holes in the ground containing contaminated water does not provide a landform suitable for habitat improvement.
- "A suitable combination of pastures and/or endemic woodland/open forest" will be planted post mining. Clarification and discussion of 'suitable' needs to be addressed.

The general rehabilitation goals are to have the mine site as a whole, safe, stable and non-polluting.

- The salinity of the final void waterbodies is predicted to increase over time, and post mining, as pumping ceases, the voids will gradually fill with saline water. This is not safe or stable and has the high potential of polluting the environment.
- In the Strategic Rehabilitation Criteria section, there is no mention of the management of waste water.
- Ongoing monitoring and maintenance would occur at the rehabilitation areas, with no mention of time frame. Concern has also held in regard to any final sign off on rehabilitation. Final sign off should occur based on independent endorsement of completion of rehabilitation work in accordance with the approved plan.

Suggested conditions to address the issues

1) Employ independent reviewers of the rehabilitation process.
2) Full responsibility over time for the re-establishment and monitoring of ecological communities to their full value pre mining.
3) The Rehabilitation and /or Mine Closure Plan and Final Void plan before must be provided before any work commences on site.
4) Infrastructure remaining post mining to be catalogued and reviewed regarding impact on the environment.
5) Erosion and sediment controls to be independently monitored over time.
6) Monitor fauna in the rehabilitation area annually, rather than 3 yearly.
7) Monitor success of regeneration area for up to 20 years post mining.

Any contributions that could be appropriate as a means of offsetting the impacts relevant to the issue

8) Ongoing long term independent monitoring and responsibility of the rehabilitated site for adverse ecological effects paid for by the mining company, and communication with the community about the results.

7. POST-CONSENT ASSESSMENT, MONITORING AND CONSULTATION

Adaptive Management Approvals

Other than adjustments made in trialling processes prior to approval there have been few, if any, instances when consent conditions applying to mining operations at SCM have been tightened after project approvals were granted.

An adaptive management approach implies capacity to relax or tighten conditions on the basis of experience, but tightening generally is not an available option if it would carry costs that would change the basis on which company investment decisions were made. Adaptive environmental management cannot be employed if there is no scope to adjust subsequent actions on the basis of observations and results.

The development of adaptive management practices over the past 35 years has led to considerable improvement in mitigating environmental impacts where environmental outcomes cannot be fully determined until the project has proceeded. The Director-General's requirements for the Stratford extension specify that the adaptive management approach must be implemented in the critical areas of surface water, ground water, noise, voids and flora & fauna. The submission does not consider whether there is scope for adaptive management to be implemented in other areas of the Environmental Assessment but is concerned with some matters that arise from its implementation as specified above.

A wide review of adaptive management practices shows that its overall application has not been consistent and that it has achieved varying levels of success in avoiding, controlling or mitigating environmental impacts. In the worst cases it has amounted to no more than a trial-and-error approach that allows a project to proceed on the basis that procedures will be modified when damage occurs. In this regard the claim that implementation of adaptive management is a means of implementing the precautionary principle must be critically examined. This submission notes that there is comment both in Australia and elsewhere that adaptive management is philosophically contrary to the precautionary principle. However, the submission also notes a level of support for adaptive management in circumstances where the precautionary principle is warranted and so proceeds on that basis.

The precautionary principle states *'…where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'*. Legal interpretation to date has established that the potential damage must be serious or irreversible and there must be a level of scientific evidence to support the existence of the risk but that the evidence does not need to amount to proof by any established definition. The issue arising is that if adaptive management is to be a means of supporting the precautionary principle, a number

of prerequisites must be in place regarding the threat meeting the precautionary principle's thresholds and the certainty of the outcomes required to avoid the potential damage. This latter requirement is especially noted in the Environmental Assessment by way of the comments by Preston CJ in the *Newcastle & Hunter Valley Speleological Society Inc v Upper Hunter Shire Council and Stoneco Pty Limited* , cited in the EA at Section 6-19. It follows that the implementation of adaptive management on a trial-by-trial basis with no certainty of the requirements to be met and no provisions to cease the action if the requirements are not met is a means of negating the precautionary principle rather than of implementing it.

