4.13.17 Long Term Rehabilitation Development and Performance

Submissions: SIG3, SIG6, SIG8, SIG22

It is difficult to predict how long it will take a given rehabilitation area to regenerate into a fully functioning ecosystem as this is dependent on many factors including disturbance history, proximity of nearby remnant vegetation, condition of the soil and the management regime implemented. There are few areas of mature mining rehabilitation in Australia, which means that there is little information currently available on the long-term ecological development of rehabilitated communities (Nichols 2005). Due to the inherent variability of ecological systems, the ability to predict long-term successional trends in rehabilitation is low, and it is difficult to accurately predict the composition and structure of vegetation beyond 10 years (Nichols 2005). Nevertheless, it is clear that ceasing agricultural activities and the implementation of appropriate management techniques have the potential to substantially increase biodiversity in offset sites requiring rehabilitation.

In addition to a summary of the performance of Coalpac site rehabilitation below, three further case studies from other mining operations are provided below to illustrate how an appropriate management regime can lead to direct measurable increases in the biodiversity of mine rehabilitation areas.

Coalpac Mine Rehabilitation

As discussed in Section 8.24 of the EA and discussed further in **Section 4.13.16** and **Section 4.13.27** of this RTS, Coalpac has demonstrated the capability to effectively implement and maintain rehabilitation established following open cut mining operations at Cullen Valley Mine and Invincible Colliery over the past ten years. Early tree seeding trials were undertaken at Cullen Valley Mine in 2002. Work has continued from that time with the refinement and improvement of preparation and seeding processes.

When Coalpac purchased the Cullen Valley Mine in 2008, significant effort was applied to the effective progression of rehabilitation areas from the post-mining landform through to the more mature vegetated areas now present at Cullen Valley Mine. This built upon the body of knowledge developed at Cullen Valley Mine and also transferred it across to the Invincible Colliery. These activities have included the completion significant landform preparation works, rehabilitation trials, seedling establishment and ongoing maintenance and support. These rehabilitation areas are continuing to develop towards long-term targets for soil quality and stability, biodiversity, vegetation community structure and habitat potential.

As committed to in the Section 8.24.8 of the EA, Coalpac will develop and maintain a consolidated RLMP for the Project to include the provision for the ongoing monitoring of rehabilitated lands on a regular basis. This document will assist in ensuring that rehabilitation objectives and targets continue to be met by Coalpac, building on the works completed to date, and that the development of sustainable revegetation and landform structures continues to be achieved in the long term.

Case Study: Mt Owen Coal Mine

The Mt Owen Coal Mine disturbed approximately 240 ha of the Ravensworth State Forest (RSF), which was subject to logging, cattle grazing and recreational activities in the past (Charnock, 2005). To offset these mining activities, approximately 430 ha of woodland (New Forest), located adjacent to the RSF, was conserved and rehabilitated with native vegetation (Charnock, 2005). An extensive management programme was put in place for continuous research into best practises and monitoring of fauna and flora in conjunction with the University of Newcastle's Centre for Sustainable Ecosystem Restoration (Department of Industry, Tourism and Resources, 2006).

Mt Owen sought approval for an increase to the mining footprint, resulting in an additional impact of 94 ha of woodland. A BOS was developed to compensate for these impacts. The development of the strategy followed a specific methodology, with the outcome being the identification of additional offset (376 ha) and rehabilitation (968 ha) areas, specific principles, objectives and a set of exhaustive assessment criteria (Charnock, 2005).

Surveys of the RSF, New Forest and offset area have shown a doubling of plant species previously recorded in the RSF remnants (with 70% being native), structural changes occurring in the understorey and herb layers, and development of ecological models for long term sustainability of ecosystem development (Cole, 2009). The New Forest (planted from 1995 to 1997) is in an advanced stage of development with over 80 ha containing 50,000 - 60,000 trees and upper middle storey plants surviving from an initial planting of approximately 80,000, as well as naturally regenerated vegetation. Some areas are growing well and producing viable seed; other areas will require further restoration efforts to balance nutrient availability and to manage weed competition. Some of the restoration planting areas that were more recently planted are also responding very well, with over 90% survival, and more than 2 m growth in less than 2 years (Cole, 2009). Some of these plants are already flowering and setting seed, which is a very promising sign for their long-term sustainability.

Case Study: Boggabri Coal Mine

The Boggabri Coal mining activities are located within the Leard State Forest. Boggabri Coal Mine commenced mining in 2006 and has implemented a progressive rehabilitation strategy. Early monitoring results of its rehabilitation area have identified 31 native vegetation species, 0 % over-storey, 35 % shrub and 20 % ground cover after 12 months increasing to 35 species, 10 % over-storey, 40 % shrub and 60 % ground cover after 36 months, with a reduction in exotic species from 9% after 12 months to 6% after 36 months survey (Parsons Brinckerhoff Pty Ltd, 2011).

Mining activities are planned in stages with corresponding rehabilitation efforts producing a continuous corridor link of over 3 km between various ages of rehabilitated land (Parsons Brinckerhoff Pty Ltd, 2011), ensuring the spread of genetic diversity.

It has been assessed that at a period following 10 years of cumulative disturbance, 20-30% of woody vegetation cover, including ground and shrub layers, is predicted for the local rehabilitated mine and revegetated offset sites (Parsons Brinckerhoff Pty Ltd, 2011).

Predicted growth parameters are reproduced from Parsons Brinckerhoff Pty Ltd (2011) and shown in **Table 18**. Monitoring of the offset areas and management strategies will remain for the life the Project.

Table 18
Predicted Growth Parameters for Boggabri Coal Rehabilitation

Habitat Feature	Rehabilitation Age (years)				
	5	10	15	20	30+
Canopy height (m)	4.5	9	13.5	18	>20
Canopy cover (%)	10	20	30	30	30
Understorey cover (%)	22	30	30	30	30

Source: Parsons Brinckerhoff (2011)

Case Study: Alcoa

Alcoa World Alumina Australia commenced mining in Jarrah forests in 1963, near Perth, Western Australia. It is a large scale operation that has disturbed over 13500 ha of forest to date, and has an expected life span of over 100 years. To compensate for these impacts Alcoa has developed a comprehensive rehabilitation program in collaboration with scientists within the company's environmental research group and in local universities, Kings Park and Botanic Gardens, and the Department of Conservation and Land Management (DCLM).

Alcoa restores approximately 450 ha of forest per year (Baker et al. 1995) and to date over 11,100 ha have been rehabilitated to forests by the company. During the last ten years, a key objective has been to return the plant species richness of the jarrah forest to the mined areas. A number of innovative techniques for soil handling using direct return techniques, soil cultivation, seed collection and treatment and plant propagation have resulted in plant species richness, measured at 15 months age, increasing from an average of 65% of forest control sites in 1991 to 100% in 2001 rehabilitated areas.

The 677 ha of grasslands requiring rehabilitation makes up approximately 29% of the total offset package. In grasslands areas of Yarran View, Hillcroft and parts of Hillview/Billabong it is anticipated that phased reduction of livestock and the management of weeds will be effective methods to assist the natural regeneration of native grasses and derived native grasslands in the first instance.

Assisted regeneration using a number of appropriate methods, including shrub and tree planting and direct seeding of groundcover species in the more modified areas of the offsets, will be implemented to attempt to achieve similar results to the above examples in comparable timeframes.

4.13.18 Weeds in Project Boundary and Offsets

Submissions: R6, SIG3, SIG8

A number of concerns have been raised on the occurrence and control of weeds in the Project Boundary and offsets and apparent use of non-sterile grasses in mine rehabilitation.

Sterile and non-competitive cereal cover crops are used initially in the native seed mix to help stabilise the soil to reduce erosion during the early development of site rehabilitation.

The main weed species identified in submissions and the latest annual flora and fauna monitoring report for Coalpac's existing operations by EcoBiological (2012) include:

- *Cytisus scoparius* (Scotch Broom);
- *Crataegus monogyna* (Hawthorne);
- *Holcus lanatus* (Yorkshire Fog);
- *Phalaris aquatic* (Phalaris);
- *Hypericum perforatum* (St Johns Wort);
- *Rubus fruticosus* (Blackberry); and
- *Eragrostis curvula* (African Lovegrass).

Of these, three are declared noxious weeds under the *Noxious Weeds Act 1993*, including St. John's Wort, Blackberry and African Lovegrass. Coalpac will continue to supress weed levels through their regular weed monitoring and control programs.

EcoBiological's report (EcoBiological 2012) covers the area occupied by Cullen Valley Mine and Invincible Colliery (which is within the Coalpac Consolidation Project Boundary) including existing biodiversity offsets areas, compensatory habitat areas and mine rehabilitation completed to date under existing approvals. Part of the flora and fauna monitoring report assesses weeds populations and identifies infestations that require management via an action plan. Ongoing monitoring and adaptive management, including weed management occurs that occur under existing operations will continue into the future for the Project. Implementation of weed management measures (to be outlined in the Project RLMP) will ensure these species are controlled. Ongoing weed control will also minimise the potential for such species to spread into adjacent areas.

Currently, the majority of the existing biodiversity offset areas and compensatory habitat areas are mapped by EcoBiological (2012) as medium or high condition with the proportions of native species more than 50%.

Coalpac are mindful of creating high quality mine rehabilitation that contributes to biodiversity and are committed to maintaining weed levels at target levels (see Section 4.13.16 of the EIA). The proposed offset properties will be managed in accordance with an approved BOMP and RLMP that will prescribe for the active management of weeds and feral animals to improve quality of vegetation and habitat. Weeds and feral animals will be managed and controlled using best practice techniques. An outline of the BOMP is provided within Section 8.15.5 of the EA and s.6 of the EIA.

4.13.19 Biodiversity Outcomes and Management of Rehabilitation Areas

Submissions: R6, SIG1, SIG3, SIG4, SIG6 – SIG9, SIG12, SIG18, SIG20, Petition, P813

A number of submissions expressed concern on the biodiversity outcomes of mine rehabilitation.

All forest and woodland areas to be cleared by Project mining operations will be progressively rehabilitated to forest and woodland in the long term. The goal of such rehabilitation is to re-establish cleared communities and associated habitats that will maximise the biodiversity and connectivity values within the landscape. Rehabilitation of mined land, in conjunction with the rehabilitation of the Hillcroft offset property will ultimately form a large block of habitat to provide an east-west link between Ben Bullen State Forest and Sunny Corner State Forest that currently does not exist.

To assist in determining if Project rehabilitation is providing all components of the target communities, reference sites will continue to be established and monitored under the RLMP.

Baseline data will be collected from these reference sites to guide rehabilitation works. Local native species will be used during the rehabilitation and seed collection programs will be undertaken to ensure adequate seed is collected from a suite of species to ensure species diversity is maintained. The rehabilitation reference sites will be monitored simultaneously throughout the life of the Project and fundamental aspects such as species composition and weed levels will be assessed and compared to the rehabilitation areas to determine if rehabilitation is progressing satisfactorily, or enable unsatisfactory aspects to be detected at an early stage of the Project. As part of the rehabilitation strategy for the Project, a series of reference sites will be established and included in the BMP using a quantitative methodology which will also be used to develop rehabilitation completion criteria.

Monitoring and ongoing management of the rehabilitation areas will assist in the provision of habitat values for a wide range of flora and fauna species in the long term. Although it is recognised that habitat attributes such as tree hollows take many decades (up to 100 years for large hollows) to develop, it is considered reasonable to assume that the rehabilitated areas will develop these habitat attributes in the long term.

As noted within the EIA, a detailed rehabilitation plan will be designed as part of the BMP and RLMP for the Project. For the life of the mine, Coalpac will manage the offset areas and rehabilitation areas, after which the offsets will be managed under a VCA (or similar mechanism) in the long term (see **Section 4.13.14**).

4.13.20 Rehabilitation Reference Sites

Submissions: R13, SIG3, SIG8

Some submissions raised concerns with the limited number of reference sites used to assess the performance of mine rehabilitation.

The two undisturbed references sites used in the assessment of existing Coalpac rehabilitation were discussed within EIA. The two reference sites mentioned were adequately assessed and sufficient species diversity data was collected. Additional quadrats undertaken by Cumberland Ecology, which recorded 67 plant species, were also included in the assessment (see Section 5.3 of the EIA).

To accommodate for the timelag to develop forest and woodland habitat from the initial establishment of rehabilitation, nest boxes will be installed in mine rehabilitation and retained vegetation at appropriate densities and locations for hollow dwelling fauna, such as Eastern False Pipistrelle, Eastern Freetail Bat, Greater Broad-Nosed Bat and Squirrel Glider. Rehabilitation will also aim to restore habitat for the Broad-Headed Snake.

As noted within Section 5.3.9 of the EIA, more reference sites are to be established for the Project as new vegetation communities and habitats are introduced into the rehabilitation program that have not already been included. Ongoing monitoring and adaptive management is proposed to be undertaken within the rehabilitation areas to ensure rehabilitation targets are being met.

4.13.21 Population Estimates of Threatened Plants

Submission: SIG8

One submission expressed concern on the population estimates of Clandulla Geebung located in the Project Boundary and in Project offsets. Firstly, it should be clarified that 2,032 individuals were estimated to occur in the Cullen Valley Mine Habitat Compensatory Area 5 Subpopulation and not 17,600 as stated in the submission. Approximately 17,745 individuals (occurring over 38 ha) were estimated in the Cullen Valley Mine Subpopulation, which was completely avoided by the Project mine plan upon discovery. A large survey effort was undertaken to estimate the population within the Project Boundary. A total of 288 randomly stratified 20 m x 1 m quadrats were sampled within the species area of occupancy in the Project Boundary. The population estimates for Clandulla Geebung in offsets were made using the same method implemented in the Project Boundary as explained above.

Although these areas were not surveyed as intensely as the Project Boundary, the area of occupancy, 86 ha, is tangible and provides an offset ratio of 26:1 hectares of conserved habitat to impacted habitat. In addition, approximately 46 ha occur outside the Project Disturbance Boundary in Ben Bullen State Forest. The Project will result in a net increase on the amount of habitat conserved for the species through the conservation of the Hillcroft property.

4.13.22 Monetary Contributions to OEH for Conservation

Submissions: SIG8 – SIG9

Several submissions cited concerns regarding the commitment in the EA for Coalpac to provide contributions to OEH during the life of the Project to assist in the progressive establishment of GoS2.

While OEH's submission on the EA noted Coalpac's willingness to contribute funding for the development, implementation and management of GOS2 at a rate linked to coal production, Coalpac has subsequently confirmed that enhancements to the proposed BOS and the provision of support to indirect offsets would be the Department's preferred option. These additional commitments are discussed further in **Section 4.13.2.1** and **Section 4.13.2.2**.

4.13.23 Cumulative Impacts

Submissions: SIG1, P160

Several submissions express concern on the cumulative impacts of mining in the area of the Project.

Section 4.9 of the EIA discusses mining operations in the area of the Project. This discussion relies on publically available information for other developments in the region, including Baal Bone Colliery, Ivanhoe North Colliery, Pine Dale Mine and Mount Piper Power Station. Cumulative impacts of surrounding mines on ecology are discussed in detail in the EIA as summarised below.

The surrounding developments are not seeking approval to clear large areas of vegetation. Baal Bone Colliery proposes to continue underground mining in the northern parts of Ben Bullen State Forest until 2015. Mining has now concluded in Longwalls 28-31 and these operations have not directly impacted vegetation through clearing. The Mount Piper Power Station Extension Project proposes to avoid direct impacts to remnant native vegetation by restricting construction to pre-cleared areas containing regrowth and planted gardens. Ivanhoe North Colliery resulted in the clearance of approximately 12.3 ha of relatively undisturbed native vegetation when it completed coal extraction in March 2012 (confirmed by Centennial Coal July 2012). The Yarraboldy Extension of Pine Dale Coal Mine will remove 27 ha of vegetation, 14 ha being native vegetation.

Collectively, the Project makes up a large proportion of the cumulative impacts in the region. As such, areas of the Ben Bullen State Forest will be subject to open cut, highwall and underground mining within the next two to three decades, beyond which, no further disturbance is likely to occur as a result of open cut mining. As noted in **Section 4.21.5**, the coal being mined by the Project is the last remaining significant open cut coal resource which can presently be economically mined in the Cullen Bullen area, and as such the cumulative impacts are finite and known and have been addressed in the EIA.

4.13.24 Cumulative Impacts on Ben Bullen State Forest and Gardens of Stone Stage 2 Proposal

The division of the Colong Foundation for Wilderness and BMCS GOS2 proposal (Muir 2005) for the reservation of public lands that the Project and Pine Dale Mine lay within is the Baal Bone and Long Swamp Division (BBLSD). Excluding underground mines, Pine Dale Mine's Yarraboldy Extension is the only development seeking to remove 20 ha of vegetation located in BBLSD. The cumulative impacts of Pine Dale Mine and the Project amount to 548 ha or 7% of the BBLSD.

The cumulative impacts of mining and other industrial development on the proposed GOS2 are not expected to increase dramatically. This is because the surrounding developments consist of either smaller surface impacts or subsurface (underground mine) operations (see **Section 4.21.5**).

Mitigation and compensation measures proposed by the Project including progressive rehabilitation of mined land and acquisition of large areas of conserved native vegetation.

4.13.25 Project Mine Plan Design

Several submissions requested a number of changes be made to the Project's mine plan exhibited in the EA. The following responses deal only with the ecological issues relating to each submission. A more general discussion on the Project mine plan and justification is included in **Section 4.21** of this RTS.

4.13.25.1 Avoidance of Vegetation

Significant modifications to the design of the Project reduced the need for vegetation clearance and impacts to most Box Gum Woodland vegetation in the Project Boundary have been avoided. This was largely achieved in the northern portions of the Project Boundary around the Cullen Valley and East Tyldesley mining areas.

The alignment of the MPPS conveyor has also been located adjacent to and substantially within an existing powerline infrastructure access corridor to reduce the amount of unnecessary vegetation clearing. These avoidance measures have excluded a further 186 ha of native vegetation from surface mining disturbance within the Project Boundary over the life of the mine (21 years).

The Revised BOS compensates the residual impacts from the removal of vegetation at 2.8:1 for forest and woodland and 3.6:1 offset ratio including the restoration of grasslands. In recognition of potential shortfalls, the revised BOS will include indirect offsets through monetary contributions towards active recovery actions for species outlined in **Section 4.13.2.2**.

4.13.25.2 Avoidance of Pagodas and Cliffs

Modifications to the Project mine plan have also led to a greater stand off from pagoda cliff formations and other cliff line areas. The original mine plan avoided such rock formations, and then was further modified after community engagement and consultation with OEH to provide a further setback or stand-off from the formations. The implementation of highwall mining under the rocky outcrops, and the associated set back of open cut areas from pagoda habitats will also reduce impacts on potential Brush-tailed Rock-Wallaby, Broad-Headed Snake, Large-Eared Pied Bat and Eastern Bent-Wing Bat habitat occurring within the sandstone plateaus, rocky outcrops and pagoda landscapes. Coalpac has further reduced the open cut footprint, specifically at the bases of retained rocky outcrops and pagoda habitats.

The limit of open cut operations has been set back a further 50 m from cliff lines and pagoda habitat to reduce potential impacts on cliff line dependant fauna. Additionally to this, geotechnical reviews will be undertaken within 500 m of these structures to record their condition and confirm individual management measures and monitoring criteria.

Coalpac has committed to the following in the EA:

- *"A 50 m buffer between mining operations and all pagodas or sandstone escarpments; and*
- *A 20 m buffer from any other significant rock exposure (outcrop) that does not fall into the above category."*

The Revised BOS compensates the residual impacts from the removal of vegetation at a 2.8:1 offset ratio for forest and woodland only and 3.6:1 offset ratio including the restoration of grasslands. In recognition of potential shortfalls of the revised BOS, Coalpac are committed to providing indirect offsets through monetary contributions towards active recovery actions for species associated with cliff line habitats such as the Broad-headed Snake and Brush-tailed Rock Wallaby (see **Section 4.13.2.2**).

4.13.25.3 Avoidance of Threatened Flora and Fauna Habitat

The Project mine plan has been modified to reduce impacts on Matters of National Environmental Significance including threatened flora and threatened fauna. The reduction in the disturbance footprints proposed for the Project through changes to the planning and design phase also resulted in the avoidance of the following ecological impacts:

- 630 ha of potential and known Capertee Stringybark habitat;

- 9 ha of Clandulla Geebung habitat; and
- 30 ha of Box Gum Woodland habitat.

4.13.25.4 Mitigation and Compensation Measures

In recognition of the potential ecological impacts of the Project, a substantial rehabilitation and offsetting package is proposed and will be implemented by Coalpac. All forest and woodland areas proposed to be cleared by Project mining operations will be rehabilitated to forest and woodland in the long term using local native species, redeveloping treed habitat in the locality.

The Revised BOS will result in a net gain in native vegetation and fauna habitat in the long term by adding over 2,353 ha of existing native vegetation such as swamps, shrubland and heath, forest and woodland to conservation tenure. The proportion of forest and woodland to grassland of revised BOS comprises approximately 78% forest and woodland, providing immediate habitat for impacted flora and fauna, at a 2.8:1 ratio. The Revised BOS also commits to regenerating 677 ha of grassland within the Project Boundary and offset properties back to forest and woodland giving a total of 3.6:1 offset ratio.

The 3,030 ha of forest, woodland, watercourses, swamps and grassland habitat within the Biodiversity Offset Properties will be permanently conserved, including 221 ha of Box Gum Woodland and Derived Native Grassland, 327 ha of known *Eucalyptus cannonii* habitat and 450 ha of suitable Capertee Stringybark habitat to be rehabilitated and 86 ha of Clandulla Geebung habitat. In addition, Coalpac will sponsor a number of active recovery actions for threatened species predicted to be impacted by the Project (see **Section 4.13.2.2**).

In addition to the compensatory offset measures provided by the Revised BOS, Coalpac will also rehabilitate existing areas of native grassland within both the proposed Biodiversity Offset properties and the Project Boundary to develop native forest and woodland communities.

While not considered in the calculation of the Revised BOS offset ratio of 3.6:1 for native forest and woodland, these rehabilitation activities will further enhance biodiversity outcomes in the long term through and provide mitigation of flora and fauna habitat for several species predicted to be impacted by the Project.

4.13.26 Timing of Rehabilitation Development

Submission: R3

One submission noted that the timing of rehabilitation progression presented in the EA should be represented in a condition of consent or as a Statement of Commitment for the Project.

Coalpac is committed to the progressive development of rehabilitation and landform for the Project as discussed in Section 8.24 of the EA. The staged development of rehabilitation for the Project and procedures for ongoing monitoring and management will be outlined in the RLMP for the Project, to be developed in accordance with relevant regulatory agencies.

