Mt Arthur Coal

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Section 6 – Planning Framework and Modification Justification

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6 PLANNING FRAMEWORK AND MODIFICATION JUSTIFICATION

6.1 LEGISLATIVE FRAMEWORK

6.1.1 Environmental Planning and Assessment Act, 1979

The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. Modification of the Consolidation Project Approval (09_0062) for the Mt Arthur Coal Mine is sought under section 75W of Part 3A of the EP&A Act.

Section 75W of the EP&A Act states:

> **75W Modification of Minister's approval**
>
> *(1) In this section:*
>
> ***Minister's approval** means an approval to carry out a project under this Part, and includes an approval of a concept plan.*
>
> ***modification of approval** means changing the terms of a Minister's approval, including:*
>
> *(a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and*
>
> *(b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*
>
> *(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.*
>
> *…*

Although Part 3A was repealed by the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011*, section 75W continues to be the applicable modification provision for an approval such as the Consolidation Project Approval (09_0062). This is because Schedule 6A of the EP&A Act, which has the effect of making the Consolidation Project Approval (09_0062) a "transitional Part 3A Project", states that provisions in the repealed Part 3A, such as section 75W, continue to apply to and in respect of a "transitional Part 3A Project".

Further, the DP&I advised BHP Billiton in a meeting held on 30 November 2011 that the DP&I was supportive in principle of a modification of Project Approval (09_0062) under section 75W of Part 3A of the EP&A Act. An outcome of the meeting was that DGRs for the Modification were sought by HVEC in February 2012 and were issued on 30 April 2012 (Attachment 2).

6.1.2 Environmental Planning Instruments

Muswellbrook Local Environmental Plan, 2009

The Mt Arthur Coal Mine is located wholly within the Muswellbrook LEP area.

The Muswellbrook LEP refers throughout to the "consent authority". Clause 1.6 of the Muswellbrook LEP provides:

> *The consent authority for the purposes of this Plan is (subject to the Act) the Council.*

The Mt Arthur Coal Mine has a Project Approval (09_0062) under Part 3A of the EP&A Act, for which the consent authority is the NSW Minister for Planning and Infrastructure (the Minister). References to "consent authority" in the Muswellbrook LEP should therefore be interpreted as references to the Minister for the Mt Arthur Coal Mine.

Clause 2.3(2) of the Muswellbrook LEP relevantly provides:

> *The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.*

The approved disturbance area for the Mt Arthur Coal Mine is primarily on lands classified under the Muswellbrook LEP as Zone RU1 "Primary Production". The approved disturbance area also contains lands listed under Zone E3 "Environmental Management".

The proposed disturbance area for the Modification is also primarily on lands classified under the Muswellbrook LEP as Zone RU1 "Primary Production". The proposed disturbance area also contains lands listed under Zone E3 "Environmental Management".

Under the Muswellbrook LEP, the land use objectives for lands zoned as RU1 "Primary Production" are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To protect the agricultural potential of rural land not identified for alternative land use, and to minimise the cost to the community of providing, extending and maintaining public amenities and services.*
- *To maintain the rural landscape character of the land in the long term.*
- *To ensure that development for the purpose of extractive industries, underground mines (other than surface works associated with underground mines) or open cut mines (other than open cut mines from the surface of the flood plain), will not:*
  - *(a) destroy or impair the agricultural production potential of the land or, in the case of underground mining, unreasonably restrict or otherwise affect any other development on the surface, or*
  - *(b) detrimentally affect in any way the quantity, flow and quality of water in either subterranean or surface water systems, or*
  - *(c) visually intrude into its surroundings, except by way of suitable screening.*
- *To protect or conserve (or both):*
  - *(a) soil stability by controlling development in accordance with land capability, and*
  - *(b) trees and other vegetation, and*
  - *(c) water resources, water quality and wetland areas, and their catchments and buffer areas, and*
  - *(d) valuable deposits of minerals and extractive materials by restricting development that would compromise the efficient extraction of those deposits.*

Open cut mining is permissible on lands zoned RU1 "Primary Production" with Development Consent, as it is an activity listed as being permitted with consent in the zoning table in Part 2 of the Muswellbrook LEP.