This submission is concerned that the environmental risks inherent in the project have not been fully identified in regard to their potential impacts and from that, risks that warrant the implementation of the precautionary principle have not been identified and defined. It follows that where the application of the precautionary principle is warranted, certainty as to outcome in those circumstances also has not been established.

Mitigation Proposed in EIS

The EIS proposes that an adaptive approach would be applied to management of impacts such as noise, blasting, acid rock management, and water management.

Adequacy of Proposed Mitigation

The proposed adaptive management approach by the proponent will be limited in application to progressively improve outcomes (if possible and economically viable) within the parameters of relevant conditions of consent.

Suggested Conditions of Consent

1. The application of an adaptive management approach should be extended to the amendment of conditions of consent where lower levels of impact could reasonably be achieved.
2. Where any uncertainty exists about the level at which constraints such as noise criteria need to be set in order to minimise adverse impact on residents or the environment, the constraints should be set conservatively. This is necessary to avoid the need for post-approval tightening of constraints that could carry costs not envisaged in earlier company decision making.

Role and Operation of the Stratford Coal Community Consultative Committee

The Stratford Coal Community Consultative Committee is operated in accordance with guidelines that apply generally to mining-related CCCs in NSW. One of the purposes of the CCC is to review the mine's complaints handling procedures and the handling and resolution of community concerns and complaints regarding mining operations, environmental management or community relations.

It is anticipated that the CCC would have an ongoing and strengthened role in relation to the expanded operations.

Concerns

The review of complaints from the community provides a valuable indication of the impacts on residents in proximity to the mining operations that potentially could be used to test the accuracy of modelled impacts, the appropriateness of regulatory criteria included in conditions of consent, and the effectiveness of remedial or mitigation measures.

However analysis of the complaints is essentially limited to case-by-case consideration, and a basic tallying of the number of complaints about noise, dust, blasting etc, and the total number of complainants. The complaints received are not systematically analysed to establish patterns in terms of factors such as location and time of day that could identify impacts not predicted by modelling or captured by existing monitoring.

Attempts to discern the source of noise nuisance are often inconclusive and at times hampered by the organisational structure of the Stratford operations - the mining operation being carried out by a contracted company, and the complaints handling process being managed by Stratford Coal employees.

The CCC's input to the planning/assessment/approval process regarding modifications to existing approvals or applications for new developments is very limited due to the scant information regarding CCC views that is included in documents, such as the current EIS, prepared for submission to planning authorities. This is illustrated by the omission from the EIS of any mention of the unanimous opposition of the CCC to the 24-hour mining operations proposed for the extension project.

Mitigation Proposed in EIS

No changes relating to the CCC are proposed in the EIS.

Suggested conditions of consent

1) The conditions of consent should require the systematic analysis of complaints to establish underlying patterns relating to factors such as location and specific mine site operations, with the outcomes of that analysis to be provided twice yearly to the CCC, and then to the relevant regulatory agency accompanied by a summary of the CCC comment on the analysis.
2) All new or modified environmental management plans, strategies and programs relating to the extension project should, when submitted for approval by regulatory agencies, be accompanied by a summary of CCC comment on the plan or strategy.
3) An annual contribution should be made by Yancoal to Gloucester Shire Council to a fund that could be drawn on to obtain expert advice that would assist community and Council

members of the CCC in their role on the Committee. Authority to approve expenditure from the fund should rest with the General Manager of GSC, acting on the advice of the Council and community members of the CCC.

4) Council representation on the proposed community consultative committee is to include two councillors and one staff member.

8. Cumulative Impact

While there are comments in each of the issue sections of this submission on cumulative impact resulting from the proposed extension of the Stratford mine, together with the other mines in the area, the general concern is that the reality of cumulative impact has not been adequately addressed in the EIS. In particular the valley wide impacts on ground and surface water, the interaction with the widespread AGL development for coal seam gas, and the socio-economic issues in the Shire.

a) Ground and Surface Water

The groundwater issues associated with the three potential mining projects (Rocky Hill, Stratford Extension, and AGL) are a major concern for the Shire and Manning Valley. As such, there needs to be a combined approach to the assessment and analysis of the ground and surface water situation and particularly, the impacts of the large groundwater extractions created by these mining proposals. This is currently not the case and none of the proponents can adequately assess cumulative impact because they are using different data and different models developed to suit their own purposes.