4.13.27 Coalpac Rehabilitation Record

Submissions: SIG8

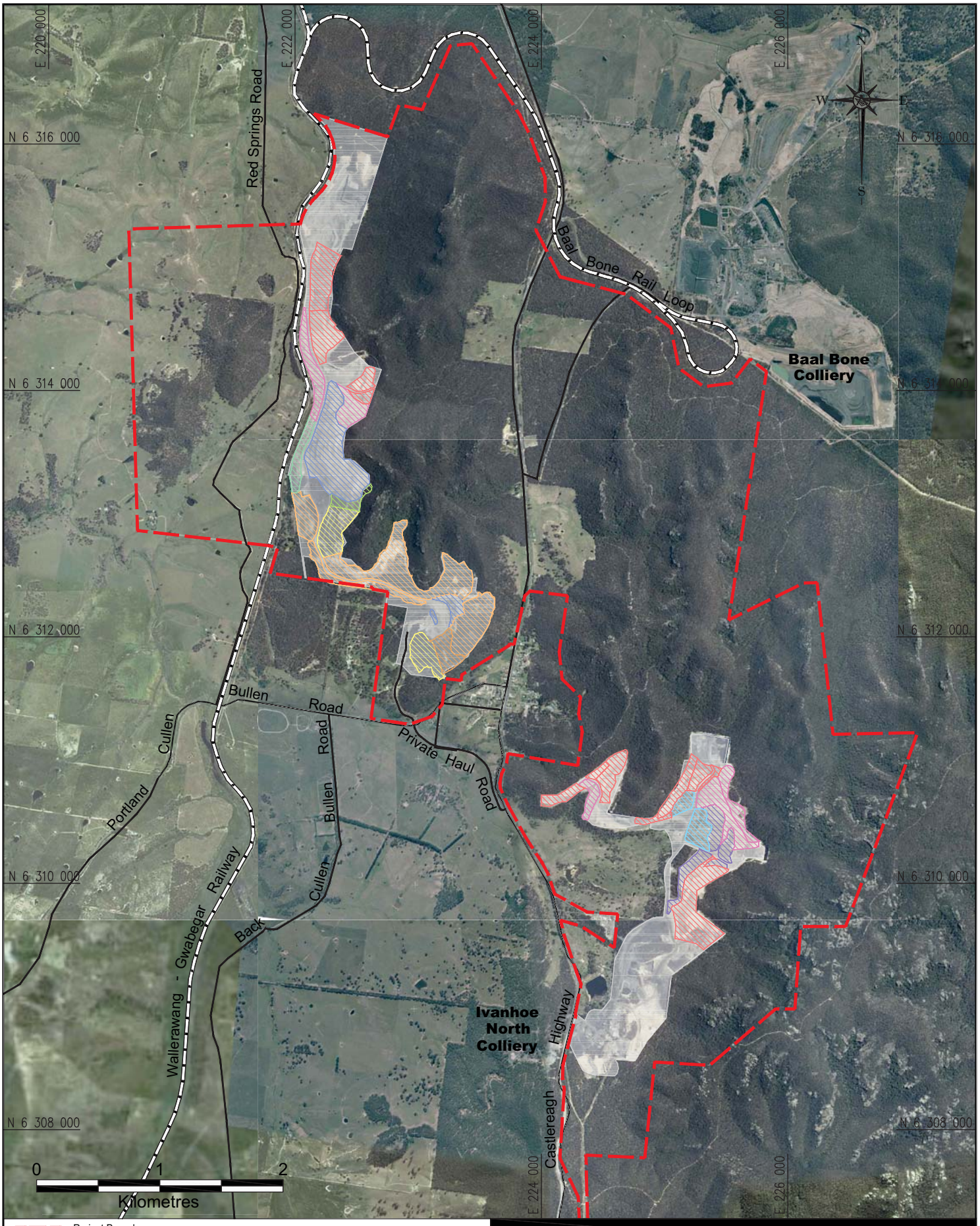
As noted within Section 8.24.1 of the EA, rehabilitation at Cullen Valley Mine and Invincible Colliery is currently undertaken in accordance with a series of approved management plans. Coalpac has a history of successfully establishing and developing rehabilitation areas for existing operations to the satisfaction of relevant government regulators.

Rehabilitation undertaken by Coalpac to date for existing operations includes significant areas (or blocks) established in 2002, 2003, 2004 (by former owners) and 2008, 2009, 2010 and 2011 (by Coalpac). There is a significant program also planned for the 2012 year. Between 2008 and 2012 inclusive, there will have been a total of 58.6 ha rehabilitated at Cullen Valley Mine and 65.8 ha rehabilitated at Invincible Colliery. The cumulative area of mine rehabilitation of the existing Cullen Valley Mine and Invincible Colliery are publically available, being presented in the AEMRs for Invincible Colliery and Cullen Valley Mine (available on the Coalpac website). Progressive rehabilitation work completed for the existing operations at Cullen Valley Mine and Invincible Colliery from 2002 is shown by calendar year on **Figure 10**.

Independent assessments of rehabilitation performance at Cullen Valley Mine and Invincible Colliery also indicated that blocks are progressing well and achieving the majority of performance and vegetation structural targets (Ecobiological 2010, 2012), including those for:

- Soil structure;
- Species diversity and density of plantings;
- Height of developing flora species and structural layers;
- Diversity of flora and fauna species present;
- Stratum proportions; and
- Native foliage cover.

Further comment on the positive development and overall quality of the existing rehabilitation areas established by Coalpac is provided in **Section 4.13.16** and **Section 4.13.17**. Photographs illustrating the quality of developing rehabilitation at Cullen Valley Mine and Invincible Colliery are shown in **Plate 16** and **Plate 17** (reproduced from the EA) and in **Plate 18** to **Plate 20**.



Project Boundary
Approved Coalpac Operations
2002 Rehabilitation
2003 Rehabilitation
2004 Rehabilitation
2005 Rehabilitation
2006 Rehabilitation
2008 Rehabilitation
2009 Rehabilitation
2010 Rehabilitation
2011 Rehabilitation
2012 Rehabilitation

Hansen Bailey

Coalpac Pty Ltd

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Existing Annual Rehabilitation 2002 - 2012

Cad File: 08614B.dwg	Date: 10.08.12	Drawn: CP	Figure 10

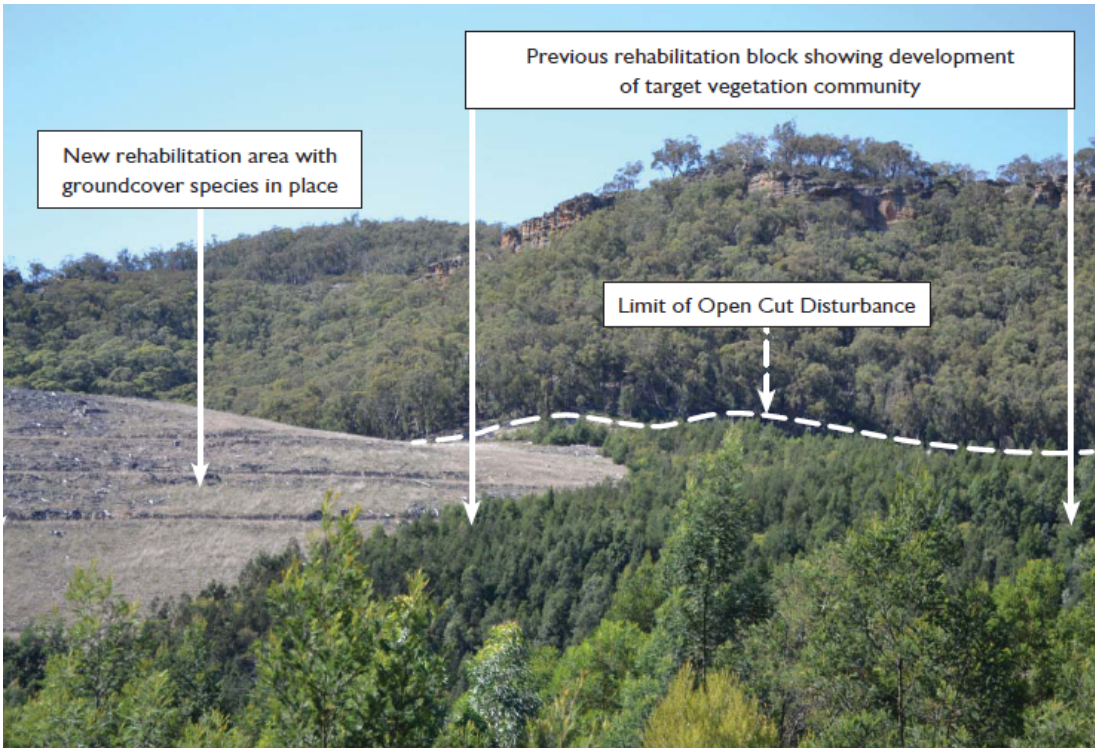


Plate 16
Rehabilitation Development at Cullen Valley Mine

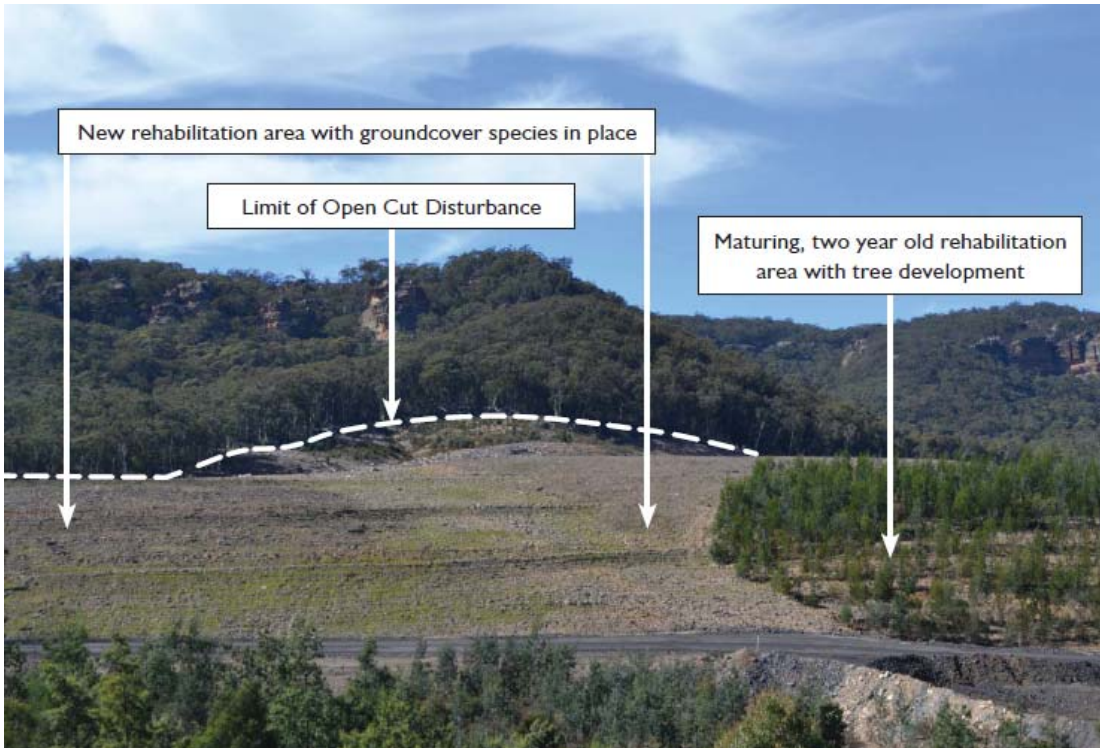


Plate 17
Rehabilitation Development at Invincible Colliery

Plate 18
Ten Year Old Rehabilitation Area at Cullen Valley Mine

Plate 19
Progressive Rehabilitation Development at Cullen Valley Mine

Plate 20
Progressive Rehabilitation Development at Invincible Colliery

The performance of existing rehabilitation areas established and managed by Coalpac provides confidence that future rehabilitation of mining areas proposed for the Project will follow suit and be of high quality providing habitat for flora and fauna.

Soil slippage issues have been minimal and any areas requiring repair have been completed in subsequent years' planned work programs.

4.13.28 Landform and Rehabilitation Development

Submission: SIG1

As noted within the EA, Coalpac will develop an internal procedure for the management of the soil resources within the Project Boundary, in consideration of a range of management and mitigation measures to be detailed in the Project RLMP. These include procedures to ensure that topsoil materials are appropriately stripped, stockpiled and handled during the development of final landform and during rehabilitation activities for the Project. As discussed in Section 8.24 of the EA, revegetation and landform shaping will be undertaken to ensure that lands within the Project Boundary remain generally consistent with the surrounding landscape post-mining and that ecological linkages are enhanced on a local and regional scale.

The lands disturbed by open cut mining operations proposed for the Project will be rehabilitated to forest and woodland in the long term and will be managed for biodiversity to ensure their ongoing viability.

4.13.28.1 Consistency with Surrounding Land Uses

Submission: SIG1

One submission referred to a comment in the Project PEA regarding the predominant land use within the Project Boundary and the assumption that the lands within the Ben Bullen State Forest are already compromised with mining activities.

The comment referred to in the above submission was a general statement that the Project operations as proposed are consistent with the existing land uses in the region. There was no presumption of land degradation within the Ben Bullen State Forest used as a means to justify the Project. Further, as noted above in **Section 4.13.6**, the Project mine plan has been significantly revised since that provided in the PEA for the Project.

4.13.29 Project implications on Gardens of Stone Stage 2 Proposal

Submissions: R6, SIG1 – SIG4, SIG6 – SIG14, SIG20, SIG24, Petition, P798, P877

A number of submissions express concern regarding the Project's impacts on and inconsistency with the GOS2. While Coalpac acknowledges that the Project will remove areas proposed by Muir (2005) for reservation under a GOS2 proposal (should it be gazetted), these are very small in the context of the total area proposed.

As outlined Section 4.4.2 of the EIA, the area to be mined and rehabilitated for the Project represents 6.8% of the Ben Bullen Long Swamp Division (BBLSD) and 1.3% of the total GOS2 proposal area. This is a small fraction of the areas proposed for reservation under the GOS2 proposal. The Project will not impact on the significant geological formations or remove any sandstone pagoda villages or escarpments within the Project Boundary.

The impacts and benefits the Project will have on the private GOS2 proposal is outlined within the EIA. Some submissions expressed doubts that rehabilitation will contribute to the achievement of the GOS2 proposal. As noted in **Section 4.13.16**, a number of measures will be implemented to ensure the success of Project rehabilitation and compatibility with the objectives of the GOS2 proposal in the long term. Specific measures include recording and comparing rehabilitation blocks against performance criteria and reference sites. Coalpac is committed to achieving high quality mine rehabilitation that will complement the surrounding environment in the long term and the BOS prepared for the Project will also provide additional compensation for predicted impacts.

Specifically, the proposed rehabilitation of mined areas and the Hillcroft offset property have been designed to provide important connectivity between existing areas of intact vegetation of Ben Bullen State Forest proposed for reservation within the GOS2 proposal and other large reserves that currently not connected by vegetated corridors. The rehabilitated areas with the Project Boundary and offset properties are considered to be an important contribution to the reservation of large areas of habitat in the long term.

The proposed Hillcroft offset will connect intact forest and woodland habitat conserved in Sunny Corner State Forest and Winburndale Nature Reserve to Ben Bullen State Forest and areas of the GOS2 proposal.

In addition, the Hyrock Hartley property may potentially provide an invaluable contribution to the Blue Mountains National Park in the long term, being located adjacent to this reserve.

4.13.30 General objections to a coal mine in Ben Bullen State Forest

Submissions: SIG2 – SIG4, SIG7 – SIG8, SIG14, Petition, P3, P798, P813, P838, P877

The EA has assessed the environmental, social and economic impacts that may result from the Project in accordance with the EARs granted by DP&I and all relevant Government guidelines and standards. Further, where residual impacts of the Project have been identified, Coalpac has committed to a number of management and mitigation measures in order to reduce the impacts. Based on the conclusions of the EIA, the Project will have socio-economic benefits that will far outweigh its ecological costs and will facilitate the proper management and development of the State's resources, with added benefits of improving biodiversity in the region in the medium to long term.

In addition to the socio-economic benefits discussed in **Section 4.17**, when the mitigation and Revised BOS are considered, the Project will have a significant ecological benefit in the long term for Clandulla Geebung, Capertee Stringybark, Box Gum Woodland, Broad-Headed Snake, Brush-tailed Rock Wallaby, woodland birds and micro-bats. All forest and woodland areas to be cleared by Project mining operations will be rehabilitated to high quality forest and woodland that complements the surrounding State Forest.

Additionally, the BOS covers approximately 3,030 ha of forest, woodland, watercourses, swamps and grassland habitat and will be permanently conserved for wildlife. This includes:

- 47.2 ha of shrubland and heath;
- 3.4 ha of swamp (not included in summary table as it provides habitat for non-impacted fauna and threatened ecological communities);
- 432.2 ha of intact forest, 1,869.89 ha of intact woodland; and
- 677.0 ha of grasslands to be restored back to forest and woodland.

More specifically, the Revised BOS will conserve 221 ha of EPBC Act Box Gum Grassy Woodland and Derived Native Grassland, 327 ha of known Capertee Stringybark habitat, 450 ha of suitable Capertee Stringybark habitat to be rehabilitated and 86 ha of Clandulla geebung habitat. The package will provide habitat for all species estimated to be impacted by the Project, with particular gains for woodland and blossom dependant birds.

In the long term, the 173 ha of EPBC Act listed Derived Native Grassland will be regenerated to EPBC Act listed Box Gum Grassy Woodland providing habitat for Regent Honeyeater and Swift Parrot. The ratio of EPBC Act and TSC Act listed Box Gum Woodland conserved to that cleared will exceed 12:1 for the Project, excluding areas to be rehabilitated within the Project Boundary. The Revised BOS will provide a total offset native vegetation at a ratio of 3.6:1.

As noted in **Section 4.13.25.4**, Coalpac has also committed to the rehabilitation of areas of native grassland within the Project Boundary and Revised BOS properties as a further mitigation measure for predicted impacts to vegetation and habitat. These areas have not been considered in calculations for the offset ratio for the Revised BOS.

4.13.30.1 Independent Flora Assessment

Submissions: SIG1, SIG9, Petition, P613, P844

A number of submissions requested that an independent flora assessment be carried out by DP&I prior to any approval of the Project.

Noted. A response to submissions provided in relation to the Project EIA is included in **Sections 4.13.1** to **4.13.29** above.

4.13.31 Central-West CMA Catchment Action Plan

Submissions: R10

The Central-West CMA submission noted the EA assessment of the Central-West Catchment Action Plan (CAP) (2007) for consistency, objectives and targets and that a reviewed version of the CAP was available to be considered for the Project.

A copy of the reviewed CAP has been accessed by Coalpac to ensure that the revised catchment management approach and goals will be considered for the Project, as requested by the Central-West CMA.

4.14 TRAFFIC & TRANSPORT

4.14.1 Road Infrastructure and Intersection Treatments

Submission: R8

The RMS submission provided a number of requirements for the road facilities and treatments proposed for the Project and noted that any arrangements for traffic controls should be made in compliance with relevant RMS documents, including the *Austroads Guide to Road Design* (2009), *Traffic Control at Work Sites* (RTA 2010) and *Austroads Guide to Road Safety Part 6: Road Safety Audit* (2009).

Noted. Coalpac has met with RMS on 30 April 2012 and discussed the requirements for the road traffic treatments required for the Project as proposed. These treatments are discussed further in **Section 4.14.2** to **Section 4.14.5**.

4.14.2 Existing Invincible Colliery Site Access Road

Submission: R8

RMS noted that existing concerns with the performance of the existing Invincible Colliery site access road were acknowledged in the EA and that should Coalpac assess the intersection with the Castlereagh Highway.

It is understood that the existing intersection was modified/widened to incorporate turning lanes into Invincible Colliery and Ivanhoe North Colliery (Ivanhoe North) at the time of commencement of operations at Ivanhoe North. In addition, traffic flow was changed to prevent trucks turning right onto the highway from Ivanhoe North. In lieu of making a right hand turn, trucks leaving the Ivanhoe North site are obliged to drive directly across the Castlereagh Highway into the Invincible Colliery site, negotiate the internal road network within Invincible Colliery and then make a left hand turn onto the Castlereagh Highway from the dedicated outgoing roadway access on the eastern side of the intersection.

As coal mining operations at Ivanhoe North have now ceased, coal trucks from that site no longer cross the intersection and turn onto the Castlereagh Highway via the internal road network of Invincible Colliery.

The proposed Castlereagh Highway overpass to the north of Cullen Bullen will remove coal truck traffic from the Private Haul Road entrance on the Castlereagh Highway to the Invincible Colliery site generated under the conditions of the existing Cullen Valley Mine approval (DA 200-5-2003). Until this overpass is completed (anticipated completion is by Year 2 of the Project), there will be limited truck traffic from the Cullen Valley Mine to the ICPP via the Castlereagh Highway (these trucks would make a left hand turn from the Castlereagh Highway into the Invincible Colliery site). It is anticipated that truck movements would not exceed four one way movements per hour, up to the date of completion of the Castlereagh Highway overpass.

On completion of the Castlereagh Highway overpass all coal truck traffic to MPPS following Project Year 2 will be via the Invincible Colliery site access intersection. It should be noted that the coal volumes transported on the Castlereagh Highway will not exceed the current combined approval limits, effectively then a continuation of the current combined haulage limits up to the date at which the proposed overland conveyor to MPPS is operational.

On completion of the proposed overland conveyor to MPPS, all coal to that facility will be delivered via the overland conveyor. As noted in Section 4.8.2 of the EA, trucks will no longer be used to haul product coal to MPPS via the Invincible Colliery site access intersection and the Castlereagh Highway, except in circumstances such as a significant failure of the conveyor.

In this case, truck haulage may be resumed via the Invincible Colliery site access intersection between the hours of 7:00 am and to 9:00 pm, not exceeding a frequency as currently approved. Any such haulage of product coal by road under emergency conditions would only occur with relevant prior notification being provided to relevant regulators and the local community.

All future trucks hauling coal and/or quarry products to other customers will enter the highway via the Invincible Colliery site intersection.

Accordingly, all future heavy vehicle traffic associated with the Project will use the Invincible Colliery site entrance/exit on completion of both the Castlereagh Highway and the overland conveyor. As confirmed by Centennial Coal (from correspondence dated 17 May 2012), the dedicated left and right turns from the Castlereagh Highway into the Ivanhoe North site will remain unused for coal haulage.

The Ivanhoe North intersection (upgraded by Centennial Coal) will therefore no longer be required during the Project as Ivanhoe North has concluded coal mining operations. As a potential improvement for that time period from the start of the Project to the date when the MPPS overland conveyor is operating, the existing line markings could potentially be changed to improve the overall safety of the intersection. Coalpac is committed to reviewing this in consultation with RMS and a meeting has been agreed to occur mid-August to discuss the potential for revision of the Invincible Colliery site access intersection. A conceptual layout of the revised intersection for this intersection is shown in **Figure 11**.

4.14.3 Red Springs Road Crossing

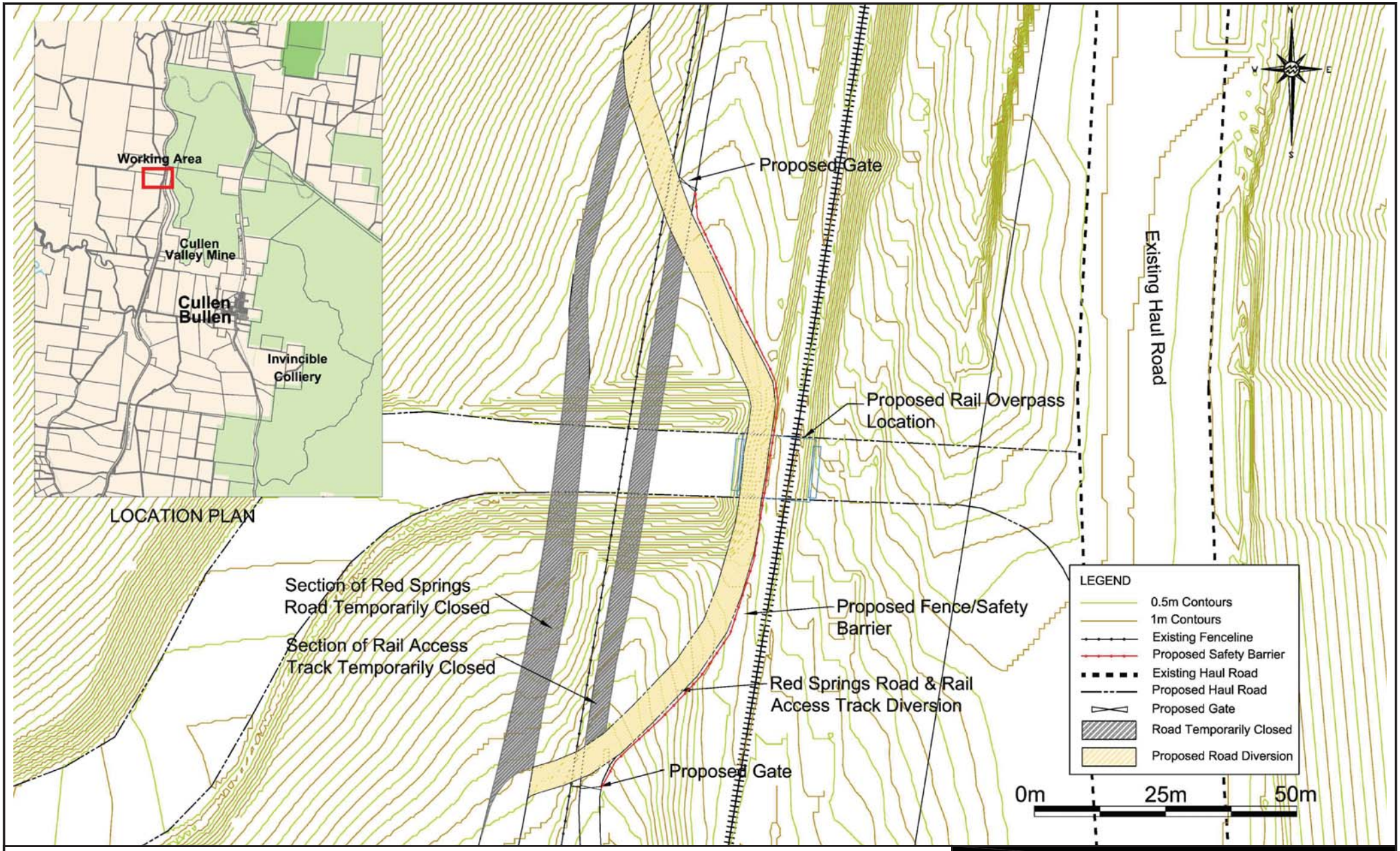
Submission: R3, R8, R14, P813

LCC noted the requirement for the haul road crossing of Red Springs Road to allow access to the Hillcroft mining area as described in the EA and outlined the options discussed to date.