Under the Muswellbrook LEP, the land use objectives for lands zoned as E3 "Environmental Management" are:

- *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.*
- *To provide for a limited range of development that does not have an adverse effect on those values.*
- *To maintain, or improve in the long term, the ecological values of existing remnant vegetation of significance including wooded hilltops, river valley systems, major scenic corridors and other local features of scenic attraction.*
- *To limit development that is visually intrusive and ensure compatibility with the existing landscape character.*
- *To allow agricultural activities that will not have an adverse impact on the environmental and scenic quality of the existing landscape.*
- *To promote ecologically sustainable development.*
- *To ensure that development in this zone on land that adjoins land in the land zoned E1 National Parks and Nature Reserves is compatible with the objectives for that zone.*

Mining is not permissible on lands zoned E3 "Environmental Management", however, development for the purpose of agriculture is permissible on land subject to this zoning and accordingly, under clause 7 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP), surface mining is permissible on these lands with development consent.

Muswellbrook Development Control Plan, 2009

The *Muswellbrook Shire Development Control Plan, 2009* (DCP) applies to all land within the Muswellbrook LGA. The objective of the DCP is to assist proponents of development in achieving development outcomes, consistent with the provisions of the Muswellbrook LEP.

Section 22 of the DCP provides minimum buffer distances for developments and primary industries, environmental assets and other rural land uses.

For the reasons stated below in relation to clause 8(2) of the Mining SEPP, as the operation of the Modification can be characterised as development for the purposes of "mining", the Minister can determine this Development Application for the Modification without having to be satisfied of these matters in section 22 of the DCP.

The DCP also provides that:

> *The minimum buffer distances do not apply to existing developments that have already been approved. The conditions of consent placed on these developments form the minimum standards that these developments should achieve.*

Notwithstanding, the open cut extension as a result of the Modification would be located to the south-west of the existing open cut boundary (i.e. further away from the Muswellbrook township) and would be within the existing mining tenements for the Mt Arthur Coal Mine.

The existing Consolidation Project Approval (09_0062) requires the provision of a biodiversity offset strategy for the approved Mt Arthur Coal Mine. The approved biodiversity offset strategy aims to provide linkages between post-mining landforms and existing remnant patches, thereby improving the habitat opportunities for local fauna. Two additional offset areas proposed for the Modification would provide additional buffering to core habitat.

State Environmental Planning Policy (Major Development) 2005

As outlined above, the Consolidation Project EA was approved under Part 3A of the EP&A Act by the Minister in September 2010 (Project Approval [09_0062] – Attachment 1).

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

The Mining SEPP, which commenced on 16 February 2007, regularises the various environmental planning instruments that previously controlled mining activities.

Clause 5(3) of the Mining SEPP gives it primacy where there is an inconsistency between the provisions of the Mining SEPP and the provisions of any other environmental planning instrument (except the *State Environmental Planning Policy [Major Projects] 2005*, *State Environmental Planning Policy No. 14 [Coastal Wetlands]* and *State Environmental Planning Policy No. 26 [Littoral Rainforests]*).

- ***Clause 2***

Clause 2 sets out the aims of the Mining SEPP as follows:

> *(a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
>
> *(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
>
> *(c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*

- ***Clause 7***

Clause 7 (1) of the Mining SEPP states that development for any of the following purposes may be carried out only with Development Consent:

> …
>
> *(b) mining carried out:*
>
> *…*
>
> *(ii) on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,*
>
> *…*

The modified Mt Arthur Coal Mine comprises mining within the existing mining leases shown on Figure 1-3.

- ***Clause 8***

Clause 8 of the Mining SEPP provides:

> ***8 Determination of permissibility under local environmental plans***
>
> *(1) If a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if provisions of the plan are satisfied:*
>
> *(a) development for that purpose may be carried out on that land with development consent without those provisions having to be satisfied, and*
>
> *(b) those provisions have no effect in determining whether or not development for that purpose may be carried out on that land or on the determination of a development application for consent to carry out development for that purpose on that land.*
>
> *(2) Without limiting subclause (1), if a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if the consent authority is satisfied as to certain matters specified in the plan, development for that purpose may be carried out on that land with development consent without the consent authority having to be satisfied as to those specified matters.*

State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)

Clause 13 of *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

> *…*
>
> *(c) in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
>
> *(d) any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)*
> *…*

The Consolidation Project EA (HVEC, 2009) confirmed that the Mt Arthur Open Cut Consolidation Project was not considered to be potentially hazardous or offensive, and as such, a preliminary hazard analysis was not required.