There are a number of anomalies in the data presented and conclusions reached between the Rocky Hill proposal and those of the other two projects. For example, the Rocky Hill EIS states (para(v)on page 4-140) that groundwater will recover to 76% of its final level in 5 years after mining stops and stabilise in 10 years. This is entirely inconsistent with the Stratford Extension EIS that says groundwater levels in the voids will not stabilise for 100-200 years (page A-51). Nor is it consistent with the modelling by AGL that suggests that groundwater systems are not connected vertically.

Section 4.6.7.3 of the Rocky Hill EIS says that water quality in the pit areas should improve post mining with reduced salinity levels. This is despite storing all saline water during mining in the Wiesmantel and Avon pits prior to filling them with overburden. The Stratford Extension EIS has water salinity levels increasing (page B-96/97) over 200years in their voids. AGL will have a major problem with the salinity of its production water and is proposing to extract the salt by Reverse Osmosis before releasing the water.

These inconsistencies are of significant concern and mean that the Stratford EIS cannot be adequately assessed for groundwater impacts in its current form.

Section 4.4.3 of the Stratford EIS has a small section on cumulative impact of groundwater. It states that the effects on groundwater drawdown are expected to be much greater when combined with the AGL project than with the Stratford mine alone. There is no comment on the cumulative impact with Rocky Hill proposed mine although the diagrams in Attachment

AD indicate that there is impact. However, the Stratford mine does not propose any mitigation other than to investigate complaints by groundwater users when they occur.

The Rocky Hill EIS predicts a reduction in groundwater flow of 25% to 66% (section 4.6.7.6) but makes no comment on the cause and significance of this or any potential mitigation measures. Again an integrated model and assessment is required to enable a proper assessment of each impact and the cumulative effect within the valley.

AGL has to undertake a major and comprehensive groundwater modelling study as part of its Concept Plan approvals 4.1 and 4.2 before it can operate any wells. As its area covers the other two mining proposals, that study could form the basis of an integrated study and assessment. Such a study should be funded by all three proponents and be undertaken by an independent steering committee.

Only in this way can the real specific and cumulative impacts on groundwater be assessed in a uniform and consistent manner. Given the potential magnitude of issues predicted in all of the project EIS documents for groundwater it is imperative that none of the three proposals should be allowed to proceed until this study is done and impacts assessed.

b) Integration with AGL CSC Project

The AGL project for coal seam gas has been given concept plan approval and approval for Stage 1 subject to a range of conditions by the NSW Government. It has yet to receive Commonwealth approval because it is still being assessed for biodiversity and conservation issues and it has not yet been through the Independent Expert Scientific Committee which will provide advice to both the NSW and Commonwealth Governments on water aspects. The Stratford Extension has not been approved through either of these processes either.
Stage 1 of the AGL project proposes 110 wells across the Valley and approximately 30 of these are located on land that is proposed for Mining Lease by the Stratford application.

As stated in Section 2.5.2 of the Stratford EIS, a Petroleum Production Lease (PPL) can only be issued to AGL if Yancoal agrees as owners of the mining lease covering the common area. The fact that an extension at Stratford can be considered without knowing if there will be a PPL over the same area appears technically unreasonable. A similar situation will occur with the Rocky Hill mine proposal that potentially affects a further 25 proposed gas wells. Therefore, it is desirable that all these three mining project are assessed jointly as there is considerable environmental interaction across the whole valley and economic interaction affecting 50% of AGL's well sites.

c) Socio-economic Aspects

As discussed in an earlier section, the socio-economic impacts of the Stratford Extension are not well analysed in the EIS for any of the aspects relating to employment, housing, local

industry, community health and welfare servicing, education or amenity value for the single project alone. In the context of cumulative impact these matters are not assessed seriously at all.