Coalpac will continue discussions with LCC, RMS, the relevant landholder (and CRIA if required) to formalise an agreement around any works on Red Springs Road to allow access to the Hillcroft mining area. Options explored for the Red Springs Road Crossing included:

1. The final proposed option, being: Diversion across the existing rail access track and under the required proposed rail overpass location. This will provide access from the existing Cullen Valley Mine haul road on the eastern side of the railway line to the western Hillcroft mining area. The proposed diversion will incorporate gates at the two locations where the diversion crosses the Rail Access Track. The layout of this proposed option is shown in **Figure 12**.
2. Culvert under the new east / west haul road: this option was found to be cost prohibitive; or
3. Closure of Red Springs Road for a period of up to 3 years whilst mining at Hillcroft: This was not the preferred option of the LCC (both owner and manager of the road).

Figure 11
Conceptual Design for Revised Invincible Colliery Site Access Intersection



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Coordinate System: MGA Zone 56

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Conceptual Red Springs Road Diversion

Cad File: 08535A.dwg	Date: 20.07.12	Drawn: DR	Figure 12

4.14.4 Castlereagh Highway Overpasses

Submission: R8

In their submission, RMS provided a number of requirements for the design and construction of the Castlereagh Highway overpass bridge and MPPS conveyor proposed for the Project, including the need for administration through a negotiated Works Authorisation Deed and compliance with *AS 5100 Bridge Design* (Standards Australia 2007).

A conceptual section and alignment proposed for the conveyor crossing of the Castlereagh Highway are shown in **Figure 13** and **Figure 14**, respectively. Coalpac will continue to consult with RMS to ensure that the Castlereagh Highway overpass bridge infrastructure is appropriately designed and constructed in compliance with the relevant Works Authorisation Deed (WAD) and in *AS 5100 Bridge Design*.

A conceptual design for the proposed haul road conveyor over the Castlereagh Highway is included in **Figure 15**.

Following a meeting with representatives of RMS on 30 April 2012, Coalpac has also received a detailed package of documents entitled, *WADPack, RMS Administration of Developer Works, Policy Guidelines Advice*. Email correspondence on 27 July 2012 advised that RMS legal section is finalising the draft WADs, which will be available in mid-August.

A Design Road Safety Audit, a step defined by RMS as a prerequisite to the sequential "*Design Review from Concept to Approval for Construction*" provided for by the WAD, has been undertaken for the haul road bridge and conveyor bridge. Coalpac anticipates that the Castlereagh Highway overpass will be constructed by RMS Pre-Certified Constructors and to that end research has been carried out to identify such Contractors.

Coalpac will also ensure that appropriate management measures for Castlereagh Highway traffic will be put in place during the construction of the overpass bridge and conveyor infrastructure, in consultation with RMS. Should Project Approval be granted, Coalpac will obtain the relevant approvals under Section 138 of the *Roads Act 1993* prior to the construction of the haul road bridge over the Castlereagh Highway.

4.14.5 Wallerawang – Gwabegar Railway Overpass

Submission: CRIA452-453

CRIA noted that the EA did provide detail on the location and configuration of the proposed construction and operation of a bridge and haul road across the Wallerawang – Gwabegar Rail Line. The CRIA submission also noted that new level crossings (for access roads) would need to be approved for the Project.

Noted. Detail on the proposed Wallerawang – Gwabegar Rail Crossing is included in **Figure 16** to **Figure 18**.

Coalpac has commenced consultation with CRIA on this infrastructure and will pursue the relevant agreements. A site meeting and inspection of the proposed sites of the bridge and siding were held with CRIA and John Holland Rail representatives on 12 May 2012. The issue of access road level crossings was discussed at the site meeting, and Coalpac proposed closure of the eastern rail access roadway at the location of the proposed bridge with routing of the western rail access roadway beneath the bridge. The rail parties agreed and expressed a preference for maintaining access on the western roadway at the expense of the eastern roadway.

4.14.6 Options for Rail Routes

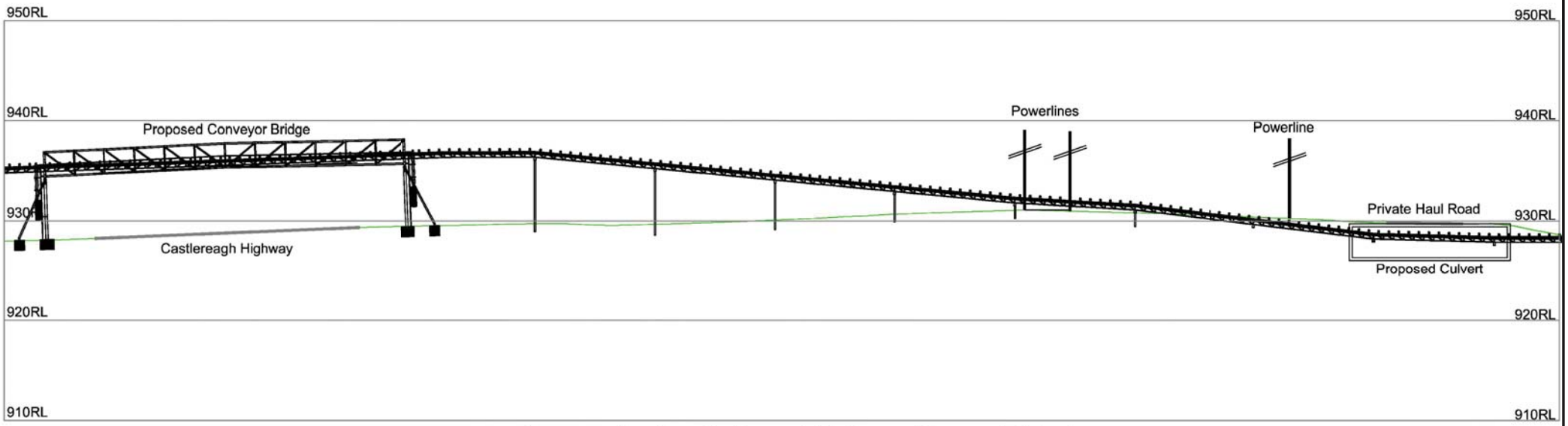
Submission: R14

This submission confirmed that the Project as proposed has the option of two rail routes, both of which use the corridor from Kandos to Wallerawang to Bowenfels. These included:

- *"The primary route, which will use RailCorp's network from Bowenfels to Port Kembla which would require RailCorp input; and*
- *The secondary route will use RailCorp's network from Bowenfels to Macarthur, and ARTC's network from Macarthur to Moss Vale and Moss Vale to Unanderra which would require ARTC input."*

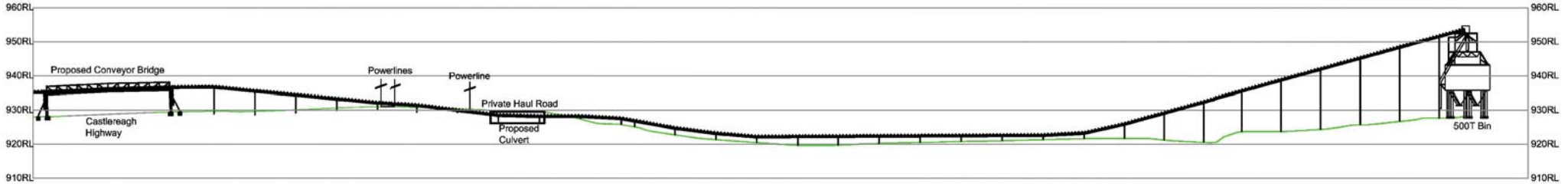
CRIA confirmed that if the construction of the Maldon – Dombarton rail line goes ahead this would provide a shorter travel path within the secondary route. CRIA owns the Maldon – Dombarton corridor, but RailCorp is the constructing authority.

Noted.



Conveyor Section: Castlereagh Highway - Proposed Culvert

0m 10m 20m



Conveyor Section: Castlereagh Highway - 500T Bin

0m 25m 50m

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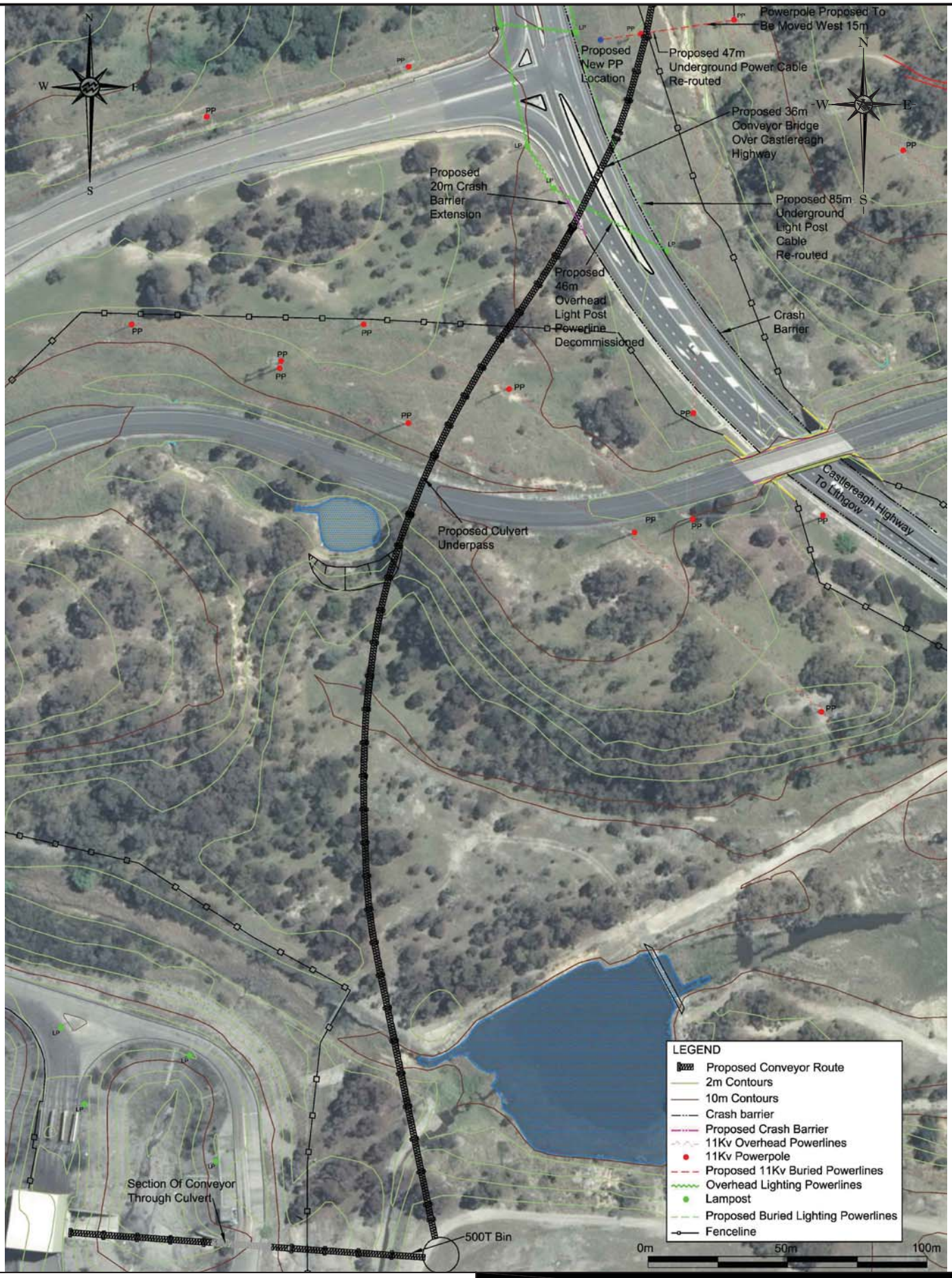
Conceptual MPPS Conveyor Section

Cad File: 08538B.dwg	Date: 31.07.12	Drawn: JD	Figure 13



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Coordinate System: MGA Zone 56

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Conceptual MPPS Conveyor Alignment

Cad File: 08536A.dwg	Date: 20.07.12	Drawn: DR	Figure 14

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Coordinate System: MGA Zone 56

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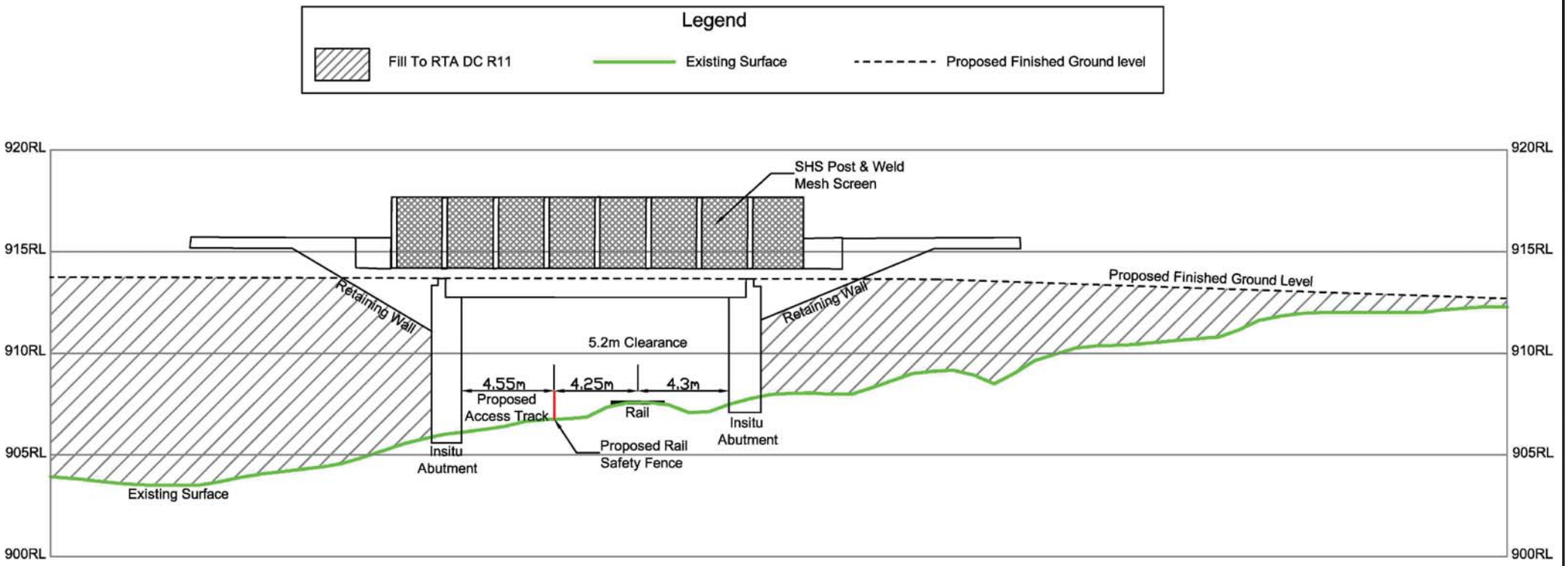
Conceptual Castlereagh Highway Overpass Location

Cad File: 08537A.dwg	Date: 20.07.12	Drawn: DR	Figure 15



Rail Overpass Typical Section

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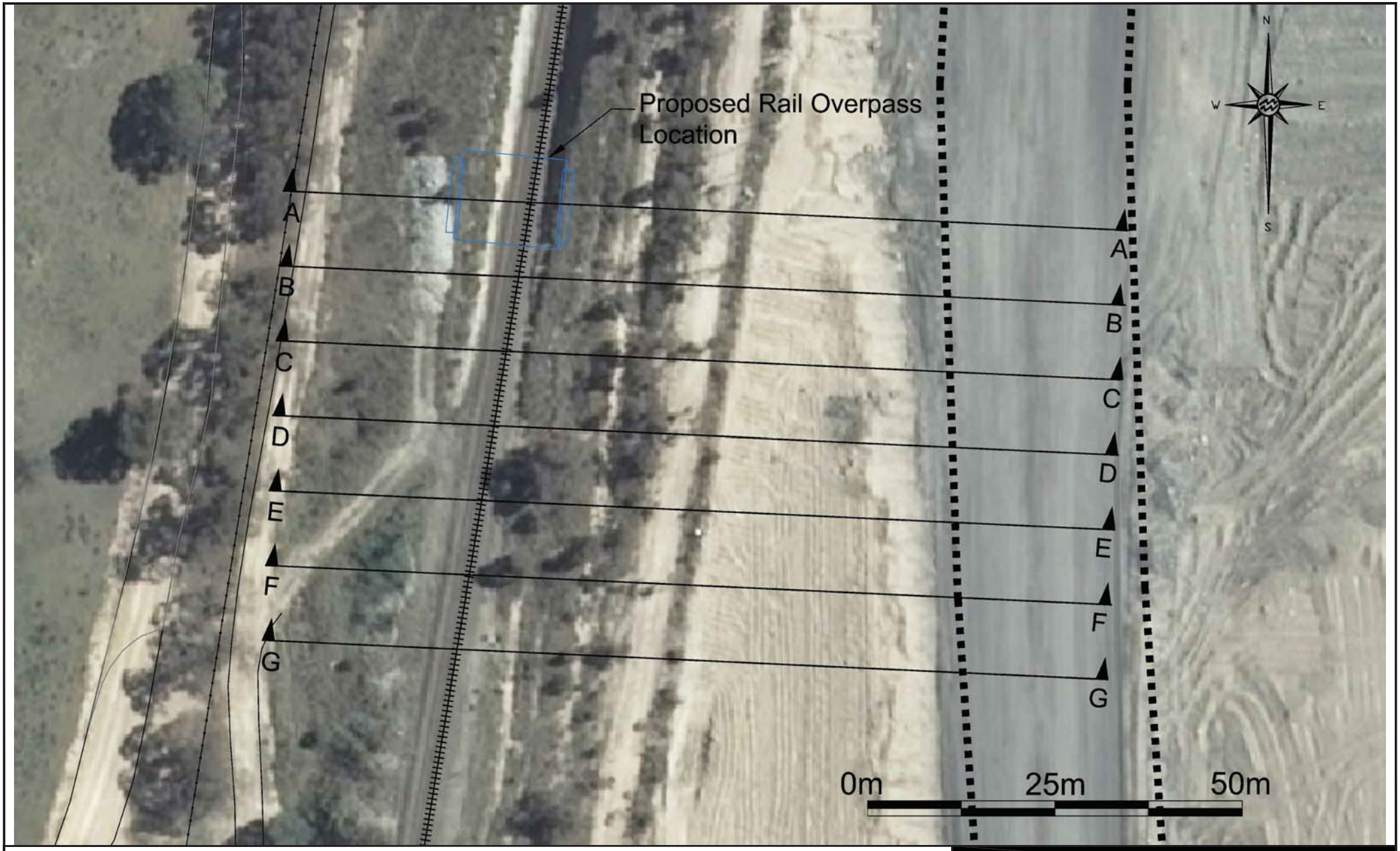
Wallerwang - Gwabegar Rail Overpass
Typical Section

Cad File: 08539B.dwg	Date: 31.07.12	Drawn: JD	Figure 16



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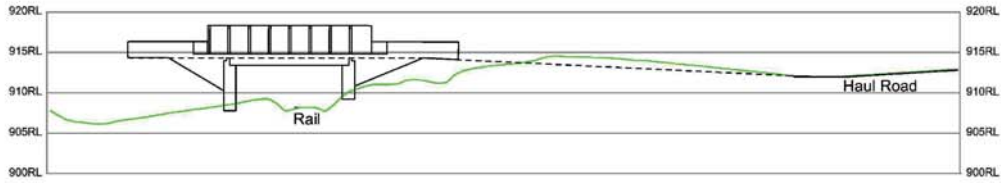
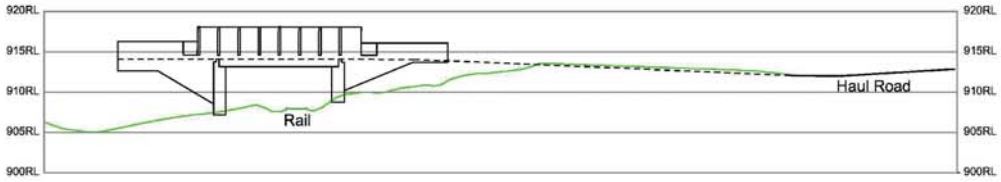
Conceptual Wallerwang - Gwabegar Rail Overpass Section Locations

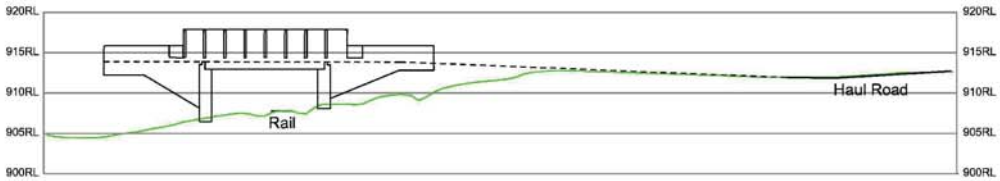
Cad File: 08541B.dwg	Date: 31.07.12	Drawn: JD	Figure 17



Section A-A



Section B-B



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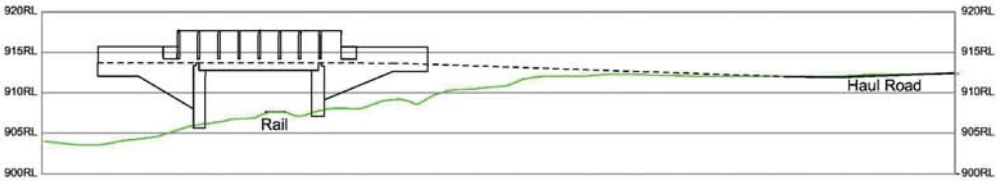
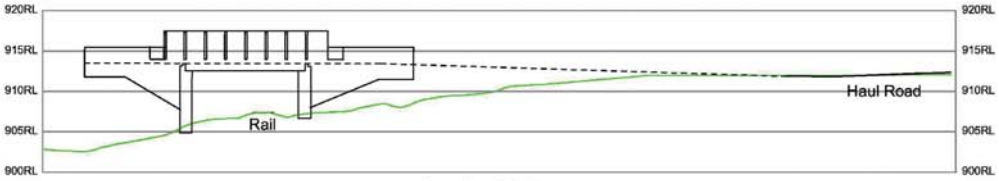
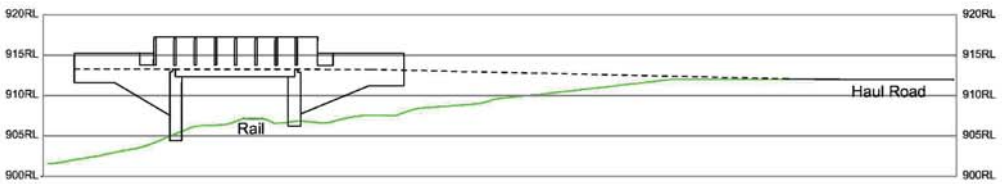


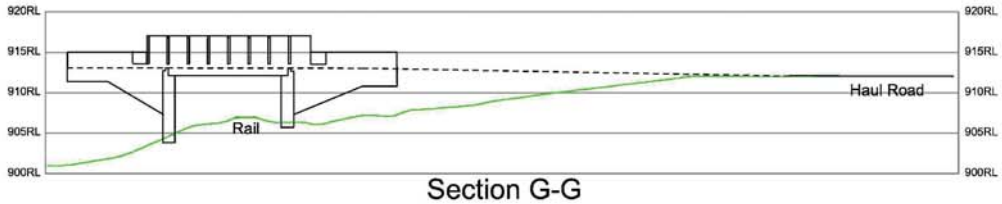
Section D-D



Section E-E



Section F-F



Section G-G

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Conceptual Wallerwang - Gwabegar Rail Overpass Sections

Cad File: 08542B.dwg	Date: 31.07.12	Drawn: JD	Figure 18

4.14.7 Haulage of Sand via the Great Western Highway

Submission: R3

LCC raised the uncertainty around the proposed upgrade of the section of the Great Western Highway proposed for sand haulage (particularly in the section between South Bowenfels and Mount Victoria) and noted the potential safety issues associated with this activity.