The Mt Arthur Coal Mine operates in accordance with the environmental management plans and management procedures required by the existing Project Approval (09_0062). These plans and procedures have been developed to minimise the environmental risks associated with operation of the Mt Arthur Coal Mine.

The relocated explosives magazine and facility has been evaluated for its potential to increase off-site hazards associated with the Mt Arthur Coal Mine. The findings indicate that the Modification would not significantly alter the consequences or likelihood of a hazardous event occurring at the Mt Arthur Coal Mine, as the operational activities on-site would be generally unchanged.

Notwithstanding, environmental management plans and procedures would be updated to include the Modification, where relevant.

Accordingly, the Minister can be satisfied as to these matters.

State Environmental Planning Policy No. 44 (Koala Habitat Protection)

State Environmental Planning Policy No. 44 (Koala Habitat Protection) requires the consent authority for any Development Application in certain LGAs (including the Muswellbrook LGA) to consider whether land subject to a Development Application is "potential Koala habitat" or "core Koala habitat".

An assessment of potential and core Koala habitat was conducted in the Consolidation Project EA (HVEC, 2009). The assessment concluded that the land subject to the Mt Arthur Coal Open Cut Consolidation Project was not core Koala habitat and no Koalas were identified (Cumberland Ecology, 2009b).

An assessment of potential and core Koala habitat was conducted for the Modification (Appendix D). The assessment concluded that some potential Koala habitat would be cleared by the Modification. However, the potential habitat was not likely to be used by Koalas given the isolated nature of the habitat in the Modification area and lack of any evidence of Koala inhabitation during surveys undertaken within the Modification area.

Accordingly, the Minister can be satisfied as to these matters.

State Environmental Planning Policy No. 55 (Remediation of Land)

State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential adverse effects of contamination on suitability of the site for its proposed use.

Clause 7(1) states that a consent authority must not consent to the carrying out of any development on land unless:

(a) *it has considered whether the land is contaminated, and*

(b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*

(c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

The Modification area is largely within existing mining leases, with the exception of the rail loop duplication and a small portion of the conveyor corridor overburden emplacement.

The majority of the rail loop duplication would be within the existing ML 1655. A portion of the rail loop duplication would extend just outside of the existing mining tenements but would remain within the Consolidation Project EA boundary (HVEC, 2009). Similarly, a small portion of the conveyor corridor overburden emplacement would extend outside of existing tenements but would be within the Consolidation Project EA boundary.

No preliminary land contamination investigation is required for the rail loop duplication area inside ML 1655 as no change of use is proposed. Given the area where the rail loop duplication would be laid outside of the existing mining tenements is within the extent of the Consolidation Project EA boundary and is within the existing rail corridor, there is no change in land use.

Similarly, given that the small portion of the conveyor corridor overburden emplacement outside of existing tenements is within the Consolidation Project EA boundary, there is no change in land use.

6.1.3 Environment Protection and Biodiversity Conservation Act, 1999

The primary objective of the Commonwealth EPBC Act is to provide for the protection of those aspects of the environment that are of "national environmental significance". The EPBC Act establishes a scheme requiring environmental assessment and approval of proposals likely to impact significantly upon such matters, which in the EPBC Act are termed "protected matters".

In February 2011, HVEC voluntarily lodged a referral (EPBC 2011/5866) under the EPBC Act for areas approved under Project Approval (09_0062). The referral was placed on public display during February and March 2011 and received no comments. The Consolidation Project was determined to be a controlled action in June 2011 to be assessed through preliminary documentation. Preliminary documentation was prepared by HVEC and lodged with the SEWPaC in November 2011.

Approval for the 'Action' was granted on 30 April 2012 (Commonwealth Approval EPBC 2011/5866). The 'Action' would continue to be conducted in a manner consistent with that described in the *Mt Arthur Coal Extension Project Referral EPBC* (BHP Billiton, 2011c) and in accordance with the conditions of the Commonwealth Approval (EPBC 2011/5866).