Employment is a clear example. All three proposals assume that there will be a pool of local people from which it can employ hundreds of staff; this is not the case in Gloucester where unemployment is about 2.9%. A similar situation exists with housing and accommodation. It is assumed in each project study that housing, rental or hotel/motel accommodation will be available but again this is not the real situation. Even current accommodation is limited and impacting adversely on availability and price for non-mine related employees and residents. The concept that investors will build sufficient housing for a possible 10 year demand is unrealistic. The tourism industry is suffering due to the currently high occupancy of hotels and motels by existing mine contractors and related short term mine related visitors.

A comprehensive cumulative impact study would address these issues but it has not been undertaken and needs to be required by the Department somehow, as part of the decision-making process for any of these projects.

The environmental assessment fails to assess cumulative impact on the landscape's heritage-visual significance despite claiming to have undertaken that assessment. The Non-Aboriginal Heritage Assessment provides only seven lines in its dismissal of this critical function and the Visual Assessment provides no consideration of cumulative impact at all. This is a critical deficiency that goes to the project's impact on the economy, social structure and lifestyle of the Gloucester area. The valley's ability to absorb the ever increasing impact of the expanding coal and gas projects is approaching saturation point, so that full and proper assessment of this impact is now critical.

d) Incremental Expansion of Stratford Mine

This issue relates to the incremental expansion and cumulative impacts of Yancoal's Stratford Coal Mine (SCM), Coal Handling and Preparation Plant (CHPP) and related infrastructure and transportation. According to Gloucester Coal's Annual Reports and readily available geological mapping of the Gloucester-Stroud Syncline, the coal resources that may be mined in the valley are large. Since the mine commenced in 1995, there have been a number of expansions to the project.

It is not possible to properly assess the long term impacts when this EIS only covers the latest expansion. There is certainly an expectation that part way through the development of this expansion, there will be an application for more pits to the north and south of those currently proposed. This will significantly affect our analysis of the impact on groundwater and surface water resources, community health and welfare, flora and fauna impact, and economies.

Ongoing exploration is very briefly mentioned in Section 2.3 but not adequately to inform this discussion. There is more information in company reports than in the EIS on this issue.

e) Cumulative Impact of other Coal Mines and CSG Projects

The DGR's state that cumulative aspects relating to the proposed AGL Wellfield and Rocky Hill Mine must be considered. However only the first stage of these developments are included in the assessment and there is very little information given about the AGL well locations, pumping rates and produced water quantity and quality, or the Rocky Hill Mine contributions. Indications are that the cumulative impacts on water resources are highly significant.

This section of the EIS is inadequate for accurate technical decisions to be made.

f) Long Term Management of Mine Site

It is understood that the State Government becomes responsible for the site and all its associated problems after the Mining Leases have expired and the mine decommissioned. Council is concerned with any possibility of the land ending up in council ownership, if example rate default occurs. Council expects that the State Government will underwrite long-term management of the site should a default in any conditions occurs. As such, if there are any problems, it will be taxpayers that foot the bill. We should ensure that Yancoal is not allowed to leave their ongoing liabilities behind such as the voids, overburden dumps and irrigated rehabilitated areas. This is particularly true for future water quality problems. Salinity levels in these areas are likely to be high such that they cannot be used for any beneficial use and will over time, through overflows or seepages, increase salinity levels in the Avon River and Manning Rivers. (This also applies to the Wards and Karuah Rivers for southern extensions at Stratford and the Duralie Mine).

9. Consolidated List of Proposed Conditions should Consent be Granted

1) The mine plan for the project is to be amended by;
    i. deletion of the proposed Roseville West Pit,
    ii. deletion of the proposed embankments and voids to enable the finished landscape to replicate in the pre-mining landscape, and
    iii. mining hours being contained to between 7.00 am and 10.00 pm daily
2) Funding of $100,000 is to be provided for the preparation of a strategic plan and a DCP (a Stratford Village Study) for the village of Stratford and include, among other things, the feasibility of providing reticulated water and sewer to enable further development of the village.
3) Should the Stratford Village Study establish that reticulation of water and sewer is feasible, then the cost of provision of those services is to be provided by the proponent.
4) a) Noise & Blasting Assessment to be re-presented, with comprehensive assessment of noise characteristics that will be generated by the project including presentation of C-weighted data.

    b) Yancoal to be required to provide evidence to confirm that proposed noise bunding will attenuate low frequency noise.

    c) There should be a single Noise Exceedance Zone. Residents within this zone should all be subject to the same management procedures and be entitled to receive the same mitigation measures.