Section 8.16.2 of the EA includes a summary of the road safety impact study undertaken as a component of the Traffic and Transport Impact Assessment completed for the Project by Hyder Consulting (2012). This assessment considered the section of the Castlereagh Highway between Cullen Bullen and the Great Western Highway as an indicator of network wide road safety, as this would be the section of the road network which would experience the most variation in traffic movements as a result of the Project. While the road safety impact study acknowledged that road haulage trips generated by the Project would use a wider road network to reach their end destinations (including the Great Western Highway to access the Sydney region), It was considered that the portion of the trip on more distant parts of the network would constitute the general background traffic growth along those roads.

As noted in Section 8.16.3 of the EA, the road safety impact study found that there would be an increase of 0.04 crashes per year (the equivalent of one additional crash every 25 years) which is not considered a significant increase above background levels, particularly given the reduction in heavy vehicle movements for the Project and that the Boulder Road intersection will not be used by Project traffic after the MPPS conveyor is constructed. Road safety risks will be further reduced by the construction of the Castlereagh Highway overpass bridge and the overland conveyor link to MPPS.

Further, as noted in Section 8.16.4 of the EA, Coalpac is committed to developing a Traffic and Transport Management Plan for the Project, should it be approved. This plan will include the consideration of construction and operational traffic impacts predicted for the Project, measures to promote driver safety and a procedure for incident management.

4.14.8 Haulage of Sand via the Cullen Valley Private Haul Road

Submission: R3

In their review of the EA, LCC identified that sand haulage trucks would travel along the internal haul road to bypass Cullen Bullen and access the Castlereagh Highway at the existing Invincible Colliery site access intersection.

The above assumption is correct. The haulage of sand for the Project will not be undertaken via the Cullen Valley Private Haul Road.

4.14.9 Coal Haulage on Public Roads

Submission: SIG8, SIG22, P447, P773

Several submissions cited concerns regarding dust and road safety impacts due to the tracking of mud and dirt onto the Castlereagh Highway at the Invincible Colliery site access road. The LEG submission also requested no further mining or coal transport should be approved until the MPPS conveyor has been constructed.

As noted in Section 4.8 of the EA, Coalpac proposes to continue the transportation of coal between Cullen Valley Mine and Invincible Colliery, between Invincible Colliery and Cullen Valley Mine and in accordance with existing approvals to the MPPS until Year 2 of the Project.

After this time, the MPPS conveyor and Wallerawang – Gwabegar Rail Siding proposed for the Project will be constructed and operational, reducing the need for haulage of product coal from the site by road. The only scenario under the Project that that would require the transportation of product coal to MPPS (or Wallerawang Power Station (WPS)) by road after Year 2 would be under emergency circumstances, if supply via the conveyor was unexpectedly disrupted and operation of the power station and hence NSW power supply, threatened. In such an event, road haulage trucks would access MPPS from Invincible Colliery only via the pre-Project route to the south via the Castlereagh Highway and Boulder Road following notification to relevant regulators and the local community.

As noted in Section 8.16.4 of the EA, Coalpac will develop a Traffic and Transport Management Plan to ensure that the predicted impacts to the traffic network for the Project can be adequately managed.

4.15 WASTE

4.15.1 On-site Effluent Disposal

Submission: R3

One submission raised a potential issue around the adequacy and capacity of the existing on-site effluent management system. It was requested that a review of the existing system be undertaken to gain separate approvals required by LCC.

As noted in Section 8.20.3 of the EA, Coalpac will review and enhance their existing Waste Management System procedures and Waste Management Plan for the Project.

An audit will be undertaken by an independent specialist to identify any required upgrade to the existing sewage system to facilitate the additional workforce and operational areas proposed.

LCC will be consulted during the preparation of the audit and the revised Waste Management Plan.

4.15.2 Waste Management Plan

Submission: R6

The EPA referred to the commitment from Coalpac to develop and implement a revised Waste Management Plan for the Project, noting that the waste management controls described in the project are consistent with the current operations of the Cullen Valley Mine and the Invincible Colliery and are adequately regulated under their respective EPLs.

Noted.

4.16 SOCIAL

4.16.1 Voluntary Planning Agreement

Submission: R3

LCC noted that they have been in negotiations with Coalpac to formalise a Voluntary Planning Agreement (VPA) for the Project.

Coalpac will continue discussions with LCC to formalise the Project VPA.

4.16.2 Social Impacts to Cullen Bullen

Submissions: R3, R5, SIG1, SIG3, SIG8 – SIG9, SIG13 – SIG14, SIG18, SIG20, Petition, P3, P8, P160, P303, P414, P417, P613, P689, P725, P746, P779, P844, P846, P877

A number of submissions noted that there would be general adverse social outcomes for the town due to the Project. These included social impacts due to adverse health, visual, amenity outcomes (due to air quality, noise and blast impacts), lowered property values, reduced population with current residents leaving the area and division of the community due to the Project proposal.

Reference was also made to a petition of 251 signatures provided to Mr Paul Toole that opposed the Project. The submissions stated that 120 signatures in opposition to the Project were provided by the residents of Cullen Bullen.

This petition was gathered prior to the EA going on public exhibition and as such represented a community response to an undefined impact. Once the EA went on public display (from 10 April 2012 – 1 June 2012) a program of community engagement was undertaken to explain and quantify the extent and impacts of the Project, with a focus on the Cullen Bullen Community. In addition to distribution of the EA document, consultation included a three day Community Information Centre held in Cullen Bullen.

LCC also held a public meeting at Cullen Bullen on 24 April 2012 at which a survey of Cullen Bullen residents was conducted. LCC meeting minutes dated 14 May 2012, noted that in the 87 survey handouts provided back to council, 28 strongly opposed the proposal, 8 opposed the proposal, 19 supported the proposal, 21 strongly supported the proposal and 11 were unsure.

LCC also confirmed that key concerns noted by Cullen Bullen residents in their responses to the survey included:

- Loss of habitat;
- Devaluation of homes;
- Water quality;
- Visual impact;
- Dust;
- Noise;
- Blasting;
- Proximity to town centre;
- Health concerns;
- Damage to homes;
- Traffic;
- Hours of operation;
- Damage to cemetery;
- Local employment;
- Access to bushland; and
- Contributions money.

The LCC survey also requested that the public provide feedback on particular conditions that they would like to see imposed on the Project, should it be approved. These conditions included:

- Stringent noise, dust and water quality monitoring;
- Restricted hours of operation;
- Restricted hours for blasting;
- Immediate rehabilitation of forest;
- Buffer zone around town centre;
- No coal transportation on the Castlereagh Highway;
- Contributions money to be spent entirely on Cullen Bullen;
- Increased local employment; and
- Better assessment system for damaged homes.

The final response requested from residents in the survey was regarding what any public contributions for the Project could be paid towards. Results from the survey were as follows:

- Roads and footpaths for Cullen Bullen - 66 votes;
- Sewerage for Cullen Bullen - 59 votes;
- Roads in the surrounding area - 45 votes;
- Hall - 7 votes;
- School - 5 votes;
- Pedestrian crossing - 5 votes;
- Enhancement of landscape - 4 votes;
- Roadside clean up - 4 votes;
- Improved water supply - 3 votes;
- Local organisations - 3 votes;
- Recreational facilities - 2 votes;
- Skate Park - 2 votes;
- Air Conditioners/Air Purifiers for homes - 2 votes;
- Indoor Sporting Facility - 2 votes;
- State Forest facilities - 2 votes;
- Visitor Picnic Area - 2 votes;
- Street lighting - 2 votes;
- Offsets for habitat loss - 2 votes;
- Double glazing for homes - 1 vote;
- Visitor Information Centre - 1 vote;
- Pipe Work - 1 vote;
- Oval & Speedway - 1 vote;
- Fuel rebates - 1 vote;
- Heritage Walk - 1 vote; and
- Public Toilets - 1 vote.

A Social Impact Assessment (SIA) was undertaken for the Project and was included in Section 8.21 of the EA. This study developed a profile for the Cullen Bullen and Portland (the local area) and Bathurst LGA and the Lithgow LGA (the wider region) and aimed to identify any future social impacts which may result from the Project. The SIA also considered issues raised by community stakeholders during the EA stakeholder engagement program. Key components of the assessment methodology included the following:

- Development and analysis of the existing local socioeconomic setting based on a review of existing information;
- Development and analysis of the Project workforce profile and workforce residential pattern;
- Consultation with the local community;
- Assessment of potential social impacts of the Project on the local area, including the social impacts associated with the additional workforce;
- Assessment of potential social impacts associated with the Project with reference to surrounding industry; and
- Development of appropriate mitigation and management measures for any adverse social impacts.

As per Section 8.12.4 of the EA, Coalpac will continue a number of programs within the local community to mitigate the social impacts predicted for the Project, with a focus on Cullen Bullen. These include ongoing sponsorship and donation programs, support to local businesses, preferentially sourcing employees from the local area and the continuation of engagement with community stakeholders. As noted above in **Section 4.16.1**, Coalpac is committed to the establishment of a VPA for the Project and are in negotiations with LCC for formalise this.

Discussion of predicted impacts to Cullen Bullen due to key health, amenity and economic issues and responses to submissions on these matters are also provided in **Sections 4.2**, **4.5**, **4.6**, **4.7**, **4.14** and **4.17** of this document. Reference should also be made to **Section 4.16.3** regarding the decision of LCC to not object to the Project following community consultation, subject to appropriate controls being put in place by Coalpac.

4.16.3 Lithgow City Council Support

Submission: SIG1

One submission noted the concern in the Cullen Bullen community regarding the change in LCC from one of objection to one of support of the Project and the uncertainty in the results of the council's public consultation process with the residents of the town.

Minutes from the LCC ordinary meeting of 14 May 2012 include a discussion on the position of LCC on the Project. This includes the consideration of the concerns raised by the Cullen Bullen community at the meeting held by the council at the Cullen Bullen Progress Hall on 24 April 2012. A key recommendation of this meeting was that:

1. *"Council prepare a submission to the NSW Department of Planning & Infrastructure indicating its overall position as not objecting to the proposal but demanding that appropriate controls need be put in place particularly in regards to noise, dust and blasting and a regime of building inspections 'pre' and 'post' blasting. Mining is not to take place within 500 metres of the village, residents residing outside of the village and the cemetery itself."*

The LCC subsequently provided a formal response to DP&I during the public exhibition phase of the Project (see **Appendix B**) that confirms the position of the council. This submission affirms that LCC have resolved not to object to the Project on a conditional basis, noting that:

> *"…appropriate controls need to be put on place, particularly in regard to noise, dust , blasting and a regime of building inspections 'pre' and 'post' blasting. Mining is not to take place within 500 metres of the village, residents residing outside of the village and the cemetery itself.*
>
> *The Council also requested "That the company be required to lodge a substantial guarantee in a special fund (bond) that will be forfeited in the event that their standards are not met."*

LCC also provided comment on a number of other specific aspects of the Project relevant to the local community surrounding the Project, including on the process for the VPA, landholder agreements and acquisition and the management traffic, air quality, noise, blasting, waste and visual issues. These have been addressed in the **Sections 4.16.1**, **4.22.3**, **4.2**, **4.5**, **4.6**, **4.15** and **4.7** of this document and include a commitment to not mine within 500 m of Cullen Bullen as requested by LCC. Mining will only occur within 500 m of a private residence located outside of Cullen Bullen with agreement from the landholder and with adequate controls in place to minimise any potential for blast impacts and risk associated with flyrock (see **Section 4.6.4**).

Coalpac has proposed further commitments to manage and control mining operations within a 500 m radius of the Cullen Bullen General Cemetery in **Section 4.12.1**. As such, a buffer zone excluding mining operations from occurring within a specific distance from Cullen Bullen has been consideration and incorporated into the Project, and no further restrictions are required.

4.17 ECONOMICS

4.17.1 Support for the Project

Submissions: SIG5, SIG16, SIG19, SIG21, SIG23

A number of submissions expressed support for the Project as discussed below. Also see **Section 4.22.1** for a summary of the public submissions in support of the Project, many of which cited economic benefits as the reason behind their support.

Delta Electricity

Delta Electricity identified that the Invincible Colliery has supplied coal to the its power stations at intervals over many decades, while the Cullen Valley mine has provided coal continuously since 2000. While the output of the two power stations and the responsibility of providing the requisite coal has been contracted to TRUenergy Pty Ltd, Delta Electricity identifies that one of the most significant factors for the long term viability of the stations is the presence of a competitive, reliable coal supply.

Delta has sought approval for the Western Rail Coal Unloader to maximise the coal supply base from which it might draw its future supplies. The rationale is to ensure, as far as possible, that the power stations will have a long term future thereby continuing to support both the state and local economies. However, local supplies remain the preferred alternative. Coal railed in from other districts to meet power station demand may affect local mine employment, produce higher greenhouse emissions given the longer transport distance and require new developments, either in terms of new mines or re-activated railway lines. In contrast, Delta identifies that the current proposal from Coalpac for an expansion of its existing operations and for transport of product coal to the MPPS via conveyor would mean continued support for the local economy and a reduced impact on the environment.

Delta states that if Coalpac was forced to cease operations there is no obvious replacement supply available from within the Western Coalfield given that the other domestic coal producers are already contracted to the power stations. Not only can no single producer meet all of the power stations' requirements but virtually all local producers are required to meet that demand. Until the Western Rail Coal unloader and, possibly, rail upgrade works could be completed, refusal of the Project is likely to lead to significantly reduced generation from the western power stations. This would lead to a supply shortfall in the national electricity market and possible market insecurity. The shortfall would have to be met by increased production from older, less efficient or more expensive generators in NSW, or by importing electricity from neighbouring states which are often constrained by inadequate interstate high-voltage transmission links. Both actions would likely cause a rise in the wholesale electricity price with consequent increased upward pressure on retail prices.

Locally, a direct loss of full-time and part-time jobs associated with the provision of power station services could be expected plus the indirect loss of jobs in the region associated with the supply of items such as chemicals, fuel oil, lubricants, generic consumables, vehicles, food and accommodation and office equipment.

Delta also identify that if Coalpac was forced to cease operations and no alternative coal supply could be found to utilise the Western Rail Coal unloader then there would need to be a shutdown of some of the Western capacity with the further impact of the loss of a significant proportion of the more than 270 people employed by Delta in the region.

Manildra Group

The Manildra Group supports the approval of the Coalpac Project as its Shoalhaven Starches plant at Nowra depends on coal from the Invincible Colliery for its coal fired boilers which produce approximately 50% of the steam requirements for the Bomaderry Plant.

Shoalhaven Starches employs approximately 300 employees plus contract personnel and manufactures Gluten, Starch, Glucose and Ethanol for the domestic and overseas markets. These products are used for the production of food products and the ethanol is used in fuel and industrial applications.

Shoalhaven Starches has purchased coal from the Invincible Colliery for many years and its boilers require low ash, sized coal with properties similar to the Lithgow seam. Its coal fired boilers are fitted with spreader stokers and chain grates and as a result the ash content, sizing and properties of the coal are critical. As a result they have not been able to source competitively priced coal of a suitable quality from collieries other than from Invincible Colliery.

Port Kembla Port Corporation

Port Kembla Port Corporation (PKCT) is supportive of the Coalpac coal export proposal as the export component of product coal from the Project will arrive at the port by rail and will generate regional benefits to the Illawarra region from construction and ultimately generate further employment from operations at the port. Also of importance is that the Coalpac development is the catalyst for development of the first berth in the outer harbour and that it will underpin infrastructure for other potential exports. A number of other potential exporters have already approached PKPC seeking access to these outer harbour facilities.

Site Plus

Site Plus identifies that the Project will provide major economic benefits for both the local community at the mine's locality and also has a major economic benefit for the Illawarra region.

TRUenergy

TRUenergy identifies that if the Project were not approved it would be necessary to source alternative, higher priced coal from other mines located in parts of NSW that are more remote to the MPPS facility. This would involve additional road and rail transport and additional development expenditure. Increased costs would need to be reflected in the wholesale prices bid into the National Electricity Market by Mt Piper.

4.17.2 Comprehensive Assessment of the Costs and Benefits

Submission: SIG22

One submission noted that a detailed assessment of the costs and benefits of the Project had not been undertaken in the EA and suggested a number of issues exist regarding the methodology used in the Project economic impact assessment (Appendix T of the EA (Gillespie 2011)).

The Department of Planning *Draft Guidelines for Economic Effects and Evaluation in EIA* (James and Gillespie 2002) identify that the "main aim of an economic evaluation is to provide information that will assist decision makers make efficient use of available resources to maximise the well-being or welfare of the community". The accepted technique for assessing changes in the economic well-being of a community is benefit-cost analysis (BCA).

Benefit cost analysis is concerned the weighing up of all the costs and benefits of a Project. As identified in the draft guidelines there are essentially two ways in which an economic evaluation can be incorporated into an EA:

- Undertake the entire EA as an applied economic analysis, or
- Include an economic section as a distinct component of an EA.

The latter approach has been taken in the Project EA but the economic assessment should not be read in isolation of the remainder of the EA. The economic assessment has initially focused on estimation of the net production benefits of the Project ($1,518 M). This provides a threshold against which the unquantified environmental, social and cultural impacts of the Project, after mitigation, can be compared. If the decision-maker considers that the environmental, social and cultural impacts of the Project after mitigation are likely to be valued by the community at greater than $1,518M then the Project would result in a decline and community welfare and would result in a reduction in economic efficiency. If the decision-maker considers that the environmental, social and cultural impacts of the Project after mitigation are likely to be valued by the community at less than $1,518M, then the Project would result in an increase in community welfare and would improve economically efficiency. The remainder of the EA provides information from experts in different disciplines to aid the decision-maker in deciding how significant the residual non-quantified environmental, cultural and social impacts of the Project are.

To further aid the decision-maker, the economic assessment has explicitly valued some of the main environmental impacts of the Project (i.e. greenhouse gas emissions, forestry impacts, value of agriculture, etc) (see **Section 4.17.4** to **4.17.10**). This provides the decision-maker with some relative orders of magnitude of these potential impacts so that they can be compared to the estimated net production benefits of the Project.

A peer review of the Project economic impact assessment has also been undertaken by Environmental Resource Economics. A copy of this review is provided in **Appendix G**.

4.17.3 The Scale of Benefits to NSW and Coalpac

Submission: SIG22

This submission states that the scale of the benefit to NSW is disproportionately lower than the benefits to Coalpac. It identifies the benefit to NSW through royalties at $144M (present value), the benefit to the Commonwealth through company tax at $169M (present value) and the remainder of the benefit to shareholders of Coalpac.

This is incorrect. The remainder of the benefit after deduction of royalties and company tax is identified in the Economic Assessment as being distributed between:

- The MPPS and Wallerawang Power Station in the form of lower cost coal (and ultimately electricity consumers in NSW in the form of lower electricity prices);
- Coalpac and its shareholders in the form of net profits; and
- The local region from the establishment of a Voluntary Planning Agreement (VPA) to fund community projects.

Coalpac is a privately owned company based in NSW. Similarly, the benefit to MPPS and WPS (and ultimately electricity consumers in NSW) will accrue to NSW. Consequently, the entire net production benefit apart from the company tax, will accrue to NSW (i.e. $1,350M).

4.17.4 Greenhouse Gas of Electricity Generation Not Included

Submission: SIG22

These submissions raised concerns that the economic assessment did not include the greenhouse gas emissions of electricity production.

However, the Project for which approval is being sought and which was evaluated in the benefit cost analysis is the mining of coal and delivery to NSW power stations or Port Kembla. No approval is being sought for the burning of coal. Costs and benefits relevant to the benefit cost analysis are all those costs and benefits up to and including the delivery of coal to purchasers.

Coal then becomes an input into a different production process. In the case of thermal coal, this production process is concerned with the burning of coal to generate electricity. This production process has its own set of costs and benefits.

Costs of coal fired power generation include the costs of coal, labour, land and capital inputs, electricity distribution costs and environmental costs, such as greenhouse gas generation. Benefits include the financial value of electricity as well as the community's willingness to pay for electricity above and beyond what they have to pay (i.e. consumer surplus). There may also be externality benefits of electricity for economic development, education, and medical care. All of these costs and benefits are relevant considerations at this next stage of the production process, not just the greenhouse gas costs.

Where these different production processes occur in NSW or Australia they are subject to separate approval and decision-making requirements. Where they occur overseas they are not subject to the Australia's or NSW's development approval process. However, decisions by the Australian and NSW Governments about whether to supply additional coal for export are likely to have little impact on decisions other countries take with regard to coal fired electricity generation. While NSW is well placed to supply some of the projected additional world demand for coal, with NSW containing less than 1% of total recoverable coal reserves in the world, there are significant coal supply source substitution possibilities (US Energy Information Administration 2010).

4.17.5 Other Greenhouse Gas Issues

Submission: SIG22

These submissions identified that it is not clear why the Australian greenhouse gas damage cost ($0.2M) is lower than the Global damage costs ($15M) and considered that the carbon tax should be included in the estimate of the net production benefits of the Project.

Estimates of the marginal global damage cost of carbon are highly uncertain and are very sensitive to the researcher's assumptions. As identified by Tol (2011), the mean estimated from published studies is a marginal cost of carbon of $177/t C ($48/ tCO2-e) and a modal estimate of $49/t C ($13 tCo2-e) reflecting the fact that the mean estimate is driven by some very large estimates. For peer reviewed studies only, the mean estimate of the social cost of carbon is $80/tC ($22/tCo2-e). For policy purposes, the marginal global damage cost of carbon would be equal to the Pigouvian tax that could be placed on carbon, thus internalising the externality and restoring the market to the efficient solution. The tax proposed by the Australian government to internalise the marginal global damage cost of carbon is initially $23/t Co2-e. This has been used in the economic assessment as representative of the marginal global damage cost of carbon.

The marginal global damage cost of carbon is defined as the net present value of the incremental global damage due to a small increase in CO2 emissions. Benefit cost analysis is undertaken from a national perspective. Therefore only costs and benefits that accrue to Australia, including the damage costs from GHG that accrue to Australia, are relevant for inclusion in the benefit cost analysis. In the absence of any studies that have focused on the marginal social damage cost of GHG emissions to Australia only, some means of apportioning global damage costs to Australian damage costs is required.

For the purpose of the Coalpac economic assessment, this has been undertaken using Australia's share of global GDP (around 1%). An alternative approach would be Australia's share of world population which is considerably less than 1%.

The economic analysis estimates the net production benefits of the Project ($1,518M) and compares this to the global and Australian GHG impacts of the Project (i.e. $15M and $2M, respectively). The proposed carbon tax in Australia has been used as a proxy for the estimated marginal global damage cost of GHG generated by the Project.

To also include the tax as a cost to Coalpac would be double counting of GHG impacts. However, with the introduction of the carbon tax, the global greenhouse gas costs from the Project would be internalised into Coalpac's operating costs, should Project Approval be granted.

4.17.6 Failure to Internalise Environmental Costs of the Biodiversity Offset Strategy

Submission: SIG22

This submission expressed concern that the significant risk that the Offset Strategy will not be effective in supporting the biodiversity values that the Project will adversely impact on has not been incorporated into the environment 'cost' of the Project. It further raises concern that while the cost of implementation of these offsets is $23M over the life of the Project, it has not included any future contributions to OEH for their future management. It was also noted that the costs of cleared vegetation and lost habitat of threatened species are not included in the economic assessment as a cost.