The Modification will be referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities for consideration under the EPBC Act.

6.1.4 Protection of the Environment Operations Act, 1997

Construction and operations at the Mt Arthur Coal Mine are currently undertaken in accordance with an existing EPL 11457 issued under the NSW *Protection of the Environment Operations Act, 1997*.

If required, any variations to existing EPL 11457 for the Modification would be undertaken in consultation with the EPA.

6.1.5 Other Approvals

A number of operational management plans and programmes for the Mt Arthur Coal Mine are required to be approved and implemented under Project Approval (09_0062) and be consistent with the relevant conditions of the EPBC Approval 2011/5866 and EPL 11457.

The existing management plans and programmes are described in Section 2.10. The existing environmental management plans would be updated where relevant to reflect the Modification.

HVEC is currently in discussions with DTIRIS to consolidate existing mining tenements at the Mt Arthur Coal Mine. Any such consolidated lease application would be consistent with the Modification.

6.2 MODIFICATION JUSTIFICATION

In accordance with the DGRs (Attachment 2), a description of the need for and objectives of the Modification and a justification of the carrying out of the Modification in the manner proposed is provided below. The discussion is provided having regard to biophysical, economic and social considerations, including consideration of alternatives, the principles of Ecologically Sustainable Development (ESD) and the consistency of the Modification with the objects of the EP&A Act.

6.2.1 Need for and Objectives of the Modification

The Modification provides for the continuation and extension of open cut coal mining operations at the Mt Arthur Coal Mine for a period of approximately four years.

At full development, the workforce would be in the order of approximately 2,600 full-time equivalent employees during peak production. An additional construction workforce of up to approximately 240 people would also be required.

The Modification would include the implementation of mitigation measures, and management (including performance monitoring), to minimise potential impacts on the environment and community (Section 4).

The Modification would involve the production of up to 32 Mtpa of ROM coal with up to 128 Mt of additional ROM coal extracted over the life of the Modification. The Modification would produce saleable thermal coal that would be sold domestically or exported for electricity generation.

The Socio-Economic Assessment (Appendix J) indicates that operation of the Modification is likely to result in an average annual stimulus of up to approximately 2,715 direct and indirect jobs in the local region, and some 9,071 direct and indirect jobs in NSW. The Modification would also make contributions to regional and NSW output or business turnover and household income.

The benefit cost analysis in Appendix J indicates that a net benefit of $1,011M would be forgone if the Modification is not implemented.

Coal has met almost half of the increase in global energy demand over the last decade (International Energy Agency [IEA], 2011). The *World Energy Outlook 2011* (IEA, 2011) examined a number of future energy scenarios, including: maintaining current policies; implementing recent government policy commitments in a cautious manner; and the policies required to limit the long-term increase in the global mean temperature to 2°C above pre-industrial levels.

All of the energy scenarios involve an increase in coal consumption in the next decade (at least), with coal consumption in 2035 at least similar to total world coal demand in 2009 (IEA, 2011).

The NSW Government (2011) anticipates that over the coming decades coal exports from NSW could increase substantially, generating significant economic growth in regional areas of the State.

Modification coal production would contribute to NSW export income, State royalties and State and Commonwealth tax revenue, as well as contributing to electricity supply and manufacturing in Australia and other countries that purchase Modification coal.

6.2.2 Consideration of Alternatives to the Modification

Given that the Modification objectives include continuation of open cut mining at the Mt Arthur Coal Mine, limited alternatives are available.

Notwithstanding, in accordance with the DGRs, description of key alternatives considered by HVEC is provided below.

Proposed Mine Plan

The additional Modification open cut areas are a logical westerly progression of the Northern Open Cut, involving a westerly extension/cutback of the approved open cut highwall. The Modification mine plan offers several advantages, including:

- minimised disturbance areas;
- additional resource recovery;
- continued use of existing infrastructure at the Mt Arthur Coal Mine;
- cutback of the existing/approved highwall, which minimises the overall surface development area and improves environmental outcomes and safety/stability issues;
- continued use of existing mine safety measures and protocols; and
- extension of existing overburden emplacements resulting in minimisation of landscape alteration.

Potential alternative plans for coal resource recovery would involve development of separate or satellite open cut pits and have not been considered further.