5) Analysis of noise nuisance reported by neighbouring residents to be factored into the noise modeling.
6) Noise & Blasting Assessment to be independently peer reviewed at Yancoal expense by a fully independent Acoustic Consultant.
7) Blast monitoring points should be established to the north-east of the Avon North pit and to the south-east of the Stratford East pit.
8) The ground vibration criteria applied to blasting in all pits should be a PVS of 2mm/s.
9) Blast size limits in all open cuts should be limited to MIC 400kg.
10) Yancoal to be required to provide evidence to support the assertion that mitigation measures beyond those proposed, such as restricted mining hours, are neither reasonable nor feasible.
11) Yancoal to be required to provide evidence that mitigation measures will be implemented in time to enable the PSNL to be achieved from commencement of the project.
12) The XQ fleet must be deployed from project commencement at which time the older

vehicle fleet should be retired.

13) All residents to be given the right to be provided with acoustical mitigation (enhanced glazing, insulation, air conditioning etc.) and to enter into a compensation agreement with Yancoal.
14) Where intrusive noise levels exceed the PSNL by 5dBA or more, residents should be deemed to be within a Property Acquisition Zone where Yancoal must acquire the property upon the request of the owner.
15) Owners whose properties are outside the area where PSNL exceedance is predicted but nevertheless experience significant noise nuisance should be entitled to have on-site noise monitoring conducted, with the cost born by Yancoal. Should that monitoring confirm PSNL exceedance at that location, the property should be deemed to be within the Noise Exceedance Zone and the owner entitled to the additional mitigation measures available to properties in that Zone.
16) Combined noise and blast monitoring points should be established to the north-east of the Avon North pit and to the south-east of the Stratford East pit.
17) a) Consent conditions to require that a fully independent noise monitoring regime be implemented.

    b) Where noise generated by mining activity exceeds PSNL's, procedures be implemented to require the mine to be shut down until noise levels comply with consent condition requirements.
18) To provide for community input, the draft Noise Management Plan for the project to be presented to the Community Consultative Committee for comment before being submitted for approval.
19) A health audit be conducted, and funded by the proponent, of residents living within 5 km of the mine site.
20) Monitoring of PM 2.5 dust particles be carried out in the village of Stratford and at the Gloucester Public Hospital, to be independently arranged/supervised by Council and reported quarterly to the CCC. The data collected is to be made available online and in real time.
21) The Department of Health be requested to oversight an investigation of domestic rainwater tanks in the village of Stratford, which is to be funded by the proponent, to test for heavy metal and hydrocarbon pollution.
22) The proponent is to offer funding for regular replacement of water filters for residents living within 1.5 km of the mine boundary. The
23) The mine managers and contractors are to provide running sheets for the water tankers on mine haul roads to ensure dust suppression spraying is carried out in compliance with consent conditions.
24) Rail wagons transporting coal are to be covered to ensure dust suppression during transport.