The benefit cost analysis has been undertaken as a threshold value analysis consistent with the Department of Planning's draft Guidelines for economic effects and evaluation in EIA (Gillespie and James 2002). This approach is based on the concept of opportunity cost. The environmental costs are thus not initially valued directly, but a reference value (net production benefits of the Project) is provided against which the relative value of the environmental costs may be assessed. The threshold value (net production benefits of the Project) indicates the price that the community must be prepared to pay to justify the preservation option.

In estimating the net production benefits of the Project, an allowance has been included for the acquisition costs of offsets proposed at the time of the preparation of the economic assessment for the Project and an allowance for management costs of these offsets. To include an additional cost for any future contributions to OEH for its future management would be double counting.

However, since the preparation of the economic assessment for the Project, additional offsets are proposed (see **Section 4.13.2.1**). Inclusion of the acquisition and management costs for these offsets would reduce the estimate of net production benefits from $1,519M to $1,518M.

Provided offsets that are negotiated with OEH, SEWPaC and DP&I offset the biodiversity values that will be lost from the Project, there would be no additional ecological costs for inclusion in the BCA. To include an economic cost for cleared vegetation and lost habitat of threatened species would result in double counting.

Nevertheless, to illustrate the relative level of conservation values impacted from the clearing of 802 ha of Ben Bullen State Forest, the economic assessment used benefit transfer. This shows that the lost conservation values are likely to be relatively small ($0.6M) relative to the net production benefits of the Project ($1,518M). This estimate of net production benefit includes the costs of offsetting the lost conservation values.

4.17.7 Opportunity Cost of Clearing Public Forest

Submission: SIG22

This submission suggests that the estimate in the economic assessment of the opportunity cost of clearing public forest is too low as:

- The estimate of foregone recreation assumes that no services or support infrastructure would be added to the area to encourage increased enjoyment of the land and does not account for any opportunity cost of not having this potential land use value in the future;
- It ignores the opportunity costs of the lost portion of forest on the viability of the Gardens of Stone Stage 2 (GoS2) proposal;
- No information was provided on the study from which conservation values were borrowed to apply to Ben Bullen State forest and the method is inappropriate as it lacks any mechanism to place on value on this item for future generations;
- The method for calculating sequestration benefits of the forest that would be foregone assumes the economic cost would end after the 21 year life; and
- The use of a 21 year time frame to calculate lost values does not reflect an application of the intergenerational equity principle.

The benefit cost analysis for the Project identified that the opportunity cost of using the part of the Ben Bullen State Forest for the Project is likely to be in the order of $0.9M, comprising Australian carbon sequestration benefits of $0.02 M, conservation values of $0.6M, recreation benefits of less than $1M and forestry values of $0.2M.

Submission 565 considers that in the absence of the Project the affected State Forest would have significant investment in recreation infrastructure with benefits that exceed costs and hence there would potentially be significant loss of future potential recreation values if the Project goes ahead. However, in the absence of the Project, this land would continue to be managed as State Forest primarily for timber values. There are no proposals for recreation infrastructure investment and even the GoS2 proposal does not include any proposals for the development of recreation infrastructure on these lands.

The GoS2 proposal is to add 40,000 ha to the existing 1,032,649 ha Blue Mountains World Heritage Area. The Project would impact the western most extremity of the proposal on poorer quality conservation land that is to be offset. Even if the GoS2 were to proceed, it is difficult to conceive that the Project would have any significant impact on its viability. The economic assessment undertaken for the GoS2 proposal identifies that the economic viability of the GoS2 proposal actually depends on it having no impacts on coal mining and sand extraction. The economic assessment of the GoS2 proposal explicitly identifies that "the State Conservation Area tenure within the GoS2 proposal allows for ongoing coal mining and associated surface activities within existing mining lease areas.

Consequently, the proposal would have no opportunity cost associated with coal mining" (Blue Mountains Conservation Society Inc. and Colong Foundation for Wilderness Ltd 2009, p. 28). It also identifies that existing sand mines and the one sand/kaolin approval, "would not be compromised by the GoS2 proposal" (Blue Mountains Conservation Society Inc. and Colong Foundation for Wilderness Ltd 2009, p. 28).

The estimated $28M to $32M net benefit of the GoS2 proposal is therefore contingent on there being no opportunity cost in relation to sand mining or coal mining. If the GoS2 proposal does result in sterilisation of coal resources then the GoS2 proposal would not be economically efficient.

Consequently, the advancement of the Project and the GoS2 proposal (with the Project Boundary excised from it until mining is completed, at which time it can be included) is likely to provide the greatest net benefits to the community. Furthermore, as some of the Project Biodiversity Offset properties are strategic land holdings adjacent to the GoS2 proposal area, the Coalpac Consolidation Project would result in additional net benefits for the GoS2 proposal.

As identified above, the lost conservation values as a result of the Project would be offset and the capital and operating costs of the proposed offsets at the time of the economic assessment were included in the estimate of the net production benefits of the Project. However, to provide some separate estimate of the likely value of lost conservation values, the economic assessment applied an economic value from Lockwood and Carberry (1998). This study was considered relevant to the Ben Bullen State Forest. A full reference was given in the economic assessment so that people who are interested in the source study could review it.

The Lockwood and Carberry (1998) study used the non-market valuation methods of choice modelling and contingent valuation. These techniques survey samples of the population to obtain estimates of their willingness to pay conserve environmental, cultural and social features. Benefit cost analysis and non-market valuation methods are based on the preferences of current generations. There is no way to measure the preferences of future generations. However, this is not considered a serious problem in benefit cost analysis for two reasons:

- Because few policies involve impacts that appear only in the far future, the willingness to pay of people alive today can be used to predict how future generations will value them (Boardman et al 2001, p. 38); and
- As most people alive today care about the well-being of their children, grandchildren and great-grandchildren whether or not they have yet been born they are likely to include the interests of these generations, to some extent, in their own valuation of impacts (Boardman et al 2001, p. 38).

The method for estimating the foregone sequestration benefits from Ben Bullen State Forest conservatively assumed maximum sequestration benefits for this region for a period of 21 years. If these foregone maximum sequestration benefits were assumed to occur in perpetuity, the foregone global carbon sequestration benefits would increase from $1.7M to $2.3M with foregone Australian benefits increasing from $0.017M to $0.023M. This is compared to net production benefits of the Project of $1,518M. In any case, at the cessation of the Project, the area of Ben Bullen State Forest that is disturbed is proposed be rehabilitated to native forest and woodland. Negative impacts for carbon sequestration will therefore only occur for 21 years, consistent with the approach taken in the benefit cost analysis. Rehabilitating woodland at the cessation of the Project will provide annual carbon sequestration benefits that are likely to be greater than the carbon sequestration levels of the existing Ben Bullen State Forest.

The use of a 21-year time frame for the Project benefit cost analysis is consistent with standard practice in benefit cost analysis. As identified in the NSW Treasury Guidelines (2007, p. 39) “Once a project period of, say, 20 years has been reached, the analysis will be relatively insensitive to the choice of a longer project period due to the discounting of future costs and benefits. In view of this and the difficulty of forecasting costs and benefits over such long periods, caution should be exercised in adopting a project period, longer than 20 years”.

4.17.8 Valuing Dust and Noise Impacts

Submission: SIG22

This submission raised a number of issues with respect to the valuation of dust and noise impacts including that:

- It is not transparent what aspects of the mitigation strategies for noise and dust are included in the economic assessment and whether costs of implementing the measures have been included;
- It is unclear what the economic assessment means when it says that environmental impacts of the Project such as noise and dust would be initially borne by the general community; and that

- The method for estimating the social cost of dust and noise ignores significant impacts (e.g. medical costs from treating dust and noise related illnesses, enjoyment and quality of life of surrounding properties and residences that are predicted to be affected including the school).

Noise and dust impacts on adjoining properties can be potentially be valued using the property value method, where the change in property value as a result of the change in environmental quality is estimated. Instead of incorporating the partial property value impact on properties impacted above the acquisition level criteria, conservatively, the full cost of acquiring them has been incorporated into the capital costs of the Project (it is noted there may also be some consumer surplus losses to these property owners above and beyond changes in property values).

However, inclusion of the full cost of acquisition is considered likely to more than allow for these consumer surplus losses. Sensitivity testing on capital cost assumptions is also undertaken to determine the impact of changes in assumptions) and where land has already been acquired, into the opportunity cost of land.

For properties impacted below the relevant criteria, an allowance has been included in the capital costs of the Project for management such as installation of air conditioning units, double glazing windows, etc. Other properties will not be adversely impacted.

In the consideration of the distribution of impacts it is stated that initially, environmental impacts such as noise and dust, greenhouse gas and clearing of native vegetation would be borne by the general community. This is to reflect the fact that without the implementation of mitigation measures these are the people on whom these impacts occur. However, with the implementation of mitigation measures, these impacts will be internalised into the cost of Coalpac's production. The acquisition of properties adversely affected by dust and noise results in the wealth of the people who own these properties being unaffected. By providing a biodiversity offset strategy that aims to result in no net loss of biodiversity values, the community's values for biodiversity should be unaffected. By paying the carbon tax when it is implemented, the marginal global damage cost from carbon emissions will be paid for by Coalpac.

The specialist reports for air quality and noise impacts of the Project do not identify other dust and noise impacts of the Project and hence no other social costs are included in the benefit cost analysis.

4.17.9 Valuation of Agricultural Land

Submission: SIG22

These submissions identify that the value used for agricultural land in the economic assessment ignores the future land use potential and that this is a critical issue that will only grow in significance as agricultural land decreases and demand for food increases.

The Project will impact agricultural lands through extension of open cut mining areas as well as the provision of ecological offsets. The value of agricultural lands is included in the analysis in two ways. Firstly, in the estimation of the net production benefits of the Project ($1,518M) the cost of acquiring agricultural land for the Project is included.

The market value of agricultural land reflects among other things the potential agricultural production that can be achieved from the land and expectations regarding future commodity prices and costs of production, in perpetuity.

The second approach was to draw on specific information provided by Scott Barnett & Associates (2011). Scott Barnett & Associates (2011) identified that with a capital investment of $0.3M, these properties in their highest state of development could provide an annual net value of $175,000. Over the 21 year evaluation period this is equivalent to a present value of $1.4M. If the impacts are assumed to occur in perpetuity, the value of impacted agriculture increases to $1.9M, present value.

If the annual net value that could be produced from the subject land were to increase over time in real terms, then the present value of impacted agricultural land would increase. However, the long term trend for agricultural commodity prices has been a decline in real value rather than an increase in value, reflecting that with growth in productivity, supply has strengthened more rapidly than demand (ABARES 2011). Between 1961 and 2008, world population grew by 117 % while food production grew by 179 % (ABARES 2011). While commodity price increases have risen over the last few years, this is partly a response to government subsidies and mandates regarding the production of biofuels (ABARES 2011). In the future, it is expected that growth in global food consumption is expected to slow. Strong productivity growth and the utilisation of hitherto unused cropping should ensure the continuing adequacy of food supplies (ABARES 2011). Consequently, substantial real increases in food prices are not anticipated.

As identified by ABARES (2011, p. 2), “There is no foreseeable risk to Australia’s food security. Australia produces twice as much food as it consumes, produces almost all its fresh food, and can easily afford the food it imports”. Furthermore, “the global food security challenge is not about the capability of world agricultural producers to produce enough food to feed the world, but rather is about ensuring that the poorest people in the world have the economic and physical access to the food they require to meet their nutritional needs” (ABARES 2011, p. 16).

4.17.10 Property Devaluation

Submissions: SIG1, SIG3, SIG8, SIG18, SIG22, Petition, P303, P613, P689, P844, P846, P877

These submissions raise concerns that the Project will adversely impact property values.

Property value impacts could be expected to occur where properties are adversely affected by noise or dust impacts above relevant regulatory criteria. Where this occurs, a standard condition of consent would require Coalpac to acquire these properties on request, at their full market value. No loss of wealth to these property owners is therefore expected.

Compared to the "without" Project case, the Project will provide employment and population in the region that would result in a greater level of demand for housing in the region and hence the Project would have a positive impact on property prices rather than a negative one.

4.17.11 Opportunity Cost of the No Mine Scenario

Submission: SIG22

This submission states that the Project economic assessment omitted to identify the opportunity costs/benefits of investments into renewable energy and clean energy jobs that would be created if Australia transitioned off coal fired power generation and thus avoided greenhouse gas from burning of coal. The submission considers that the Project will have a significant impact on delaying NSW's transition to a clean energy future.

The economic assessment presented in the EA is for the Project. In the benefit cost analysis framework, opportunity costs relate to resources that would be consumed by the Project. The opportunity cost of all resources used in the Project (i.e. their value in their next best use) is reflected in their market value (assuming a competitive market) because the many potential users of the input, bid its price up to its potential income in the alternative use.

Without the Project, the resources to be allocated to the mining operation would be engaged in other uses in the economy. These are the opportunity costs of the proposed Project. Given that markets for these resources (land, machinery, labour etc.) in the Australian economy are relatively competitive and not highly distorted by subsidies and regulations, market prices reflect these resources opportunity costs. The opportunity cost of investor's capital is also taken into account through the use of a discount rate that reflects the social opportunity cost of capital.

The Project will have no impact in delaying NSW's transition to a clean energy future. The main economic barrier to any such transition is the relative price of alternative energy sources.

4.17.12 Time Frames for the Economic Assessment

Submission: SIG22

These submissions identify concerns with the time frames of the economic assessments, stating that the time scales for measuring short, medium and long-term benefits need to be identified and used consistently. Specific issues raised include:

- The coal reserves will be depleted but this is not taken into account in the economic assessment;
- The Economic Assessment states that the Project would provide "ongoing stimulus to the Lithgow and Bathurst economies", but fails to provide detail on what is meant by "on-going";
- The CEA acknowledges that the coal mining industry cannot provide a sustained stream of jobs and income to Lithgow, the region and NSW (i.e., no long-term or ongoing benefits);
- There is no assessment of the impact on economic well-being of the local and regional community after this short-time; and
- An inconsistency in the application of the timeframe for impacts is apparent in the failure to consider the cumulative effect of the GHG emissions, only the impact of GHG emissions for the period of the mine have been valued (i.e. 21 years).

The Economic Assessment evaluates the Project in two different frameworks. These are the benefit cost analysis which looks at costs and benefits each year over the Project life (21 years), and regional economic impact assessment, which is a static analysis that looks at the economic activity provided by the Project in a typical year.

The regional economic impact assessment identifies that the level of annual regional economic activity associated with the Project would be in the order of:

- $219M in annual direct and indirect regional output or business turnover;
- $105M in annual direct and indirect regional value-added;
- $30M in annual direct and indirect household income; and
- 293 direct and indirect jobs.

This level of ongoing stimulus to the regional economy would obviously be for the duration of the Project (i.e. 21 years). Following this, there will be reduction in economic activity in the region, as discussed in the Project Economic Assessment, which identifies that the significance of Project cessation impacts would depend on:

- The degree to which any displaced workers and their families remain within the region, even if they remain unemployed. This is because continued expenditure by these people in the regional economy (even at reduced levels) contributes to final demand;

- The economic structure and trends in the regional economy at the time. For example, if cessation of the Project takes place in a declining economy the impacts might be felt more greatly than if it takes place in a growing, diversified economy; and
- Whether other mining developments or other opportunities in the region arise that allow employment of displaced workers.

Given these uncertainties, it is not possible to foresee the likely circumstances within which cessation of the Project would occur. It is therefore important for regional authorities and leaders to take every opportunity provided by the regional economic stimulus of the Project to strengthen and broaden the region's economic base.

In the benefit cost analysis framework, the time frame for analysis was the Project life (21 years), consistent with NSW Treasury (2007) *Guidelines for Economic Appraisal*. If the Project results in the depletion of the coal reserves then no additional net production benefits will be able to be obtained from mining coal in the Project mining authorities. Greenhouse gas emissions that are generated by the Project (i.e. during the Project life) have been valued and included in the benefit cost analysis. In the absence of any additional approval for mine extension, no greenhouse gas emissions would be generated by the Project after this time. The $23/t CO2-e used in the analysis to value greenhouse gas emissions represents the present value of additional economic damages now and in the future caused by an additional tonne of CO2-e emissions. There is therefore no inconsistency in the application of timeframes in the Project economic assessment.

4.17.13 Spatial Scales

Submission: SIG22

This submission considers that the economic assessment was not consistent in the setting of the physical boundary for the benefit cost analysis, with benefits focused on the national level and costs such as greenhouse gas not considered within the same boundary. It considers that the benefit cost analysis should be considered at each community level.

It is conventional practice in benefit costs analysis to undertake it from a national perspective, with all costs and benefits that accrue outside national borders excluded (Sinden and Thampapillai 1995). Adopting a sub-national perspective is not recommended (Boardman et al 2001). As identified by Bennett (2011, p. 93) a benefit cost analysis from a national perspective "extends the analysis beyond what is strictly relevant to a NSW government planning authority. However, given the interconnected nature of the Australian economy and society, this is considered a sound approach. Spillovers between states (including those associated with the tax system and the movement of resources over state boundaries) necessitate this approach both from conceptual and practical perspectives".

The benefit cost analysis undertaken for the Project was undertaken from a national perspective. Costs that occur at the local level and regional level are relevant in this framework. The fact that some costs occur locally does not mean that there is a need for a "local" level benefit cost analysis. It simply means that some costs and benefits occur at different scales but they are all relevant to a national benefit cost analysis.

Contrary to the assertion made by Submission 538, greenhouse gas impacts were also assessed at a national level. That is, greenhouse gas emissions generated by the Project (i.e. mining and delivery to power stations), were initially valued using an estimate of the marginal global damage cost of carbon. This global damage costs was then apportioned using Australia's share of global GDP to estimate the share of these global damage costs accruing to Australia.

4.17.14 Benefits and Costs for the Lithgow Region

Submission: SIG22

This submission identifies that the continued and additional employment and economic activity at the Project provided to the Lithgow region are not sustainable past 21 years of operation. It suggests that the Project would be to the detriment of the local economy as it would remove both existing and potential sustainable future land use opportunities, including agriculture and recreation. The submission also raises issue with the uncertainty surrounding the quantum of the VPA, the continued truck movements on Lithgow roads and environmental offsets that would at best maintain the status quo. Disruptions to families and the community through the acquisition of affected land due to noise and dust are also suggested not to have been assessed.

The notion that if an activity does not last forever it is somehow not desirable is nonsensical. From an economic perspective what is of prime importance are the costs and benefits of the Project, not the economic activity. Provided the benefits of the Project to the community outweigh the cost, then community welfare is improved by the Project regardless of its timeframe. The benefit cost analysis undertaken for the Project identifies that some agricultural lands will be utilised for the Project however, the opportunity cost of using these resources is very low (i.e. $1.4M present value. Similarly, the opportunity cost of recreation in Ben Bullen State Forest is approximating zero).

Agriculture (and any recreation) that is displaced by the Project would also be associated with some regional economic activity. However, given the very low opportunity cost of these activities, the regional economic impacts would be extremely small.

In contrast, the Project is estimated to provide up to the following levels of economic activity to the regional economy for a period of 21 years:

- $219M in annual direct and indirect regional output or business turnover;
- $105M in annual direct and indirect regional value-added;
- $30M in annual direct and indirect household income; and

- 293 direct and indirect jobs.

The submission implies that there are questionable benefits of the Project at the local level. However, it should be noted that while royalties and company tax benefits of the Project initially accrue at the State and National level, these funds are used by both these levels of government to fund the provision of government infrastructure and services across Australia and NSW, including the Lithgow region.

Lithgow region residents also use electricity and will benefit from the lower cost coal supplied to MPPS and WPS (which will ultimately result in lower electricity prices for NSW households). In addition, the region will benefit from the VPA with Lithgow City Council. While the details have yet to be finalised, any level of VPA will result in some of the net production benefits of the Project being directly redistributed to the region, through LCC.

Some costs of the Project will also be borne at the local level. These include those costs associated with continued road transport of some coal resource (albeit at lower levels than that which currently occurs), localised noise and dust impacts and impacts on biodiversity. However, the Project design attempts to minimise and mitigate these impacts as much as possible. Offset properties are proposed to mitigate the impact on biodiversity. The aim of the Biodiversity Offset Strategy for the Project is to result in no net loss of biodiversity values.

Properties adversely impacted by noise and dust generated by Project operations will be acquired, should the private landowner request. No loss of wealth to these property owners is therefore expected. The private residences and properties identified in the EA as being predicted to receive air quality and noise impacts above the relevant criteria are discussed in **Section 4.2** and **Section 4.5**, respectively. Even if all of these landholders relocated outside the region it is not expected to have any measurable consequences for the Lithgow community, which comprises 8,765 households at the 2011 census.

4.17.15 Benefits and Costs at the State and Federal Level

Submission: SIG22

This submission considers that the benefit cost analysis has included benefits from the MPPS electricity production and therefore should also include associated costs, particularly greenhouse gas emissions. It also considers that the calculation of the cumulative effect of the greenhouse gas emissions should be the same for both the National and Global impact assessment. It also raises the issue that the cumulative impact of mining at the national level has been to drive up the value of the Australian dollar with consequent impacts for all other industries.

The benefit cost analysis does not include the costs and the benefits of MPPS electricity production. Some benefits of the Project accrue to MPPS in the form of cheaper coal, which ultimately will result in cheaper electricity prices for consumers. However, only the cheaper coal benefit is included in the analysis (i.e. the difference between the world price of coal and the negotiated financial price that MPPS would pay for coal from the Project).

The national perspective of benefit cost analysis, referred to above, means that only greenhouse gas impacts that accrue to Australia should be included. Consequently, the impact of greenhouse gas emissions from the Project, are not the same at the National and Global level.

The Project is expected to have minimal impact on the Australian dollar. The high Australian dollar reflects a combination of macro-economic factors including strong commodity prices, weakness of the US dollar and high Australian interest rates.

The weakness in the US dollar is a function of a number of factors including interest rate policy in the US and lack of global investor confidence in the US dollar as a "safe haven".

At the time the EA was published, strong commodity prices reflected strong growth in Europe, expectations of rebuilding demand for raw materials from Japan, turmoil in the Middle East and North Africa boosting energy prices, expectations that Japan's nuclear crisis will add to demand for oil, gas and coal, continuation of the industrialisation process in China and other emerging countries, and world supply struggling to keep up with demand. A weak US dollar is also positive for commodity prices as they are priced in US dollars.

Australian interest rates are well above those in the US, Europe and Japan. This has the effect of attracting funds to Australia, which in turn pushes up the Australian dollar.

While a high Australian dollar can have a negative impact on export and import competing sectors of the economy overall it is considered a positive for the economy. For consumers it results in lower prices for imported items such as cars, clothing, petrol and many electrical goods. This in turn is likely to take pressure off inflation and reduce the extent to which the RBA has to raise interest rates.

4.17.16 Benefits and Costs at the Global Level

Submission: SIG22

This submission raises the issue that Coalpac shareholders have not been identified and hence a very large and significant proportion of the claimed economic benefit could be flowing offshore. It also identifies that cumulative effect of greenhouse emissions is likely to make the global proposition less attractive.

Coalpac is an Australian owned private company. The benefits of the Project that accrue to Coalpac accrue to Australia. The economic assessment identifies the global damage cost of greenhouse gas emissions that arise from the Project at $15M present value and the damage costs to Australia at $0.2M. The net production benefits of the Project are estimated at $1,518M. So even if the global damage costs of greenhouse gas were included in the analysis these are small relative to the estimated net production benefits of the Project.

4.17.17 Project Alternatives

Submission SIG3

This submission identified that there are other superior coal resources that could be mined in preference to the remnant resources targeted for the Project. Further, less damaging underground coal mining methods also could be pursued to obtain the last remnants of coal under Ben Bullen State Forest.

The Project is to extract coal within mining authorities held by Coalpac or under sub-lease agreement, a resource that has been used to supply coal requirements for Mount Piper Power Station. Over 70% of the proposed output is contracted to Delta Electricity to provide over two thirds of the coal requirements for MPPS. There is great uncertainty around the availability and price of coal from alternative sources for MPPS (see **Section 4.17.1**). The Project offers a local, reliable, low cost source of coal for MPPS.