Infrastructure Changes

The key potential alternatives to the Modification infrastructure changes proposed are described below.

Mt Arthur Rail Loop Duplication – High Capacity Option

As described in Section 3.2.1, the rail loop duplication option involves the duplication of approximately 5 km of track immediately adjacent to the existing Mt Arthur Coal Mine rail loop.

Current analysis and modelling indicates that the loop duplication may be needed because of ship loading requirements at the Port of Newcastle, and constraints on the Main Northern Railway line.

Construction of the loop duplication adjacent to the existing loop has many advantages, including reduction of additional disturbance areas and use of common/existing rail infrastructure between the two loops. No alternatives have been considered to this.

Relocation of Load Point for Existing Overland Conveyor to Bayswater Power Station

Relocation of the conveyor load point is required because the conveyor to the existing point would be buried by the conveyor corridor overburden emplacement (Section 3.2.2).

The revised location has several advantages including:

- allowing overburden to be placed close to the adjacent open cut (i.e. in the conveyor corridor);
- remaining within existing and approved disturbance areas;
- utilising the remaining portion of the overland conveyor; and
- being at the closest point to the open cut along the conveyor that would be unaffected by the proposed conveyor corridor overburden emplacement (thus minimising truck movements).

Relocation of Explosives Magazines and Facilities

Relocation of the explosives magazine and facilities is required because the existing location would become part of the conveyor corridor overburden emplacement (Section 3.2.3). The advantages of the revised location include that it is:

- in existing/approved disturbance areas; and
- in close proximity to the open cut.

Final Voids

Final voids are generally left at the conclusion of open cut mining with the size of these voids dictated by the depth of the open cut, the extent of backfilling of the voids that is undertaken and the mining sequence.

The existing Mt Arthur Coal Mine has approval for a final void in the Northern Open Cut, McDonalds Pit, Belmont Pit and the Saddlers Pit. The McDonalds and Belmont Pits are currently used as on-site water storages.

As part of the Modification, the Saddlers Pit void would be backfilled. Therefore, the overall catchment areas reporting to final voids would be reduced by the Modification.

The final landforms, including final voids, would continue to be reviewed as part of the FLDP (Section 5).

No Modification

Consideration of the potential consequences of not proceeding with the Modification is provided in Section 6.2.6.

6.2.3 Consideration of Climate Change Projections for Australia and NSW

Consideration of the potential implications of climate change involves complex interactions between climatic, biophysical, social, economic, institutional and technological processes.

The weight of scientific opinion supports the proposition that the world is warming due to the release of emissions of carbon dioxide and other greenhouse gases from human activities including industrial processes, fossil fuel combustion, and changes in land use, such as deforestation (Pew Centre on Global Climate Change, undated).

Although understanding of climate change has improved markedly over the past several decades, climate change projections are still subject to uncertainties such as (Commonwealth Scientific and Industrial Research Organisation [CSIRO], 2007):

- *Socio-economic uncertainties associated with the current and future activities of humans, which affect the development of greenhouse gas and aerosol emission scenarios.*
- *Uncertainties associated with our understanding of how the Earth's major biophysical systems behave and how they are represented in climate models.*
- *Uncertainties regarding the assignment of probability distributions to regional climate change projections.*
- *Uncertainties associated with projecting climate change at small spatial scales, particularly for coastal and mountainous areas.*

Climate Change Projections for Australia

In Australia, the climate is projected to become warmer and drier. By 2030, warming (for mid-range global emission scenarios) is projected to be about 1°C over most of Australia, with slightly less warming in some coastal areas, and slightly more warming inland (CSIRO, 2007). By 2070, annual average temperatures are projected to increase by 1.8 to 3.4°C with spatial variations similar to those for 2030 (CSIRO, 2007) depending on the emission scenarios examined. Substantial increases in the frequency of days over 35°C, fewer frosts and increased evaporation are likely (CSIRO, 2007).

Sea level is projected to rise by 18 to 59 cm by 2100, or 2 to 7 cm per decade, as a result of global warming (CSIRO, 2007). Sea level rise will have impacts on soft sediment shorelines and intertidal ecosystems, which will be especially vulnerable to change with additional impacts from extreme events.