25) The water Management plan shall be revised to include provisions to achieve the following;
    i. 90% of an amount of water equal to the water flowing through/or captured on, the site shall be returned to Avondale and Dog Trap Creeks.
    ii. Produced water from the mine pits must be treated to irrigation standards and returned to the local surface water system.
26) The mine plan is to be amended to ensure that the post mining landscape shall reflect the pre-mining landscape, and ensuring that potentially acid forming waste is effectively managed.
27) Independent monitoring of water quality and quantity for the life of the mine and for a specified period following mining at strategic locations including;
    1) within the mine site including outfalls from rehabilitated, partially rehabilitated and active waste emplacements
    2) all storages within the mine area
    3) any discharge points
    4) upstream and downstream from the mine site
28) Monitoring of salt in soil in all areas where irrigation is conducted
29) No approvals should be given until Yancoal provides information on the proposed strategy to manage the cumulative impacts of groundwater drawdowns of this project in conjunction with drawdowns from the CSG mining and the Rocky Hill mine.
30) Clean irrigation water at 0.5ML/ha should be provided to neighbours at 10% normal cost charged by the Office of Water to compensate for boundary impacts on surface and groundwater resources.
31) No approvals should be given until Yancoal provides information on likely future expansion to enable incremental expansion impacts to be assessed.
32) Regulated downstream releases have been effective in other areas where the natural flow regime has been altered. Artificial maintenance of the flow regime using treated water from the mine site should be considered. The condition proposed in the previous section regarding return of 90% of water volume to natural systems will address these concerns.
33) Artificial maintenance of the flow regime using treated water from the mine site should be considered.
34) The proposed diversion of Wenham Cox/Bowens Road be realigned generally in a South easterly direction from the entrance to 350 Wenham Cox Road to join Bowens Road at a point 6.9 km from the Bucketts Way junction;
35) The Bucketts Way - Wenham Cox Road junction be upgraded to provide protected turning lanes for right-hand and left-hand turn in the Bucketts Way;
36) The Bucketts Way - Bowens Road (Wood St) junction be upgraded to provide a protected right hand turn lane in the Bucketts Way;

37) The pavement be widened and obstructions removed in Wenham Cox Road to provide 2 Lane traffic in both directions for its full length;
38) Wheatley's Lane be upgraded to a 6 m two Lane Road with adequate shoulders for its full length;
39) The intersection of Wheatley's Lane and Wenham Cox Road be widened to provide adequate turning space for large vehicles;
40) Notice of proposed closures to be published one week in advance in the Gloucester Advocate and on the SCL website. A minimum of 24 hours notice of any additional closures to be advised to affected residents by phone or email.
41) As Glen Road is a through road providing tourist access to The Glen nature reserve and to Bulahdelah via Waukivory Road, A permanent sign should be placed at the Glen Rd / Waukivory Rd intersection advising that the road may be closed at a point before the Bucketts Way exit.
42) All rehabilitated pasture land in the mine area should be brought to improved pasture status within 5 years and leased to district landholders. This would assist in compensating the district productivity for sterile land in the mine and offset areas.
43) No existing pasture land should be rehabilitated for biodiversity offset. Except for the proposed re-vegetation of cleared land to re-establish linkages in the Craven Valley wildlife corridor in offset areas 3 & 4 - which is supported - only non-agricultural land should be used to offset destruction of vegetation by mine development.
44) The intended vegetation community function for rehabilitated areas should be specified. The community composition and structure that will deliver this function should also be clearly specified. The company should retain responsibility for the land until the specifications have been met.
45) While on Mine site managers must undertake rigorous pest plant and animal plan and implement this to the satisfaction of Council.
46) The proposed offset area 1 should be rejected as it is not appropriately located and is unlikely to be of enduring viability. An alternative area within the Craven Valley corridor with better linkages to other offset areas, and with a higher tree-hollow density, should be identified from the survey data prepared for the EIS.
47) Monitoring undertaken as part of the Biodiversity Management Plan must be undertaken in an adaptive management framework that provides for changes to be made in response to identified under-achievement of objectives.
48) In addition to lodging the proposed conservation bond to ensure availability of funding for implementation of the biodiversity offset strategy, Yancoal shall nominate additional areas that would be used as supplementary offsets in the event that monitoring finds that habitat restoration in initial offset areas has not achieved long-term viability and functionality of biodiversity.
49) A higher offset ratio should be required. This is necessary to compensate for the generally low densities of hollow bearing trees in the offset areas, the long time lag that will occur in the establishment of replacement habitat; uncertain utilisation rate

of artificial nest boxes; uncertainty of success of development of offset habitat; and the impacts on the proposed offset areas of houses, power transmission easements and planned coal seam gas infrastructure.