The Project design has already considered the environmental constraints associated with the coal resource and foregoes $325M in total net production benefits, including a minimum of $31M (present value) in royalties to the NSW government. The environmental impacts of the Project have also been substantially reduced through impact mitigation expenditure related to ecology, noise, air quality, blasting etc, estimated in the order of $14M annually or $295M over the life of the Project.

The Australian net production benefits of the Project ($1,518M) are substantially greater than those from Ben Bullen State Forest ($0.9M).

A description of the assessment of the viability an underground mining option for the Project is provided below in **Section 4.17.18**.

4.17.18 Increased Workforce from Underground Mining and Lower Environmental Impacts

Submission: SIG3 – SIG4, SIG9, P3, P342, P629, P786, P813, P877

This submission identifies that the mining workforce arising from any increase in underground mining in the region to supply power station needs would increase the supply of goods and services to the community. At the same time, environmental impacts would decrease relative to the damage caused by open-cut operations. The submission also stated that the existing underground mining operations in the region could provide a good substitute coal resource if the Project is not approved.

While noted as a preferred option in a number of submissions, it is not considered financially viable or safe to undertake the Project using underground mining methods, especially utilising longwall mining methods as suggested by this submission. As noted in Section 4.2.2 of the EA, development of an underground mining operation was considered by Coalpac during the Project pre-feasibility planning stage through a review of the available coal resource to determine whether such an operation would be a viable option to extract the coal resource defined in the EA.

This review found that much of the central and southern extents of the Project Boundary are located above areas which have previously been extensively mined in the Lithgow Seam (the lowest seam in the vertical sequence) via underground methods and as such, are only amenable to open cut mining. In the far north of the Project the Lithgow Seam thins to a point where it is no longer present.

For the remaining northern areas, the Coalpac review found that the Lithgow Seam over much of the area is not able to be economically mined by underground methods. Where the Lithgow Seam is present, the reduced seam thickness, limited reserve size, low depth of cover, sensitive overlying topography (including the presence of pagodas and publically-visible sandstone cliffs), poorer coal quality and other contributory factors did not represent a feasible environmental and economic underground mining option for the Project in comparison with the combined open cut / highwall mining operation proposed.

Underground mining would also significantly restrict coal recovery for the same surface impact when compared to open cut and highwall mining methods, resulting in a higher environmental impact per tonne of coal extracted. The Project comprises a combination of both open-cut and highwall mining, with highwall mining used in sensitive areas to minimise environmental impacts. Relative to the "without" Project case, the Project will provide up to 293 direct and indirect jobs. They are additional to any jobs created by any other coal mining projects in the region.

4.17.19 Comparison of Scenarios

Submission: SIG22

This submission raises issue with the different base case that assessments are compared to. In the economic assessment the base case is the 'no mining' scenario. For the traffic assessment, the comparator is the existing road transport movements.

In benefit cost analysis there are clear guidelines requiring comparison of the "with" Project scenario to the "without" Project scenario. Consequently, the Project is compared to the no mine scenario. In regional economic impact assessment, there are no such guidelines. The base case against which a project is compared will depend on the purpose of the analysis. The regional economic impacts can be assessed relative to the existing level of economic activity provided by the mine to show how much more annual economic activity it will provide than it does now or relative to the base case of no mining which represents the total economic activity that continuation of the mine will provide. The latter approach was used in the regional economic impact assessment, consistent with the approach taken in the benefit cost analysis.

Other methodologies have their own approaches. For instance, while the Project will continue to generate traffic movements, it was important to demonstrate the level of these movements will be at a reduced level relative to the current level of traffic movements.

As identified by Hyder Consulting (2011) the truck traffic movements generated by the product sand and coal haulage to domestic customers (relative to the no mining scenario) would not be substantial and the increase in crash risk exposure would be marginal. Nevertheless, these impacts could be reduced through haulage in off-peak periods when there is more spare capacity and also less safety risk due to fewer vehicles on the road.

4.17.20 Precedent

Submission: SIG3

This submission expressed concern about the precedent that would be set for open-cut mining along the western facing slopes of the Great Dividing Range to within 50 metres of the pagoda studded sandstone cliff lines, if the Project were approved.

However, approval of the Project would not result in any precedent. All coal mining projects are assessed on their merits pursuant to the provisions of the EP&A Act.

4.17.21 Project Driven by need to maximise sale price, not mining practicalities

Submission: SIG3

This submission identifies that the Invincible Colliery and Cullen Valley Mine are for sale and notes that the Project seeks to maximise the sale price. The long-term viability of mining these resources is not a consideration for the seller.

This is incorrect. Maximisation of the Project's market value would arise under the optimal mine plan. The Project design foregoes $325M, present value, in net production benefits (including $31M present value in royalties to the NSW Government) so that environmental, cultural and social impacts of the Project can be minimised. The long term viability of mining the resources is a major consideration for any potential purchaser. Investment is always required to develop any mining project and all mining companies seek investment via a number of methods, whether that be via company cash reserves, a stock market capital raising, bank debt, or equity divestment, to name a few common investment methodologies.

As noted in Section 10.3.7 of the EA, the Project also requires capital resources and profitability to achieve the target mining outcomes at the same time that leading practice environmental management measures are implemented.

4.17.22 Request for Bond

Submission: R3

The Lithgow City Council requested *"That the company be required to lodge a substantial guarantee in a special fund (bond) that will be forfeited in the event that their standards are not met."*

Under the requirements of the *Mining Act 1992* and DRE Policy *EDP11 – Rehabilitation Security Deposits* (2012), all mining authorisation and title holders are required to lodge a security deposit with the DRE.

The purpose of this deposit is to ensure that any costs associated with the NSW Government completing the rehabilitation of a site in the event of default by a title holder are covered. Coalpac will therefore set up an appropriate Rehabilitation Security Deposit for the Project, to the approval of DRE. Coalpac will inform LCC once this process is complete.

4.18 FORESTRY

4.18.1 Access to the Ben Bullen State Forest

Submissions: SIG2 – SIG4, SIG7 – SIG8, SIG14, Petition, P3, P798, P813, P838, P877

A number of submissions raised concern around the Project occurring in the State Forest and impacts on access tracks that are currently used to access the Ben Bullen State Forest. A number of submissions raised concern around the Project occurring in the State Forest and impacts on access tracks that are currently used to access the Ben Bullen State Forest. A number of submissions also raised concerns that the public would be locked out of the area for at least 21 years, privatising a public asset.

As noted in Section 4.12 of the EA, Coalpac will consult with Forests NSW regarding tracks within the Ben Bullen State Forests that will be impacted by the Project and formalise alternate points of access, as required. This will allow access to those areas of the Ben Bullen State Forest located outside of the Project Disturbance Boundary to provide ongoing connectivity with adjacent reserves to the east and north that will not be impacted by the Project.

During the life of the Project, Coalpac will maintain the existing access point in the south of the Project Boundary for the Gardeners Gap Track (as shown on Figure 5 of the EA). This track will run under the MPPS conveyor infrastructure. Coalpac will also create a northern access route within the Project Boundary to allow for public access to the Ben Bullen State Forest, in consultation with Forests NSW.

4.18.2 Mining within the Ben Bullen State Forest

Submission: SIG3

One submission raised the perceived issue of inconsistent landuse of mining within the Ben Bullen State Forest under the *Forestry Act 1916* (Forestry Act). A range of submissions also expressed a concern that the Project as proposed represents the privatisation of the Ben Bullen State Forest as a public asset.

The Project proposed to impact less than 12% of the total area of the Ben Bullen State Forest, with a maximum economic impact of $0.9M over the life of the Project due to reduced forestry and recreational values.

As noted in Section 5.6.5 of the EA, Coalpac has an agreement in place with Forests NSW for exploration and mining activities. Similar agreements are currently being negotiated for the Project to continue all mining and exploration related activities within the Ben Bullen State Forest (including sharing Endeavour Energy's existing power access corridor to enable the construction and use of the Project conveyor to MPPS).

These Agreements will be developed in consultation with Endeavour Energy and Forests NSW for the access and management of lands within the Ben Bullen State Forest for the life of the Project (see **Section 4.18.3**).

4.18.3 Compensation Agreement with Forests NSW

Submission: R13

This submission noted the position of Forests NSW as the registered landholder of all lands within State Forests and their respective management responsibilities for the Ben Bullen State Forest under the Forestry Act. It was noted that Coalpac must enter into a compensation agreement with the Forests NSW for the full and final settlement to occur. Forests NSW also stated that any infrastructure or site disturbance which may occur outside of the Mining Lease(s) will require an Occupation Permit with associated terms and conditions.

As noted in the Section 5.6.5 and Table 12 of the EA, Coalpac will negotiate similar agreements with Forests NSW for exploration and mining activities in the Ben Bullen State Forest. Coalpac are currently well advanced in finalising the terms for an Occupancy Permit required for the Project and will continue consultation with Forests NSW.

4.19 REHABILITATION

4.19.1 Timing of Rehabilitation Works

Submission: R3

LCC referred to the timing of rehabilitation as presented in the EA and requested that the timing be supported with an appropriate SOC or through conditions of consent from DP&I.

Coalpac is committed to progressively establishing rehabilitation generally in accordance with the conceptual areas shown in Figure 10 to Figure 13 and as described in Section 8.24 of the EA. This commitment is demonstrated by the strong rehabilitation track record under current approvals, as discussed in Sections.

Coalpac will also develop a consolidated RLMP as committed to in Section 8.24.8 of the EA. This document will provide detail and management commitments on the timing, establishment, maintenance and performance monitoring of rehabilitation works for the Project.

4.19.1.1 Restoration of Biodiversity and Geodiversity in Project Rehabilitation

Submissions: R6, SIG1, SIG3, SIG4, SIG6 – SIG9, SIG11, SIG12, SIG14, SIG18, SIG20, Petition, P813

A number of submissions noted that the rehabilitation of open cut coal mines is incapable of restoring the original biodiversity and geodiversity of the Project Boundary.

As noted in Section 8.24.2, the primary rehabilitation objective for Coalpac's rehabilitation is to create a stable final landform and return the post-mining landscapes of Cullen Valley Mine and Invincible Colliery to emulate the pre-mining land capability and vegetation communities.

The rehabilitation program also aims to enhance local and regional ecological linkages across the site and with adjacent areas of the Ben Bullen State Forest. These key objectives for rehabilitation will be retained for the Project.

Re-forestation will continue to be undertaken to develop vegetation communities that are generally consistent with the surrounding landscape, aiming to connect remnant native vegetation communities with re-established habitat areas. The rehabilitation strategy for the Project will also continue to focus on promoting biodiversity and the establishment of habitat for Threatened flora and fauna species.

While it is noted that the Project will remove large areas of habitat for a number of threatened species, the EIA has considered all threatened species that are known or with potential to occur within Project Boundary. The EIA also considered the habitat requirements of all species, the extent of direct habitat clearance, probable indirect impacts (e.g. edge effects, noise, dust, etc), and the potential to avoid, mitigate and/or compensate for the impacts predicted.

The EIA concluded that the impacts of the Project could be ameliorated for all species by a combination of avoidance, mitigation and compensation. This was to be achieved by staged clearing and progressive rehabilitation of disturbed areas, avoidance of some areas of forest and woodland clearance, active fauna management as part of the Biodiversity Management Plan (BMP), and provision of a comprehensive BOS (revised in response to submissions as noted in **Section 4.13.2.1**), both adjacent to the Project Boundary and in the surrounding region.

As noted in **Sections 4.1.2** and **4.6.5**, the open cut and highwall mining operations proposed for the Project will be managed to minimise any potential to the sandstone escarpment and pagoda features located within and adjacent to the Project Boundary. As such, the geodiversity of the exposed cliffs and pagodas will be retained within and adjacent to the Project Boundary.

4.19.1.2 Addition of the Ben Bullen State Forest to the Conservation Reserve System

Submissions: SIG1, SIG3, SIG7 - SIG8, SIG10 – SIG12, SIG14, SIG15, SIG20, Petition, P798

A number of submissions confirmed their support for the OEH proposal to add the Ben Bullen State Forest to the conservation reserve system due to its outstanding natural values.

Noted. While Coalpac proposed to support the progressive establishment of the GoS2 within the Project Boundary in the EA placed on public exhibition, OEH has subsequently noted in consultation that revisions to the Project BOS and indirect offset measures would be the preferred compensatory mechanism for the Project. These measures are discussed further in **Section 4.13.2.1** and **Section 4.13.2.2** respectively.

4.19.1.3 Agricultural Lands

Submission: R1

The submission received from NSW DPI confirmed that the Project would not affect commercial agricultural land and the Project rehabilitation would not require reinstatement of lands for agricultural use.

4.20 FINAL LANDFORM & MINE CLOSURE

4.20.1 Rehabilitation of Landform Slopes

Submission: SIG13

One submission noted the role of talus slopes in forming a natural batter or buttress against cliff escarpments and stated that these slopes can be steeper than the 34° angle of repose. It was noted that these slopes may not be able to be returned to their existing form after mining.

As noted in Section 8.2.3 of the EA, the distribution of talus and scree slopes within the Project Boundary is restricted to the immediate base of most cliffs, with only thin scree deposits noted in previous site inspections. Talus and scree deposits forming much of the steep terrain are limited in extent and depth, and more detailed investigation is required at final highwall design stage in order to fully delineate these features and risk assess their stability. As such, Coalpac has committed to a risk review buffer zone of 100 m between proposed open cut mining areas and these sensitive features.

Rehabilitation and the development of a post-mining landscape for the Project to return the areas to a form similar to the existing landscape is described in Section 8.24.4 and 8.24.5 of the EA. Management measures for rehabilitation and landform reinstatement will be detailed in a RLMP for the Project, should it be approved.

4.20.2 Final Landform Slope Angles

Submission: R15

One submission noted that the EA states that *"final slopes will be predominately formed at 18 degrees or less"* and requires that AII rehabilitated slope angles less than 18 degrees, free draining with no final void.

While the requirement to minimise final slopes is minimised, the requirements to restrict all rehabilitation slopes to be below 18 degrees is not ideal as many of the natural slopes within the Project Boundary are well in excess of this and up to 30 degrees in some localised areas. To achieve an 18 degree slope in these localised areas would create additional and unnecessary disturbance at the toe of the OEA and such a slope would not be consistent with the surrounding landform and natural landscape.

All endeavours would be made to ensure the slope angle is 18 degrees or less wherever practical, with the exception of localised areas where the natural slope angles at the highwall crest are greater than 18 degrees.

This is consistent with the existing Approval conditions. As noted in Section 8.24.8 of the EA, Coalpac will develop a consolidated RLMP for the Project in consultation with DRE and in accordance with the *Guidelines to the Mining, Rehabilitation and Environmental Management Process.*

4.21 PROJECT JUSTIFICATION

4.21.1 Changing Values of Coal Mining Assessments

Submission: SIG1

In their submission, BMCS stated that there has been a change in the valuation of the value of coal mining assessments due to a greater understanding of greenhouse gas emissions, climate change, and a clearer understanding of the economic and social value of the environment at regional and local scales. It was noted that, from the viewpoint of BMCS, that the environmental and social costs of the Project may be of similar or even greater magnitude than the coal profits foregone. Reference was also made to excerpts from the NSW Planning and Assessment Commission (PAC) report for the Bulli Seam Operations (NSW PAC 2010) where the inherent values of the environment were discussed.

An overview of the impact assessments undertaken for the Project is presented in Section 10.9 of the EA. This section confirms that the Project has been conservatively assessed based on worst case scenarios, assuming the Project is operating at a maximum coal production rate of 3.5 Mtpa and all reasonable and feasible mitigation measures have been applied. Project mine plans have been prepared to facilitate economic productivity within the constraints of the site and all relevant environmental criteria and careful consideration has been given to comments received from the local community of Cullen Bullen and other near neighbours, particularly in relation to noise, blasting, air quality greenhouse gas, socio-economic and potential visual issues.

As stated in Section 10.10 of the EA, the environmental and planning context of the Project was assessed in accordance with Section 5 of Part I of the EP&A Act and is therefore considered to address the 'objects' of the Act. These 'objects' of the EP&A Act also adopt the principles of Ecologically Sustainable Development (ESD) in the application of the Act, as articulated in Section 6(2)(a) of the *Protection of the Environment Administration Act 1991* where it is stated that:

> *"…ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs…"*

The key principles of ESD were considered and addressed for the Project in Section 10.10.2 of the EA and include:

- The Precautionary Principle;
- Intergenerational Equity;
- Biodiversity Conservation; and
- Improved Valuation.

The discussion of ESD principles from the EA is reproduced below:

Precautionary Principle

The precautionary principle is *"that if 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.*

In the application of the precautionary principle, public and private decisions should be guided by:

i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

ii) an assessment of the risk-weighted consequences of various options,"

Adherence to the precautionary principle requires avoiding serious or irreversible environmental damage by properly assessing potential impacts and taking the necessary mitigation measures.

The Project is consistent with this principle in that it has been assessed to avoid all serious or irreversible damage to the environment. This EA identifies, with certainty, all environmental impacts from the development of the Project which has been designed to avoid serious or irreversible environmental damage to the environment by properly assessing potential impacts.

To ensure this, this EA is based on a 'worst case scenario' basis. Where a potential serious or irreversible damage was identified the appropriate redesign of the Project has been implemented to avoid those consequences.

Intergenerational Equity

This principle requires *"that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations"*.

The structure of the Project, determined through the examination of the alternatives along with the commitments to environmental management systems, and the management and mitigation measures proposed, will operate to ensure that there is no effect on the environment as a result of the Project which would diminish the health, diversity or productivity of the environment for future generations.

This has been achieved by limiting the scale of the Project and excluding development from sensitive areas. Where appropriate for compliance with this principle the Project has been subjected to development and operational standards as well as by providing for generous offset areas, particularly in relation to native vegetation and CEEC.

Biodiversity Conservation

This principle requires the *"conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration"* of any development proposal.

The design of the Project in excluding large areas of native vegetation and CEEC along with the Biodiversity Offset Strategy committed to by Coalpac, demonstrate adherence to this principle and ensure that the Project will not threaten the preservation of biodiversity and ecological integrity of the area and that the biodiversity and ecological value of the area is maintained and potentially improved in the long term.

Improved Valuation

This principle is as to *"improved valuation, pricing and incentive mechanisms - namely that environmental factors should be included in the valuation of assets and services, such as:*

i) polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;

ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and

iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems."

The Project adheres to this principle in providing for Coalpac to acquire properties that are materially impacted, the establishment of infrastructure such as the coal conveyor to the MPPS, the construction of a bridge over the highway, the bunding of active areas, surrendering areas sensitive to mining from the active Project area and the vegetation offset strategy.

4.21.2 Social and Environmental Licence to Operate

Submission: SIG8

One submission stated that Coalpac does not have social licence to operate, citing concerns regarding the Project in the local community and by environmental groups and previous poor environmental performance. LEG also noted that Coalpac does not have an environmental licence to operate in the Ben Bullen State Forest or the Gardens of Stone Stage 2 proposal area.

While it should be noted that Coalpac's existing operations of Invincible Colliery and Cullen Valley Mine interact with the existing community and the environment of the Ben Bullen State Forest, there is no presumption that the Project would achieve a social and environmental licence to operate. Rather, it was the objective of the detailed pre-feasibility and technical studies undertaken for the Project to consider and address critical issues to ensure that it is available to the determining authority to approve the proposal.

As noted in Section 10.6 of the EA, once the 'No Project' and the Optimal Resource Recovery Mine Plan options were unacceptable, detailed assessment was undertaken to identify a Project design that could meet the legal, social, political and environmental expectations of the community and achieve a 'social licence to mine'. The outcome of this process is that the Project is able to be approved in accordance with the 'objects' of the EP&A Act and the principles of ESD, as well as compliance with the DGRs.

Section 4.22.7.1 includes a discussion on Coalpac's current environmental record.

4.21.3 Underground Mining Precedents

Submissions: SIG3, SIG8

This submission noted that:

> *"The proposed open-cut mining would, if approved, set the precedent of open-cut mining along the western facing slopes of the Great Dividing Range to within 50 metres of the pagoda studded sandstone cliff lines. If this sort of mining were to be proposed in the Capertee Valley, the Hartley Valley or the Wolgan Valley, a spontaneous public protest would arise from the influential middle classes that would see such proposals rejected, and perhaps even prevent development applications being lodged. The only difference between those proposals and this current open-cut proposal is that the protestors from Cullen Bullen are less well connected.*

> *There are other superior coal resources that could be mined in preference to these remnant resources. These resources are found in a location distant from settlement areas and can be obtained by underground mining methods. Further, less damaging underground coal mining methods also could be pursued to obtain the last remnants of coal under Ben Bullen State Forest. Underground mining occurs to the north, south and east of the proposal."*

Concern was also raised by that the Project will set a precedent of open cut mining in the Gardens of Stone.

Should it be approved, the Project would not create a precedent for mining in the wider Capertee, Hartley or Wolgan Valley. As with the Project, any subsequent application for mining in the region would be assessed on its individual merits, impacts and mitigation by the determining authority.

Coalpac acknowledges and agrees with the importance of the sandstone and escarpment features located within and adjacent to the Project Boundary. As such, it has excluded them from direct mining impacts (resulting in the sterilisation of 14 Mt of coal and $629.4M) and included risk management buffer areas (as described in Section 8.2.3 of the EA). Additional required management and mitigation measures will be put in place to ensure that any potential for disturbance to these features are minimised. These measures are outlined in **Section 4.1.2**, **Section 4.6.5** and in **Appendix D**.

The potential for the Project coal resource to be accessed by underground operations was considered in the pre-feasibility and EA studies and was found to not be a viable option as described in detail in Section 4.2.2 of the EA and in **Section 4.21.3** of this RTS.

As noted in Section 2.2.1 of the EA, the Gardens of Stone National Park is located approximately 2 km to the north of the Project Boundary and will not impact on this reserve. The Project is, however, located within a small portion (1.3% of the proposed land area) the GoS2 proposal area and the impacts predicted for this area are discussed in Section 8.14.3 of the EA.

The Project Disturbance Boundary will only directly affect 1.3% of the total proposed GoS2 conservation area as proposed in Muir (2005). The Project has also been designed to avoid impacts to significant geological features such as pagodas and escarpments and the proposed (Revised) BOS (see **Section 4.13.2.1**) for the Project will add to or complement some of the objectives in GoS2 in the long term.

4.21.4 Viability of Underground Mine Plan Option

Submissions: SIG3 – SIG4, SIG9, P3, P342, P629, P786, P813, P877

A number of submissions question the use of the open cut and highwall mining methods proposed for the Project on a number of grounds. Concerns noted include the increased surface impacts of open cut methods relative to those from underground mining, higher coal quality and the lower intensity of underground operations.

As noted in Section 4.2.2 of the EA, the development of an underground mining operation was considered during the pre-feasibility planning stage of the Project. This review assessed the existing underground workings within the Project Boundary and the available coal resource to determine whether an underground operation would be viable.

Throughout the 130 year history of coal mining in the local area there have been no significant commercial underground operations in any coal seam other than the Lithgow Seam (beyond some exploration adits in other seams). This is compelling evidence that the only coal seam in the local area that can financially support underground operations is the Lithgow Seam. Over that same period, focus on underground mining in the Lithgow Seam has led to the completion of extensive underground workings and the practical exhaustion of underground reserves in that seam within the Project Boundary (as per Figure 39 of the EA).

The Lithgow Seam is only present in a workable thickness over a portion of the total area covered by the Project Boundary. Underground mining cannot be supported in the coal seams that overly the Lithgow Seam, not because of low margin, but for the fact that the cost of extracting the coal by underground means exceeds its value (i.e. no margin and loss making). It is only the lower operating cost of open cut and highwall mining that makes the Project coal resource economical.

Recognising the impact of open cut mining, Coalpac has proposed to employ highwall mining widely within the Project to minimise the surface disturbance, particularly adjacent to and beneath the sandstone cliffs and pagoda formations. The relatively low operating costs of an unmanned and unsupported (in terms of the underground entries) mining system such as highwall mining permits economic access to the seams that overly the already extensively worked Lithgow Seam.