The interaction of severe weather events, such as tropical cyclones, with the coastal ocean has the potential to generate severe waves and storm surge, which in turn can have significant impacts on the coast. Warmer ocean waters and sediment transport following heavy rainfall will affect fisheries and coastal ecosystems (CSIRO, 2007).

Climate change may result in changes to rainfall patterns, runoff patterns and river flow. High global emission scenario projections for annual average rainfall in Australia for around 2050 and 2070, relative to 1990 include (CSIRO, 2007):

- in southern areas (-20 % to +0% by 2050 and -30% to +5% by 2070);
- in central, eastern and northern areas (-20% to +10% by 2050 and -30% to +20% by 2070);
- decreases are most pronounced in winter and spring;
- some inland and eastern coastal areas becoming wetter in summer, and some inland areas becoming wetter in autumn; and
- where average rainfall increases, predictions of more extremely wet years and where average rainfall decreases, more dry spells.

Climate Change Projections for NSW

Current climate trends indicate an accelerating increase in average annual temperature in NSW, with an annual average temperature rise of approximately 0.1°C per decade during the 1950s to 1980s and an annual average temperature rise of approximately 0.5°C per decade from 1990 to 2010 (DECCW, 2010c).

Projections of climate change in NSW were undertaken by the DECCW (2010c) and are reported in the NSW Climate Impact Profile.

Based on a global emissions scenario that assumes a low uptake of carbon alternative fuels, NSW is projected to experience the following changes to its climate by 2050 (DECCW, 2010c):

- NSW is expected to become hotter, with higher maximum and minimum temperatures very likely (i.e. greater than 90% probability) to be experienced across the state in all seasons.

- The greatest increases in maximum temperatures are projected to occur in the north and west of the state, with winter and spring maximum temperatures expected to rise by around 2 to 3°C across much of northern NSW.
- A slight increase in summer rainfall is projected for NSW, however, this is likely to be accompanied by a significant decrease in winter rainfall in the south-western regions.
- Many parts of the state will experience a shift from winter dominated to summer-dominated rainfall, which may have implications for the duration and severity of drought in these areas.
- Evaporation is expected to significantly increase across much of NSW, due to increased temperatures.

Projected changes to NSW's climate would have associated impacts, including to land, settlements and ecosystems (DECCW, 2010c).

The projected increases in evaporation are likely to counteract the expected increases in summer rainfall across the state, and as such, dry soil conditions would be expected to be even more prevalent in the west of the state. Erosion of soils is also expected to increase across the state, due to increased runoff associated with higher intensity rainfall events and lower rainfall comparative to evaporation, and decreased vegetation cover (DECCW, 2010c).

Projected changes in rainfall and evaporation in all regions will also likely affect the soil salinity. An increase or decrease in soil salinity in a particular area will depend on local factors for each catchment (DECCW, 2010c).

Settlements would likely be affected by increased sea levels and increased frequency and intensity of flood-producing rainfall events. Changes in rainfall, runoff and evaporation are also likely to affect NSW water supplies (DECCW, 2010c).

The potential implications of climate change on local groundwater resources are addressed in Appendix B.

6.2.4 Ecologically Sustainable Development Considerations

Background

The concept of sustainable development came to prominence at the World Commission on Environment and Development (1987), in the report titled *Our Common Future*, which defined sustainable development as:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

In recognition of the importance of sustainable development, the Commonwealth Government developed a *National Strategy for Ecologically Sustainable Development* (NSESD) (Commonwealth of Australia, 1992) that defines ESD as:

> *…*
> *using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.*

The NSESD was developed with the following core objectives:

- enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- provide for equity within and between generations; and
- protect biological diversity and maintain essential processes and life support systems.

In addition, the NSESD contains the following goal:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

In accordance with the core objectives and a view to achieving this goal, the NSESD presents private enterprise in Australia with the following role:

> *Private enterprise in Australia has a critical role to play in supporting the concept of ESD while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy.*

Clause 7 of Schedule 2 of the EP&A Regulation requires justification for the Modification having regard to biophysical, economic and social consideration, including the principles of ESD.