50) More areas with at least moderate tree-hollow density should be included in the offset areas.
51) Where placement of nest boxes is required as a supplementary measure, that should occur in the more mature areas of forest and woodland in the offset areas prior to any clearance in the project area.
52) The number of nest boxes to be installed in the offset areas relative to potential nesting hollows removed should be at a ratio of 2:1
53) The statement in the EIS that there is no intention for Yancoal mining or exploration activities to occur within the biodiversity offset areas should be strengthened in the consent conditions, with acceptance of the offsets being made conditional on the preclusion of future mining or exploration by Yancoal in the offset areas.
54) Because of potential difficulties in securing an adequate covenant over offset areas within mine lease areas, the expanded mine lease area should not extend over any part of the proposed offset areas.
55) The Avon North open cut shall not extend into the forest / woodland area identified by Ecobiological as having more than 20 tree-hollows per hectare.
56) A wooded corridor at least 50m wide shall be retained between the Stratford main pit and the Avon North open cut to preserve connectivity between the high-value remnant habitat north of the Stratford main pit and the forested areas to the east. Without this, the potential existing corridor identified in the EIS (App F, Fig10) would be severed.
57) The haul road from the Avon North open cut shall not cut across the link between the forest remnant west of the pit and the forest remnants to the east. It is to be routed along the southern edge of the existing Bowens Road North open cut. As currently proposed, it would sever the potential existing corridor identified in the EIS.
58) The Stratford East open cut shall not extend into the forest / woodland area identified by Ecobiological as having more than 20 tree-hollows per hectare.
59) Night-time mining is not approved in the Stratford East and Avon North open cuts because of the impact on nocturnal threatened species utilising the native vegetation remnants within and adjacent to the expanded project area.
60) The number of nest boxes to be placed in offset areas to compensate for losses due to clearing or isolation of habitat is to be supplemented by additional boxes to provide habitat for fauna likely to be displaced from areas adjoining the expanded mining area due to disturbance from noise, lighting and blasting for the duration of the project.
61) The draft Biodiversity Management Plan and reports on the biodiversity monitoring program should be provided to the CCC for comment before being submitted to the regulatory agency, and the biodiversity management reports should be included among the publically available environmental monitoring reports posted on the SCL website.
62) . The Non-Aboriginal Heritage Assessment of the landscape should be commenced by undertaking a full and proper review of all relevant documents and attaching due

weight to them, rather than taking the selective and dismissive approach evidenced in the EIS.

63) A full and proper assessment of the visual impact on the landscape should be made from a representative pattern of locations in the immediate area and the broader area, but placing emphasis on those sites that offer wider views over the land, particularly where those views are representative of the valley's heritage landscape significance. This critical assessment should take note of best overseas practices being used in Europe and the US, where features such as viewing angles, elevations, and distance diminution, visual mass of the impacting development and a much expanded range of mitigation techniques are taken into consideration. The following viewing sites are illustrative rather than exhaustive examples.

- The view to the north from Glen Road, which provides access to The Glen Nature Reserve and to Bulahdelah via Waukivory Road; will view the project's southern limits, including the Stratford East open cut and the Stratford waste rock emplacement. The waste rock emplacement will be raised by 45m to a final height of 196mAHD.
- The view from the Bucketts Way to the east, approximately 800 metres north of Craven. The view includes current mining infrastructure and although the roadside plantings are not very advanced, gives an insight into the impact that strip plantings bordering roads will eventually have on views across the valley floor.
- The broad view to the east from the Bucketts Way at Stratford, approximately 600 metres north of the railway underpass, at the entrance gate and cattle grid to the property number 3796, will view mine excavations, waste rock emplacements and infrastructure. That view can be further appreciated from the Bucketts Way by travelling along the next 400 meters to the north as the road crests a low hill.
- The broad view to the east and south from the Bucketts Way intersection with Gloucester Tops Road will reveal the cumulative impact of the Stratford Extension with the proposed Gloucester Resources Rocky Hill project (if that project is approved). Extensive views of both these projects will merge into the one continuous landscape disfigurement of mining, stockpiles, waste rock emplacements and infrastructure.