The combined application of open cut and highwall mining proposed for the Project is a balance between maximising resource recovery, economic operation and minimisation of impact upon the environment and community.

A response to the issues raised in submissions regarding the regional precedent for underground mining operations are included in **Section 4.21.3**.

4.21.5 Availability of other Coal Resources

Submissions: SIG1, SIG3, SIG22

Several submissions noted the availability of other remnant coal reserves and resources in the region that could be developed to provide the required coal supply to MPPS. Particular reference was made to the ability of existing underground operations in the region to satisfy the coal needs of local power stations.

As noted in Section 10.5.2 of the EA, if the Project not be approved, the closure of Cullen Valley Mine and Invincible Colliery in 2012 following the extraction of coal resources allowed under existing approvals would sterilise more than 108 Mt of coal reserves that is optimally located for the most environmentally and economically efficient fuel supply to MPPS.

TRUenergy would also lose the availability of up to potentially 2.625 Mtpa of suitable steaming coal from the Project seen to be critical for the future stable and economically optimal operation of MPPS and generation of electricity (see TRUenergy correspondence in Appendix D of the EA). Coal for MPPS would need to be replaced by other sources expected to be from further afield via rail, for which the rail unloader would need to be constructed at cost to electricity prices and greater other costs (including greenhouse gas emissions and other social and environmental costs).

Responses to the EA as provided by Delta Electricity and TRUenergy outlining their position of support for the Project and the implications of accessing other coal resources for use in MPPS is summarised in **Section 4.17.1**.

4.21.6 Renewable Energy Alternatives

Submissions: SIG1, SIG3, SIG9, SIG11, SIG22

A number of submissions stated that renewable energy alternatives to coal and options for energy conservation were not adequately assessed, or were inaccurately dismissed in the EA justification. The increasing viability of renewable energy technologies in supply of base load energy requirements was also noted.

As noted in Section 10.1 of the EA, there is a general acceptance that there will be a continuing requirement for coal to meet basic energy needs and in particular, for electricity generation (IEA 2011 and AEMO 2011). International and local predictions are that the need for coal as a source of energy for electricity production will increase for some years to come despite an expectation of an increase of energy from alternate sources.

While the EA acknowledges the non-renewable nature of coal resources and the impacts of coal fired power generation on greenhouse gas emissions, it should be noted that an alternative source has not yet been, or not considered to be for some time to come, developed sufficiently to replace carbon based energy entirely as the source of energy for base load electricity supply (IEA 2011). The expected path forward with regard to energy for the world, is that while there will be development of non-carbon based energy, the political technological challenges and infrastructure development requirements (when compared to the inevitable increase in demand for electricity) is that there will, for some time, continue to be a need for low cost, good quality, thermal coal for electricity generation, such as would be produced by the Project.

Even with a reduction in the energy growth rate due to demand management initiatives and increased production from renewable energy sources in the State, it is expected that a large proportion of the energy demand will need to be met by the existing coal fired power generating facilities for some time to come (Dodson and Dunckley 2011).

The Invincible Colliery and Cullen Valley Mine have been long term suppliers to the Delta Electricity owned WPS and MPPS near Lithgow which together produce approximately 8% of the total generation in the National Electricity Market from some 6.0 Mtpa of coal.

Presently, the two mines provide more than 40% of the coal consumed at MPPS. With the Project, this would increase to a predicted 70% in the future. Coalpac has entered into a long term contract to supply up to 2.625 Mtpa of coal to MPPS. The Project therefore plays an important role in the continuation of the supply of the coal to MPPS ensuring continuity of their capacity to meet the demands for reliable and optimally priced steaming coal in the cheapest and least environmentally impacting manner.

The Project will also ensure the continuation of coal supply to the local power stations for the support of the capacity and reliability of the operation of the Delta Electricity power stations to support the ability of TRUenergy to supply competitively priced electricity to NSW (Section 10.3.3 of the EA). Further, it was noted in Section 10.3.4 of the EA that to the extent that planning approvals to allow ongoing coal production are not granted, TRUenergy will need to procure additional coal supplies from either local suppliers or further afield.

Significant reductions in Coalpac's supply will lead to higher costs for TRUenergy, the wholesale market and in turn retail customers of electricity. One of the key reasons for increased supply lies in the potential need to move away from local mines or pay higher coal prices to local suppliers if Coalpac's operations are discontinued (see also **Section 4.17.1** of this document).

4.22 GENERAL

4.22.1 Support for the Project

Submissions: P1, P2, P4, P5 - P7, P15, P21, P22, P26 - P64, P66, P67, P70, P71, P72 – P100, , P105 - P112, P118 - P143, P145, P149, P151 - P156, P158, P163, P171, P185, P287, P295, P309, P315, P354, P406, P450, P463, P529, P567, P705, P708, P715

Of the public submissions received during exhibition of the EA, 133 expressed support for the Project on a number of grounds. In addition to general expressions of support, these submissions also noted several key benefits of the Project which are summarised below. Submissions in support of the Project received from SIGs are included in **Section 4.17**.

Economic Impacts

The positives economic impacts, both direct and through flow-on effects, were cited in many of the public submission in support of the Project. These included beneficial economic impacts associated with:

- Direct employment effects for the Project workforce;
- Flow on effects to existing and new service providers;
- Investment in the Project site and contributions to the local community;
- Contributions to the NSW economy due to increased output and business turnover;

- Continuation of the supply of product coal to MPPS and other facilities for electricity generation and other industrial processes. In particular, a number of submissions noted that under the Project, Coalpac will continue to provide a large proportion of the total coal demands of MPPS.

Social Impacts

The importance of the continuation and consolidation of Coalpac's operations as proposed for the Project in providing ongoing employment and economic stimulus was also noted as a key factor in supporting the local community from a social perspective. A number of submissions in support of the Project noted the additional social contributions that the Project would provide through the promotion of local employment and the long term stability that would be provided should it be approved.

Several submissions also stated that they would be obliged to leave the local area to seek work elsewhere should the Project not be approved, which would lead to further flow-on social impacts.

Environmental Management

A number of submissions in support of the Project also made reference to Coalpac's existing environmental management record in minimising community impacts and through demonstrated compliance with environmental monitoring criteria. It was requested that these monitoring and environmental management measures should continue for the Project and Coalpac's commitment to a high standard of environmental management was also noted.

The ability of the Project to access a known coal resource to continue the supply of product coal to MPPS in the most efficient manner available was also noted in the submissions. The proposed development of the MPPS conveyor and site infrastructure to reduce the number haul trucks (allowed under current approvals) off public roads adjacent to Cullen Bullen was also noted as a positive aspect of the Project.

Coalpac's detailed mine planning process undertaken for the Project to minimise environmental impacts to the community in response to local concerns raised in consultation was also noted in several submissions as a positive outcome from the EA process.

4.22.2 Mining Proximity to Cullen Bullen

Submissions: R3, SIG3, SIG8

LCC noted their resolution to not object to the Project should appropriate management controls for amenity issues for Cullen Bullen be put in place. LCC also noted that mining should not take place within 500 m of Cullen Bullen or individual residences outside of town or the Cullen Bullen General Cemetery.

A large number of other submissions from SIGs and the public stated that the open cut mining operations proposed for the Project are located too close to Cullen Bullen, raising concerns around an inadequate buffer zone and the resultant impacts to amenity and health due to air quality, noise and blasting and visual impacts from the Project. Specific issues regarding impacts to Cullen Bullen are addressed in greater detail in **Sections 4.2**, **4.5** and **4.6.1** of this document.

No open cut mining operations for the Project will take place within 500 m of any residence located in Cullen Bullen. No mining operations will occur within 500 m of a residence located outside of Cullen Bullen without prior agreement between Coalpac and the landholder. Coalpac has proposed further commitments to restrict, manage and control mining operations within a 500 m radius of the Cullen Bullen General Cemetery as outlined in **Section 4.12.1**. As such, a buffer zone excluding mining operations from occurring within a specific distance from Cullen Bullen has been considered and incorporated into the Project, and no further restrictions are required.

Cullen Bullen Buffer Zone

A large number of submissions also required that a buffer zone be established surrounding Cullen Bullen and coal mining operations should be excluded from this area due to impacts on the health and amenity of residents within the town. While the buffer zone distance requested in submissions varied (buffer zones of up to 5,000 m were noted), this issue was raised from a number of SIGs and in responses from the public.

As noted in Section 4.2 of the EA, Coalpac completed comprehensive pre-feasibility studies to develop a detailed understanding of the Project, which included the review of various mine planning, infrastructure and operating scenarios. The key objectives of these assessments were to minimise environmental and social impacts on the Cullen Bullen township and other nearby receivers and the natural environment, whilst maximising resource recovery and operational efficiencies that could be achieved through the consolidation of Invincible Colliery and Cullen Valley Mine as proposed for the Project. The conceptual mine plans for the Project were also assessed in consideration of the principles of ESD prior to being finalised.

As a result of the review phase, extensive changes to the concept mine plan presented in the EA were undertaken to reduce impacts to threatened flora species and to minimise noise, air and visual amenity impacts to nearby private neighbours, including those within Cullen Bullen.

Following the definition of concept mine plans, a range of further technical assessments were completed to predict impacts to the air quality (PAEHolmes 2012) and acoustic environment (Bridges 2012) of Cullen Bullen at receiver locations as a result of Project operations.

These assessments confirmed those receivers and properties that would receive impacts in exceedance of relevant regulatory criteria and that the adoption of best practice management measures committed to by Coalpac for the Project would result in the impacts being managed to below these criteria for the majority of residences within the town over the life of the Project. The proximity of open cut mining operations proposed for the Project in relation to the township of Cullen Bullen is presented in **Section 4.22.2** and shown on **Figure 19**.

In addition to the management and mitigation commitments specified in the EA, Coalpac will also design and implement a predictive meteorological system for use in the pro-active management of air quality and noise impacts for the Project. This system is discussed further in **Section 4.2.18**.

As such, a buffer zone excluding mining operations from occurring within a specific distance from Cullen Bullen is not required. Coalpac will seek agreements with all landholders predicted to receive significant air quality and noise in the EA, as described in **Section 4.22.3**.

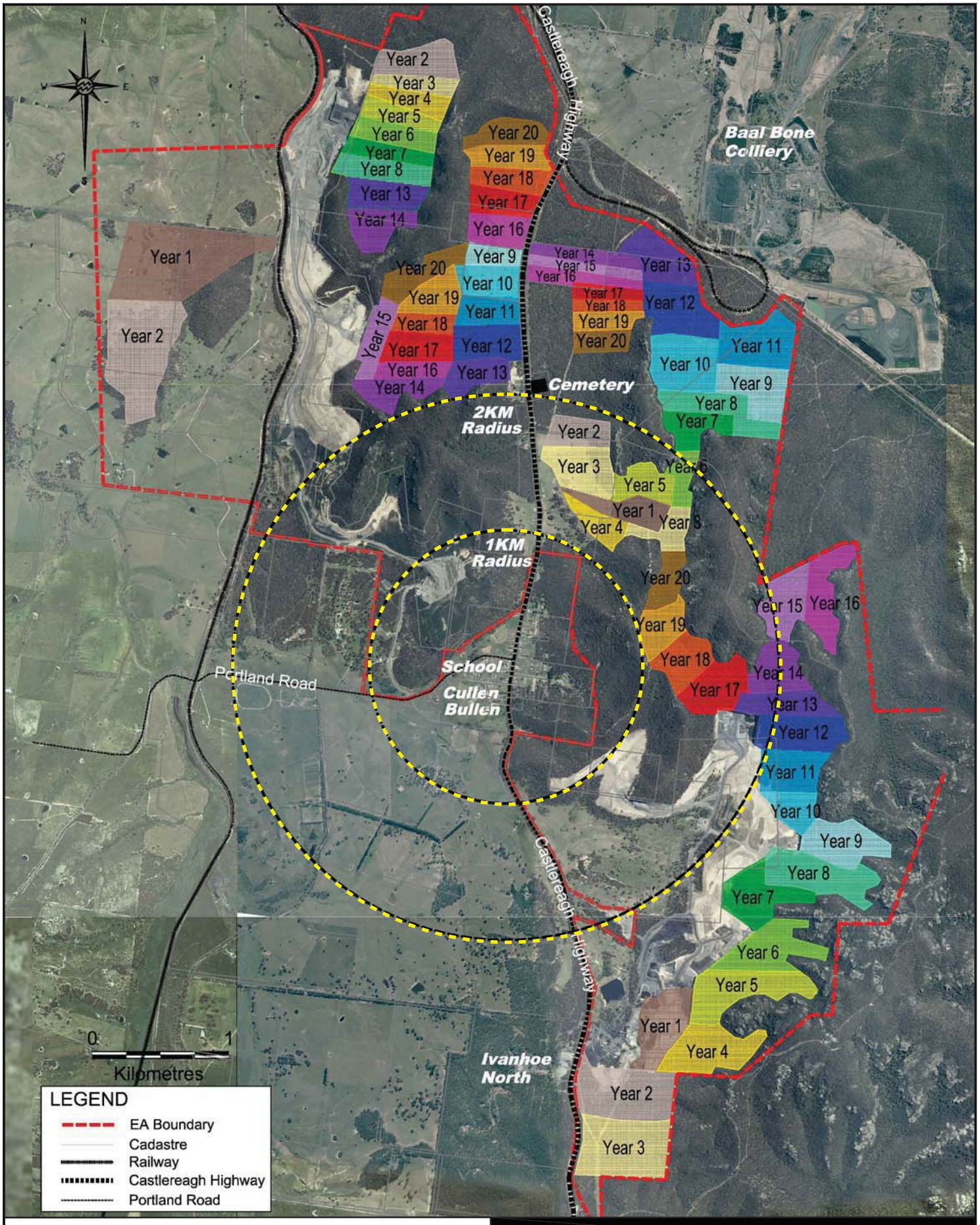
4.22.3 Landholder Agreements

Submission: R3

One submission noted Coalpac's negotiation of agreements with landholders as a means to mitigate Project amenity impacts predicted in the EA for private residences. It was also noted that these agreements should have some mechanisms in place to ensure that they are reportable and that any disputes that may arise can be adequately resolved.

LCC also noted that at the time of exhibition, Coalpac had not entered into agreements with all affected landholders identified in the EA and that the document does not indicate how the impacts will be mitigated should an affected landowner and Coalpac be unable to reach an agreement. To ensure that the terms of all landholder agreements for the Project can be assessed for compliance if required, Coalpac will provide all formalised agreements to the DP&I and LCC (without commercially in-confidence information) only with the permission of the private landholder.

Coalpac will use best endeavours to seek agreement with landholders identified in the EA as being predicted to receive adverse amenity impacts above relevant criteria. These include those private residences and properties discussed in Sections 8.3.3 and 8.6.3 of the EA where impacts above Project amenity criteria would still occur despite best practice management of noise and dust impacts being adopted by Coalpac.



Hansen Bailey

Coalpac Pty Ltd

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Annual Mining Areas

Cad File: 08636A.dwg	Date: 10.08.12	Drawn: CP	Figure 19

4.22.4 Land Acquisition Process

Submission: R3

LCC referred to the EA providing some affected landholders with a right to request acquisition from Coalpac due to predicted exceedances of relevant impact criteria and that this process should be well understood by all parties. LCC also raised the issue that there may be landholders that were not identified in the EA noise assessment as being entitled to request compulsory acquisition.

Should the Project be approved, it is anticipated that the DP&I will include conditions of Project Approval confirming those landholders with the right to request that their property be acquired by Coalpac at market value and the process by which this would occur. Those residences and properties that are predicted to exceed relevant air quality and noise management criteria are discussed in **Section 4.2** and **Section 4.5.**

An outline of the background noise levels adopted for the Project to assess project noise impacts and predict exceedances at receiver locations is provided in **Section 4.5.1** of this document. Further commitments in relation to noise predictions are included in **Section 4.5.5**.

4.22.5 Location of the Proposed MPPS Conveyor

Submission: P394

One submission noted that the route of the MPPS conveyor proposed for the Project runs across mining authorities that are held by Ivanhoe Coal Pty Limited (Ivanhoe) and Boulder Mining Pty Limited (Boulder) both subsidiaries of Centennial Coal Company Limited (Centennial). In particular, it was noted that:

> *"…the proposed corridor for the overland conveyor traverses ML 1301 and EL5899, both of which form part of Centennial's Proposed Neubecks Open Cut Project (Neubecks Project). The feasibility study for the Neubecks Project is nearly completed and base line environmental studies have commenced.*
>
> *The Neubecks Project feasibility study has identified a significant recoverable resource of saleable product at low ash that would be sterilised by the conveyor corridor. This high quality resource has a low strip ratio and would be a major profit contributor to the overall project.*
>
> *Centennial does not oppose the idea of an overland conveyor but strongly objects to the:*
>
> - *Significant commercial impact on the Proposed Neubecks Project, and*
> - *Sterilisation of coal resources and reserves, by the current proposal."*

It was also noted that the proposed MPPS conveyor route appeared to cross land that is part of the Coal Link Coal Haul Road (Haul Road) from Angus Place Colliery to Mount Piper Power Station. Centennial now leases and operates this Haul Road and have not been consulted on the interaction of proposed overland conveyor and the Haul Road.

Coalpac met with Centennial Coal representatives on 26 July 2012 to discuss their concerns regarding the proposed conveyor path. Coalpac presented details regarding the proposed alignment for the conveyor and committed to provide detailed drawings regarding the proposed conveyor path to highlight that it follows an existing access corridor for power transmission lines and its minimal impact upon ML1301 and EL5899. That information has been provided and Coalpac are awaiting their response.

4.22.6 Sand Mining Component of the Project

Submissions: SIG1, SIG3

One submission raised concern regarding the proposed sand mining component of the Project and the level of detail provided on the resource in assessing its environmental impacts and justifying the operation. It was also noted that the sand mining operations would result in acid generation and waste management issues, high energy and water demand, and traffic impacts.

One submission also noted that the sand mining component of the Project could compromise Sydney's expanding construction materials recycling industry.

A description of the sand mining component the Project is outlined in Section 4.4.3 of the EA. As stated in that section, the sand resource is contained within a friable, weakly cemented sandstone horizon which is stratigraphically located within a few metres of the immediate floor of the Lithgow Seam, with extraction via a low intensity truck / shovel operation and processing at a mobile crushing and screening plant (described in Section 4.6.2 of the EA). While the submission is correct in that approximately 4,000 – 5,000 L of water per tonne of product sand would be required during the wet screening process, the majority of this volume would be recycled as part of the recovery process, Of this, some water would be retained within the sand product sold (in a range of approximately 5% to 9%). Depending on the moisture content of the raw sand fed for processing, this may also include a small proportion of the water added through the washing process.

In the EA (Section 4.4.3 and Section 8.11.4), it was noted that the preferred option for waste materials generated by the processing of sandstone would be pumped via borehole into the abandoned underground workings of Tyldesley Colliery to assist in the management of the existing subsurface heating issue in that area. As stated, this activity would only occur if further geochemical testing of the sand resource confirms that the waste is inert and an alternate option would be to emplace sand processing waste in active overburden emplacements (Section 4.6 of the EA).

The progression of the sand mining operation following the extraction of the Lithgow Seam (the deepest seam in the target coal measures) in the northern Cullen Valley mining area for the Project will not impact on the effective rehabilitation of this area. The location of the sand resource in relation to the Lithgow seam will allow the lower intensity sand mining operation to occur without impacting on the progressive rehabilitation of the Cullen Valley mining area as shown on Figure 10 to Figure 14.

The Traffic and Transport impact assessment for the Project (Hyder Consulting 2012) identifies that the sand component of the Project would result in an increase of 64 one-way truck movements per day to the Sydney region. This would occur via the Castlereagh Highway and the Great Western Highway, with all trucks to leave the Project via the existing Invincible Colliery site access intersection. B Double trucks will not be used for the haulage of sand to market via the Great Western Highway.

As noted in Section 4.2.5 of the EA, the provision of sand product to the Sydney region as proposed for the Project would allow the shortage of construction sand in that market to be partially alleviated, with minimal environmental impact in addition to that already incurred by open cut coal mining activities. It is anticipated that the 0.45 Mbcm per annum product sand proposed for the Project would not have a significant impact on the construction materials recycling industry.

4.22.7 Fish River Pipeline Relocation

Submission: R3

One submission required that the realignment of the Fish River Pipeline be undertaken without disruption to the continuity of water service provision.

Noted. As per Section 4.12 of the EA, Coalpac will realign the existing Fish River Pipeline (in the East Tyldesley mining area) prior to Year 14 of the Project in consultation with the relevant regulators.

4.22.7.1 Coalpac's Environmental Record

Submissions: SIG1, SIG3, SIG8 – SIG9, SIG11, Petition, P442, P877

A number of submissions raised concerns regarding Coalpac's environmental management record and the number of non-compliances from their existing operations at Cullen Valley Mine and Invincible Colliery. Discussion on each is described below.

Cullen Valley Mine

In 2001, the Lithgow Coal Company was fined $30,000 for breaching the EPL conditions which requires that activities occurring in or on the premises must be carried out in a manner that will minimise the generation or emission of wind-blown or traffic generated dust at the Cullen Valley Mine. Lithgow Coal Company made a number of procedural and operational changes at their Cullen Valley Mine and as a result there were no further dust related compliance issues.

Coalpac purchased the Lithgow Coal Company in 2008 and since that time there have been minor and technical non-compliances against EPL 1095 and no other prosecutions or legal proceedings have been brought against the company at Cullen Valley mine as shown in **Table 19**.

Table 19
Cullen Valley Mine Environmental Track Record

Start date	Non-compliance	Licence Condition	Comment
10-Dec-10	Yes	M8.1	Meteorological monitoring station at Cullen Valley Mine experienced technical & equipment failures causing less than 3% data to be recorded. A new meteorological unit was ordered and installed on 1st March 2012 at Cullen Valley Mine.
10-Dec-09	Yes	L3.1	Minor exceedance of total suspended solids and pH limit
10-Dec-08	No	n/a	Full compliance.
10-Dec-07	No	n/a	Full compliance.
10-Dec-06	No	n/a	Full compliance.
10-Dec-05	No	n/a	Full compliance.
10-Dec-04	No	n/a	Full compliance.
10-Dec-03	No	n/a	Full compliance.
10-Dec-02	No	n/a	Full compliance.
10-Dec-01	Yes	L6	Noise exceedance on 28-Feb-02.
		O1.1	Bunding was identified as inadequate during compliance audit. This was rectified.
		M1.3	Minor technical breach - name of person who took sample was not recorded. Rectified.
		M2.1	Failed to undertake monitoring in accordance with condition. condition cannot be complied as not applicable to this site - licence needs to be revised. Now rectified.
		M4.2	Time of some complaints not recorded. Rectified.
		M7.1	Did not monitor all blasts as required by licence. Now rectified.
10-Dec-00	Yes	2.1	Licensee failed to collect the total number of samples specified in the license. Rectified

Start date	Non-compliance	Licence Condition	Comment
10-Dec-99	Yes	M2.1	Licensee required to conduct 52 samples annually during discharge events. Only 2 samples were conducted due to only 2 water discharge events occurring from DP1.
		L6.1	Exceedance of noise limits. Property was purchased, Project Mod and New Approval since that time.
		M6.2	Monthly dust monitoring not submitted to the EPA monthly as in accordance with licence. Rectified.
		L7.1	Exceedance of 120dBA blasting overpressure levels. Level recorded was 120.2dBA

Invincible Colliery

In 2006/2007 financial year, Coalpac began to recover more coal than originally planned (as a result of higher mining and processing recovery), and subsequently applied for a production increase Modification in April 2007. Coalpac anticipated receiving the Modification by September 2007. Three months later (December 2007) a modification granting approval for the additional limit (increasing by 150,000 tonnes per annum) was granted by DP&I. In 2008 Coalpac was fined for a breach of development consent for producing 100,000 additional tonnes of saleable coal in the 12 months to September 2007.

Coalpac has had, and continues to have a good environmental track record with only minor and technical non-compliances and no other prosecutions or legal proceedings have been brought against the company at the Invincible Colliery as shown in **Table 20**.

In addition to the comments in submissions on Cullen Valley Mine and Invincible Colliery, several submissions also referred to the pollution of the Grose River due to discharge of water from the closed Canyon Colliery Mine that is polluted with zinc and nickel.