Clause 7(4) of Schedule 2 of the EP&A Regulation provides a definition of ESD relevant to the preparation of EISs:

> *(4) The principles of ecologically sustainable development are as follows:*
>
> *(a) the **precautionary principle**, namely, 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,*
>
> *(b) **inter-generational equity**, namely, 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,*
>
> *(c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
>
> *(d) **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,*
>
> *(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 design, planning and assessment of the Modification has been carried out applying the principles of ESD, through:

- proposal of a logical extension to existing/approved operations;
- incorporation of risk assessment and analysis at various stages in the Modification design, environmental assessment and decision-making;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders;
- assessment of potential greenhouse gas emissions associated with the Modification; and
- optimisation of the economic benefits to the community arising from the development of the Modification.

The Modification design takes into account biophysical considerations, including the principles of ESD as defined in clause 7(4) of Schedule 2 of the EP&A Regulation.

In addition, it can be demonstrated that the Modification can be undertaken in accordance with ESD principles through the application of measures to avoid, mitigate and offset the potential environmental impacts of the Modification.

The following sub-sections describe the consideration and application of the principles of ESD to the Modification.

Precautionary Principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account, especially in relation to threats of irreversible environmental damage.

An ERA (Appendix L) was conducted to identify Modification related risks and develop appropriate mitigation measures and strategies. The ERA considers potential environmental impacts associated with the Modification, including long-term effects. In addition, long-term risks are considered by the specialist studies conducted in support of this EA (Section 1.6).

Findings of these specialist assessments are presented in Section 4 and relevant appendices. Measures designed to avoid, mitigate and offset potential environmental impacts arising from the Modification are also described in Sections 4 and 5.

The specialist assessments and ERA have evaluated the potential for harm to the environment associated with development of the Modification.

Assessment of potential short, medium and long-term impacts of the Modification have been carried out during the preparation of this EA on aspects of surface water and groundwater, transport movements, air quality emissions (including greenhouse gas emissions), noise, heritage, visual character, terrestrial and aquatic ecology, heritage, agricultural land uses and socio-economics.

A range of measures have been adopted as components of the Modification design to minimise the potential for serious and/or irreversible damage to the environment, including operational controls, physical, the development of environmental management and monitoring programmes and biodiversity offsets (Section 4.6). Where residual risks are identified, contingency controls have also been considered (Section 4).

The implementation of an adaptive management approach is consistent with the precautionary principle as described by Chief Justice Preston in *Newcastle & Hunter Valley Speleological Society Inc v Upper Hunter Shire Council and Stoneco Pty Limited* (2010) NSWLEC 48 at (184):

> *…In adaptive management the goal to be achieved is set, so there is no uncertainty as to the outcome and conditions requiring adaptive management do not lack certainty, but rather they establish a regime which would permit changes, within defined parameters, to the way the outcome is achieved.*

Social Equity

Social equity is defined by inter-generational and intra-generational equity. Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations, while intra-generational equity is applied within the same generation.

The principles of social equity are addressed through:

- assessment of the socio-economic impacts of the Modification, including the distribution of impacts between stakeholders and consideration of the potential socio-economic costs of climate change (Appendix J);
- management measures to be implemented in relation to the potential impacts of the Modification on water resources, heritage, land resources, agriculture, noise, air quality, ecology, transport, hazards and risks, greenhouse gas emissions, visual character and socio-economics (Section 4);
- implementation of environmental management and monitoring programmes (Section 4) to minimise potential environmental impacts (which include environmental management and monitoring programmes covering the Modification life); and
- implementation of biodiversity offsets during the life of the Modification to compensate for potential localised impacts that have been identified for the development (Section 4.6.4).

The Modification would benefit current and future generations through the generation of employment and regional expenditure (Appendix J). The Modification would also provide significant stimulus to local and regional economies and provide NSW export earnings and royalties, thus contributing to future generations through social welfare, amenity and infrastructure.

The Modification incorporates a range of operational, physical controls and environmental management and mitigation measures (e.g. biodiversity offsets, land acquisition) to minimise potential impacts on the environment and the costs of these measures would be met by HVEC. These costs have been included in the Socio-Economic Assessment (Appendix J) and, therefore, the potential benefits to current and future generations have been calculated in the context of the mitigated Modification.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or 'biodiversity' is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species as well as diversity of ecosystems (Lindenmayer and Burgman, 2005).