64) Extensive strip plantings of trees along the Bucketts Way and other access road will have a significant impact on the valley's heritage landscape qualities and must not be allowed to become the standard approach to mitigating visual impact. The EIS must identify techniques that allow the landscape vistas to be retained. This may involve placing selective screen plantings closer to the sites that need to be screened and designing plantings so that distance views and vistas are retained by way of viewing corridors and open unplanted sections. As a guide, plantings should be site specific

and at some distance from access routes so that the all-obscuring wall-of-trees effect does not result.

65) Visual impacts on views from individual properties should be mitigated by more suitable placement and design, rather than relying on walls of trees. When used to mitigate the visual impact from surrounding properties, tree plantings should be on mine property rather than on the affected property.
66) Maintenance plans should be provided and funded for all proposed tree plantings. Some existing roadside plantings in and near the area already have an untidy, neglected appearance. Maintenance plans should embrace issues such as basic care, removal of rubbish, removal of weeds, pruning and thinning and eventual removal if they are excessive or their function is no longer required. In this regard, the duration of all mitigating measures should be considered and their long term impact assessed with a view to establishing ongoing maintenance and possible partial or total removal as circumstances require.
67) The visual impact of supporting infrastructure (as opposed to mine excavations, waste rock emplacements and stockpiles) should be carefully assessed from viewing points and access routes, both close and distant. In some instances, partial visibility of the structures may be less intrusive than the 'wall of trees' effect.
68) Full consideration must be given to all aspects of the size and placement of waste rock emplacements and coal stockpiles, including the levelling and back-filling of voids to minimise their visual impact.
69) Prior to consideration of the development proposal, the proponent should be required to provide detailed information on the potential lighting impact of the project, including mapping of the area that would be impacted by light from night operations.
70) To minimise the effect of direct and indirect light nuisance on properties in proximity to the project area and adverse impacts on nocturnal fauna in adjacent habitats, the conditions of consent should preclude night-time mining operations.
71) Employ independent reviewers of the rehabilitation process at regular intervals.
72) Full responsibility over time for the re-establishment and monitoring of ecological communities to their full value pre mining.
73) The Rehabilitation and /or Mine Closure Plan and Final Void plan must be provided before any work commences on site.
74) Infrastructure remaining post mining to be catalogued and reviewed regarding impact on the environment.
75) Erosion and sediment controls to be independently monitored over time
76) Monitor fauna in the rehabilitation area annually, rather than 3 yearly.
77) Monitor success of regeneration area for up to 20 years post mining.
78) Ongoing long term monitoring and responsibility of the rehabilitated site for adverse ecological effects by the mining company, and then communicate with the

community about the results.

79) The conditions of consent should require the systematic analysis of complaints to establish underlying patterns relating to factors such as location and specific mine site operations, with the outcomes of that analysis to be provided twice yearly to the CCC, and then to the relevant regulatory agency accompanied by a summary of the CCC comment on the analysis.
80) Council representation on the proposed community consultative committee is to include two councillors and one staff member.
81) All new or modified environmental management plans, strategies and programs relating to the extension project should, when submitted for approval by regulatory agencies, be accompanied by a summary of Community Consultative Committee comment on the plan or strategy.
82) An annual contribution should be made by Yancoal to Gloucester Shire Council to a fund that could be drawn on to obtain expert advice that would assist community and Council members of the Community Consultative Committee in their role on the Committee. Authority to approve expenditure from the fund should rest with the General Manager of GSC, acting on the advice of the Council and community members of the Community Consultative Committee.
83) All monitoring programs to be operated by an independent contractor, managed by Council with all costs met by the proponent.
84) The application of an adaptive management approach should be extended to the amendment of conditions of consent where lower levels of impact could reasonably be achieved.
85) Where any uncertainty exists about the level at which constraints such as noise criteria need to be set in order to minimise adverse impact on residents or the environment, the constraints should be set conservatively. This is necessary to avoid the need for post-approval tightening of constraints that could carry costs not envisaged in earlier company decision making.