Table 20
Invincible Colliery Environmental Track Record

Start date	Non-compliance	Licence Condition	Comment
28-Feb-11	Yes	L6.1	Exceedance of blast overpressure limit by 0.3 dBL (120.3 dBL) on 28/06/11
28-Feb-10	No	n/a	Full compliance.
28-Feb-09	No	n/a	Full compliance.

Start date	Non-compliance	Licence Condition	Comment
28-Feb-08	Yes	L3.1	Minor exceedance of TSS concentration at Discharge point 1 on 1 occasion (16/05/08)
28-Feb-07	No	n/a	Full compliance.
28-Feb-06	No	n/a	Full compliance.
28-Feb-05	Yes	M2	Failed to undertake all monitoring required
28-Feb-04	Yes	M2.1	Licensee failed to monitor discharge at DP001 and DP002
28-Feb-03	Yes	M2.1	Failure to conduct any monitoring as required by licence
28-Feb-02	Yes	M2.1	Monitoring not undertaken at monitoring point 1 as required by licence.
28-Feb-01	Yes	2.1	Licensee did not sample at the frequency required by the license
28-Feb-00	Yes	L3	Exceedance of TSS discharge limit
		R3	Incorrect statement of compliance

While the discharge of mine water from Canyon Colliery (approximately 32 km from the Project Boundary) is not relevant to the Project, it should be noted that Coalpac is managing the site in accordance with an approved Mine Closure Plan and six monthly water monitoring program to track the sustained long term improvement in the water quality of the discharge from the site. The agreed site rehabilitation program has been successfully implemented with the support of both the DRE and EPA.

The election to adopt a strategy of natural attenuation with monitoring and assessment was made based on the findings of an independent technical report. An independent review of the management of groundwater at the site in 2009 found that that any method for treatment of the polluted water would result in additional impacts to the region and recommended that natural attenuation with a monitoring program was the best management strategy. The report considered a range of alternative strategies including capture, treat and release.

Monitoring results over the past 2 years have shown a general improvement in the water quality which supports the adoption natural attenuation strategy. The effectiveness of the natural attenuation strategy is due to be formally assessed in 2013.

4.22.7.2 Project Conditions of Consent

Submission: R3

LCC requested that the DP&I provide the opportunity to review any draft consent conditions in the event that Project Approval would be imminent. The LCC also noted that the issue of what type of works would require Construction Certificates and approval under the Local Government Act should be clarified.

Noted. Coalpac will engage with LCC on the preparation of Construction Certificates required for the Project to ensure compliance with the relevant requirements of the Local Government Act.

4.22.7.3 Intensification of Mining Operations Upon Approval

Submission: SIG3

One submission noted that the Project seeks to wind back environmental protections embodied in the existing Planning Approval for Invincible Colliery by replacing areas approved for highwall underground mining with an approval for open cut mining over the same area. Concern was noted that the Project seeks to overturn the previous consent (Project Approval (PA) 07_0127 for Invincible Colliery) in relation to mining operations and final landform and subject new areas under the pagoda complexes to highwall mining operations.

Noted. The submission is correct in that the Project proposed to change the method of mining currently approved under PA 07_0127 from highwall to open cut. As noted in Section 4.3 of the EA, the existing constraints from the existing development consents (including Invincible Colliery PA 07_0127) on current Coalpac operations have been incorporated into the EA.

In addition, the single consolidated Planning Approval sought for the Project seeks to maintain and enhance environmental protections in place for Coalpac's currently approved operations. Commitments to ensure that leading practice environmental protections proposed for the Project are implemented were outlined in the EA and reproduced below in **Section 5** of this document.

4.22.7.4 Project Risk Assessment

Submission: P61

One submission strongly objected to the Project risk assessment, noting that additional mitigation measures should be requested by DP&I.

The revised environmental risk assessment as summarised in Section 7 of the EA presents a ranking of the risk associated with Project impacts in the absence of mitigation controls. These controls guided the assessment to each issue assessed in the technical studies completed for the EA.

4.22.7.5 Request for Acquisition due to Amenity Impacts

Submissions: P613, P844

Two submissions from the landholders of Receptor ID 258 (as per Table 2 and Figure 3 of the EA) requested that Coalpac acquire that property at full market value due to loss of amenity due to blasting, air quality and noise impacts. It was also requested that conditions requiring that Coalpac to purchase properties on request be added to any conditions of approval for the Project.

Predicted amenity impacts for the Project from the EA are presented in **Section 4.2.15** and **Section 4.5.5**. As noted in these sections, the property of Receptor ID 258 is not predicted to receive noise impacts above the PSNC. The property is predicted to experience 24 hour PM10 levels greater than the relevant criterion for 1 day per year under Year 20 modelling conditions. As noted in Section 8.3.3, the AQIA modelling represents worst case operation of the Project under adverse prevailing weather conditions and it is expected that the proactive management of operations (see **Section 4.2.18**) would result in these the PM10 24 hr impacts not being experienced at this receptor location.

As such, this property is not expected to receive conditions requiring acquisition upon request under any approval for the Project.

4.22.7.6 Temporarily Vacating Residences for Project Blasts

Submission: P725

One submission raised the issue that older residents are intimidated when asked to leave their homes when a blast is due.

Coalpac has discussed the impacts of the Project with the two individuals whose residences may be within a 500 m radius of proposed blasting areas. During this consultation, Coalpac committed that wherever reasonable and feasible, Coalpac will avoid blasting within this area. Where blasting was necessary and unavoidable, Coalpac committed to working with relevant individuals and where any temporary relocation may be required due to blasting, to ensure that inconveniences are minimised.

4.22.7.7 Response to Environmental Complaints

Submission: P725

One submission noted that there would be a fear of reprisals for any residences that made complaints regarding the Project.

While the submission did not specify specific instances where any such event had occurred, Coalpac will continue to follow the existing complaints recording and response procedure for the Project.

Coalpac will continue to encourage its near neighbours to provide any comments on its operations via its existing community line on (02) 6359 0600, as regularly listed on community Newsletters to assist in continual improvement at its operations.

4.22.7.8 Temporary Road Closures for Project Blasting

Submission: P813

One submission noted that the adequate notice should be placed on a number of locations on the local traffic network to provide adequate notice of temporary closures of the Castlereagh Highway for Project blasting, with advertisement in local newspapers and radio several days prior.

Noted. Coalpac will continue to advertise any temporary road closures required for the Project.

5 REVISED STATEMENT OF COMMITMENTS

Following consideration of the submissions received from stakeholders in response to the public exhibition of the Project, Coalpac has updated the SOCs listed in Table 69 of the EA to incorporate additional management and control measures to further mitigate any potential adverse environmental impacts. Additional commitments from this RTS to that presented in the EA are shown in **bold**.

Coalpac propose to operate the Project in accordance with the SOCs described below in **Table 21**.

Table 21
Project Revised Statement of Commitments

Ref	Commitment	Section
Mining Operations		
1	Coalpac will extract coal via open cut and highwall mining methods at a rate of up to 3.5 Mtpa product coal for 21 years from the grant of a mining authority, generally in accordance with this EA.	EA 4
2	Coalpac will ensure that open cut mining in the Lithgow Seam does not encroach within 50 metres of the Tyldesley Colliery Workings and that the water extraction from these workings will be managed to assist with mitigation of the localised subsurface heating at Cullen Valley Mine.	EA 8.10
3	Coalpac will design and undertake highwall mining operations generally as described in this EA to no noticeable surface subsidence (i.e. < 20 mm at the surface).	EA 4.4.3 & 8.1
4	The total area of active open cut mining in any given year will be limited to less than 100 ha over the life of the Project.	EA 4
5	The Project will include an additional standoff zone from any open cut highwall crest of at least 50 m from any pagoda or significant sandstone escarpment or outcrop. For any exposed significant outcrop or formation that does not occur within the above category, the open cut highwall crest will include a standoff zone of a minimum of 20 m.	EA 4.4.3
6	Coalpac will seek the appropriate licences and approvals as relevant to the Project and listed in Table 12.	EA 5.8
7	Coalpac will surrender its existing planning approvals as listed in Table 12 following the grant of the Project Approval at a time mutually agreeable with DP&I.	EA 5.8
6	No mining operations will occur within 500 m of a residence located outside of Cullen Bullen without prior agreement between Coalpac and the landholder.	RTS 4.22.2
7	**Conduct and document regular inspections associated with the highwall joint conditions, joint orientations and overall stability of the highwalls, to be undertaken by appropriately qualified geotechnical specialists. Geotechnical mapping of highwalls and regular pagoda**	**RTS 4.1.2**

Ref	Commitment	Section
	and escarpment inspections via physical or photogrammetric methods will be carried out as design and risk assessment inputs.	
8	**The Project Highwall Mining Management Plan (see EA SOC Ref 8) will include at least the preparation of:** **• A Hazard Map (vertical elevation) of the highwall, defining and locating any significant hazards and potential zones of localised (small scale) instability. The highwall mining layout will be aligned with a surveyed baseline. This baseline will be set out and validated by the mine surveyor. Any other localised hazards or restrictions to work practices shall be included on the Hazard Map;** **• Highwall Mining Plan (plan view) showing the pillars and Barrier Pillars, survey baseline, toe position, crest position, surface features including pagodas and escarpments/cliffs and any other significant features; and** **• Risk Assessment specifically addressing the risk of instability of the highwall (large scale) that could threaten any surface cliff and pagoda features, and the risk of pillar instability and surface subsidence >20 mm (the design criteria).**	**RTS 4.1.2**
9	**Coal production will not increase from the currently approved volume of 2.2 Mtpa (combined Cullen Valley Mine and Invincible Colliery volumes) to the 3.5 Mtpa sought for the Project until attenuated mobile equipment is on site.**	**RTS 4.5.4**
Environmental Management		
10	Coalpac will develop and implement an Environmental Management System in consultation with the relevant regulators (and the Aboriginal community where relevant) consistent with Section 6 of this EA to the approval of DP&I which shall comprise: • Environmental Management Strategy; • EMP (incorporating subsidence, air quality, noise, blasting, surface water and groundwater); • Highwall Mining Management Plan; • Subsurface Heating Management Plan; • Biodiversity Management Plan (including Land Disturbance Protocol); • Biodiversity Offsets Management Plan; • Rehabilitation and Landscape Management Plan (including consideration of Cullen Bullen General Cemetery); • Water Management Plan (including groundwater and surface water); • Aboriginal Cultural Heritage Management Plan; • Historic Heritage Management Plan; • Bushfire Management Plan; • Traffic and Transport Management Plan (including coal and sand haulage); • Waste Management Plan (including for hazardous materials); • Slope Stability Major Hazard Management Plan; and • Sandstone Pagoda Risk Analysis Procedure (including all commitments from blast, slope analysis, Aboriginal heritage assessments into one checklist form).	EA 8
11	Coalpac will seek an environmental monitoring data sharing agreement with neighbouring industry to allow for the assessment of cumulative impacts and the development of co-operative management measures.	EA 8.3 & 8.10

Ref	Commitment	Section
Air Quality and Greenhouse		
12	Coalpac will utilise technologies and initiatives to achieve the air quality outcomes described in this EA.	EA 8.3 & 8.5
13	Coalpac will undertake calculations of greenhouse gas emissions and annually review energy efficiency initiatives to ensure that Scope 1 greenhouse gas emissions per tonne of product coal are kept to the minimum practicable level.	
14	Coalpac will install a real-time air quality monitor in consultation with Office of Environment and Heritage.	
15	Coalpac will install a real-time meteorological monitoring station with predictive air quality modelling software capabilities at a location selected in consultation with the Office of Environment and Heritage.	
16	**A proactive real-time air quality monitoring system will be installed prior to increasing production above currently approved limits.**	**RTS 4.2.1**
17	**Coalpac will manage dust emissions from haul trucks travelling on the internal haul road by the use of water carts (including Level 2 watering).**	**RTS 4.2.3**
18	**Air quality KPIs and associated review periods from the existing Coalpac PRPs will be adopted for Project operations and included in the AQMP.**	**RTS 4.2.4**
19	**Coalpac will the implement the air quality management controls for the MPPS conveyor and haul truck sizes as noted by the EPA in their submission, consistent with the EA.**	**RTS 4.2.19**
Noise and Blasting		
20	Coalpac will utilise the noise control and management measures listed in Section 8.6.4 to achieve the predicted noise levels at private receivers as listed in Table 27 and Table 28.	EA 8.6
21	Coalpac will install a real-time noise monitoring system with monitors at locations selected in consultation with Office of Environment and Heritage.	EA 8.6
22	Coalpac will design all mine blasts through utilising the control and management measures in this EA to achieve the vibration and overpressure criteria for all sensitive surface features listed in this EA (see Table 30).	EA 8.7
23	**The additional noise attenuation works for the ICPP as described in the AIA and EA will be undertaken by Year 2 of the Project.**	**RTS 4.5.1**
24	**Any plant and equipment found to have defective or missing sound attenuation components will not be used operationally until repaired/reinstated.**	**RTS 4.5.4**

Ref	Commitment	Section
25	**Coalpac will implement leading practice management measures to ensure that residences and properties predicted to receive mild noise impacts during at least one modelled year for the Project do not receive noise impacts above 35 dBA (whilst an Agreement is not in place).**	**RTS 4.5.5**
26	**The predictive meteorological component of the Air Quality Management System to be implemented for the Project (Section 4.2.18) will be used to proactively identify the areas of the site where operations will need to be modified to meet predicted air quality criteria.**	**RTS 4.5.5**
27	**Coalpac will revise the Draft Noise Management Procedure for the Project in consultation with EPA on a six-monthly basis.**	**RTS 4.5.14**
28	**Coalpac will implement a real-time monitoring system for the Project, enabling blast management decisions to be made as weather conditions change.**	**RTS 4.6.1**
29	**Coalpac will offer all private residences within 2 km of active blast areas for the Project an independent baseline structural survey prior to Project mining upon receipt of a written request from the landowner. The independent contractor would be approved by DP&I prior to the surveys being undertaken.**	**RTS 4.6.3**
30	**Blasts required for any mining activities within 500 m of the Cullen Bullen General Cemetery (the closest point being a distance of 178 m) will be designed to manage vibration and overpressure levels.** **No blasting will occur on days when formal services are scheduled at Cullen Bullen General Cemetery; and no mining or coal haulage within a 1,500 m radius will occur within two hours of formal services at Cullen Bullen General Cemetery.**	**RTS 4.12.1**
Visual		
31	Visual bunds will be constructed generally in accordance with Figure 10 to Figure 13 to reduce visual impacts of private receivers and where practical, along the Castlereagh Highway.	EA 8.8
32	Infrastructure lighting will consist of horizontal lights with hoods and louvres in elevated and exposed areas utilising low brightness lights to the level necessary for operational and safety requirements to minimise adverse night lighting impacts.	EA 8.8
33	Specific mitigation measures will be developed and implemented by Year 2 for the Cullen Bullen General Cemetery to reduce visual impacts from mining in consultation with LCC to the approval of DP&I.	EA 8.8.4
34	Should a landholder with a residence (constructed prior to grant of the Project Approval) within 5 km of the active mining area consider they are experiencing high visual impact as a result of the Project, Coalpac will carry out a specific visual assessment from the residence and develop a tree screening strategy for the residence on the property in consultation with the landholder and to the satisfaction of the DP&I.	EA 8.8

Ref	Commitment	Section
Ecology		
35	Coalpac will progressively rehabilitate mined areas and regenerate cleared areas with a focus on the re-establishment of Capertee Stringybark, Clandulla Geebung and Box Gum Woodland as habitat for the region's Threatened wildlife species.	EA 8.15
36	Coalpac will establish the Biodiversity Offset Strategy as described in this EA for the purpose of initially maintaining and ultimately improving the ecological values of the region.	EA 8.15
37	**As part of the Revised BOS, Coalpac commits to providing indirect offsets through contributions towards recovery actions for the following threatened species:** **• Broad Headed Snake;** **• Brush-tailed Rock Wallaby** **• Woodland Birds; and** **• Koala.** **Coalpac will provide support to the indirect offset measures outlined above totalling $300,000 to be spent equally for these four species in the first five years of the Project.**	**RTS 4.13.2.2, 4.13.5**
38	**Targeted searches for the Squirrel Glider will be conducted on Biodiversity Offset Properties as part of the BOMP. In addition, nest boxes targeted to provide den sites for the species will be used in mine rehabilitation**	**RTS 4.13.5.4**
39	**The Project Biodiversity Offset Properties will be permanently conserved via a Voluntary Conservation Agreement (VCA), or other suitable arrangement to protect flora and fauna values in the long term within two years of Project Approval.**	**RTS 4.13.14**
40	**Coalpac will also engage a dedicated Biodiversity Offset Manager to implement the BOMP commitments for both existing Compensatory Habitat Areas and the offset properties proposed for the Project under the Revised BOS.** **Coalpac will liaise with traditional owners of the land to encourage involvement in restoration practices.**	**RTS 4.13.15**
Aboriginal Archaeology and Cultural Heritage		
41	The salvage or protection of all known Aboriginal objects within the Project Boundary will be managed in accordance with an AHMP to be developed in consultation with the Aboriginal community and Department of Office of Environment and Heritage.	EA 8.12
42	Coalpac will establish, in consultation with the Aboriginal community and Office of Environment and Heritage, a keeping place for the purpose of housing salvaged Aboriginal artefacts from the local area.	
43	Coalpac will conduct relevant monitoring at all rock shelters with deposit sites as shown on Figure 40 when blasting within 500 m of each to achieve the criteria in Table 30. Safe access tracks will be installed to facilitate this in accordance with the Land Disturbance Protocol to the approval of relevant regulators.	EA 8.7 & 8.12

Ref	Commitment	Section
Non-Aboriginal Heritage		
44	Coalpac will complete an archival recording of the Heritage items predicted to be disturbed by the Project as described in Table 41 in consultation with the NSW Heritage Office.	EA 8.13
45	Coalpac will ensure that the remaining Heritage items located on its landholdings are managed in accordance with this EA.	EA 8.13
46	Coalpac will undertake a detailed archival recording and structural inspection of the Cullen Bullen General Cemetery in accordance with relevant guidelines prior to the commencement of coal extraction under this EA in consultation with LCC.	EA 8.13
Water Resources		
47	Coalpac will undertake groundwater and surface monitoring for the Project in consultation with relevant regulators, including the installation of two additional bores and four replacement bores.	EA 8.9 & 8.10
48	Coalpac will design and construct a consolidated Water Management System for the Project in consultation with relevant regulators and to the approval of DP&I to ensure that water quality in the surrounding catchments is maintained.	
49	Coalpac will maintain its existing licensed water discharge points and operate them to the approval of relevant regulators.	
50	**Groundwater monitoring will continue to allow the assessment of the condition of the historic flooded underground workings of Old Invincible Colliery to confirm that this storage will not be significantly impacted by the Project.** **This additional data (for a period of two to five years) will be used to validate the key findings of the surface water and groundwater assessments undertaken for the Project.**	**RTS 4.1.2, 4.9.5**
51	**If monitoring data shows that the Project adversely impacts on groundwater water at a private receiver, Coalpac will provide reasonable compensation in consultation with the relevant landowner.**	**RTS 4.9.5**
Rehabilitation		
52	Bunds in key sensitive locations will be treated as quickly as possible to promote the rapid establishment of rehabilitation.	EA 4.4.3
53	**Coalpac will also include the consideration of PAF material management measures and provide detail on a PAF monitoring and management in the Rehabilitation and Landscape Management Plan for the Project. This plan will be prepared in accordance with the most recent version of the DRE Mining Operations Plan guideline.**	**RTS 4.10.2**
54	**Local native species will be used during the rehabilitation and seed collection programs to ensure collection from a suite of species to encourage species diversity.**	**RTS 4.13.9**

Ref	Commitment	Section
55	**Coalpac will establish an appropriate Rehabilitation Security Deposit for the Project, to the approval of DRE. Coalpac will inform LCC once this process is complete, as part of the annual review meeting on site.**	**RTS 4.17.22**
Geochemical		
56	Potentially acid forming coarse rejects will be covered as soon as practical with at least 5 metres of Non Acid Forming overburden material to minimise the length of exposure time to oxidising conditions and minimise the potential for acid mine drainage.	EA 8.11
57	All inert waste from the washing of crushed sandstone will be pumped into the flooded Tyldesley Colliery underground workings via boreholes drilled to intersect the workings or co-disposed in-pit. In the unlikely event that any waste material is determined to be PAF this will be buried deep in-pit with Potentially Acid Forming overburden.	
Traffic		
58	Coalpac will construct the MPPS conveyor by Year 2 to reduce haulage of product coal by road from Invincible Colliery site access road.	EA 8.16
59	Haulage of product coal by road to WPS and MPPS (following the construction of the MPPS conveyor) for emergency supply will only be undertaken on a limited basis and with prior notification to DP&I and the local community.	
60	No haulage of product sand for the Project will travel through Lithgow to access the Sydney market via the Bells Line of Road.	
61	All heavy vehicles for the Project, with the exception of those required for deliveries to Cullen Valley Mine via the Private Haul Road, will enter site via the Invincible Colliery access road intersection with the Castlereagh Highway following the construction of the Castlereagh Highway overpass bridge and associated internal access roads.	
62	**Coalpac will continue discussions with regulatory agencies and the relevant landholder to formalise an agreement around any works on Red Springs Road to allow access to the Hillcroft mining area.**	**RTS 4.14.3**
63	**Coalpac will ensure that appropriate management measures for Castlereagh Highway traffic will be put in place during the construction of the overpass bridge infrastructure, in consultation with RMS.**	**RTS 4.14**
64	**Coalpac will obtain the relevant approvals under Section 138 of the *Roads Act 1993* prior to the construction of the haul road bridge over the Castlereagh Highway.**	
65	**The haulage of sand for the Project will not be undertaken via the Cullen Valley Private Haul Road at Cullen Bullen.**	**RTS 4.14.8**
66	**B Double trucks will not be used for the haulage of sand to market via the Great Western Highway.**	**RTS 4.22.6**

Ref	Commitment	Section
67	**During the life of the Project, Coalpac will maintain the existing access point in the south of the Project Boundary for the Gardeners Gap Track (as shown on Figure 5 of the EA).** **Coalpac will also create a northern access route within the Project Boundary to allow for public access to the Ben Bullen State Forest, in consultation with Forests NSW.**	**RTS 4.18.1**
Community		
68	Coalpac has offered to enter into an appropriate VPA on terms it will seek to agree with LCC. Coalpac proposes to develop a Community Fund centred on Cullen Bullen (and the wider local area). This proposed fund will be supported by contributions from Coalpac over the 21 year life of the Project to be overseen by a committee made of local residents, LCC officials and Coalpac staff.	EA 8.21
69	Coalpac will consolidate the two existing Communities Consultative Committees for the Project in consultation with them, LCC and DP&I.	EA 6.6
70	**Coalpac will use best endeavours to seek agreement with landholders identified in the EA as being predicted to receive adverse amenity impacts above relevant criteria. These include those private residences and properties discussed in Sections 8.3.3 and 8.6.3 of the EA where impacts above Project amenity criteria will still occur despite best practice management of noise and dust impacts being adopted by Coalpac.** **All formalised agreements will be provided to the DP&I and LCC (without commercially in-confidence information) only with the permission of the private landholder.**	**RTS 4.22.3**
71	**Coalpac will continue to work with relevant individuals to minimise any inconvenience due to blasting required within a 500m radius of a residence. Any blasting event within this radius shall be planned and the landholder notified with 7 days, and any inconvenience on the day of the blast shall be limited to no more than one hour.**	**RTS 4.22.6.6**
Waste		
72	**Coalpac will commission an audit to identify any required upgrade to the existing mine sewage system to facilitate the additional workforce and operational areas proposed. This audit will be undertaken by an independent specialist in consultation with LCC.**	**RTS 4.15.1**
Training and Reporting		
73	Coalpac will provide regular, relevant training to all employees and contractors in relation to the commitments in this EA.	EA 6.6
74	Coalpac will prepare an Annual Review report (which summarises monitoring results and reviews performance against the predictions and commitments in this EA) and distribute it to the relevant regulatory authorities and the CCC.	EA 6.6

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