For the purposes of this EA, ecological integrity has been considered in terms of ecological health and ecological values.

Hunter Eco (Appendix D) and Niche (2012) (Appendix 1 of Appendix D) undertook detailed baseline flora and fauna surveys within the proposed Modification areas.

The existing Mt Arthur Coal Mine is located in a mining and agricultural landscape. The natural vegetation in and around the Mt Arthur Coal Mine had been predominantly cleared for a variety of agricultural purposes prior to mining.

The proposed Northern Open Cut Extension area is dominated by grassland and widely scattered trees (Appendix D).

The proposed Southern Open Cut Extension area (western flank) is characterised by a mixture of open grassland and woodland (Appendix D). The two main communities in the proposed Southern Open Cut Extension area (east of Mount Arthur) are dominated by Spotted Gum (*Corymbia maculata)* and by Blakely's Red Gum (*Eucalyptus blakelyi*), with the remainder of the area open grassland (Appendix D).

A central feature of the proposed overburden emplacement area is a drainage line, being the upper reaches of Saddler's Creek, that is dominated by Broadleaf Cumbungi (*Typha orientalis*) reeds (Appendix D). Patches of Forest Red Gum (*Eucalyptus tereticornis*), Spotted Gum (*Corymbia maculata*) and Narrow-leaved Ironbark (*Eucalyptus crebra*) are present along the edges of the central creekline (Appendix D). The proposed rail loop duplication area is dominated by open grassland (Appendix D). Disturbed areas along the rail line, resulting either from excavation or bunding required to create a level track, have been planted with a variety of exotic grasses such as Rhodes Grass (*Chloris gayana*), Red Natal Grass (*Melinis repens*) and Reed Canary Grass (*Phalaris arundinacea*) (Appendix D).

During the recent surveys conducted by Niche (Appendix 1 of Appendix D), a total of 77 vertebrate species were recorded, comprising 44 birds, 25 mammals (including six introduced species), five reptiles and three frogs.

Three threatened populations listed as endangered under the TSC Act would be impacted by the proposed Modification and comprise the: *Acacia pendula* population in the Hunter catchment; *Cymbidium canaliculatum* population in the Hunter Catchment; and *Diuris tricolor* population in the Muswellbrook LGA (Appendix D).

One threatened flora species, the Lobed Blue-grass (*Bothriochloa biloba*), listed as vulnerable under the EPBC Act was recorded within the proposed Northern Open Cut Extension area.

No threatened species listed under the NSW *Fisheries Management Act, 1994* have been recorded within or near the proposed Modification area (Appendix D), primarily due to the absence of appropriate habitat.

Table 4-8 provides a list of threatened fauna species with records within the proposed Modification area. Two threatened bird species (Varied Sittella [*Daphoenositta chrysoptera*] and Grey-crowned Babbler (eastern subspecies) [*Pomatostomus temporalis temporalis*]) have previously been recorded in the Modification area. Possibly six threatened mammal species have been recorded within the proposed Modification area:

- Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Southern Myotis (*Myotis macropus*);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*; and
- Eastern Cave Bat (*Vespadelus troughtoni*).

The environmental assessments in Section 4.6 and Appendix D describe the potential impacts of the Modification on local and regional ecology.

In accordance with ESD principles, the Modification addresses the conservation of biodiversity and ecological integrity by proposing an environmental management framework designed to conserve ecological values, where practicable, after consideration of potential Modification impacts as described in the sub-sections below.

Greenhouse Gas Emissions and Biological Diversity and Ecological Integrity

Natural ecosystems are considered to be vulnerable to climate change. Patterns of temperature and precipitation are key factors affecting the distribution and abundance of species (Preston and Jones, 2005). Projected changes in climate will have diverse ecological implications. Habitat for some species will expand, contract and/or shift with the changing climate, resulting in habitat losses or gains, which could prove challenging, particularly for species that are threatened.

Anthropogenic Climate Change is listed as a key threatening process under the TSC Act.

In making its final determination to list Anthropogenic Climate Change as a key threatening process, the NSW Scientific Committee (2000) found that:

1. The distribution of most species, populations and communities is determined, at least at some spatial scale, by climate.
2. Climate change has occurred throughout geological history and has been a major driving force for evolution.
3. There is evidence that modification of the environment by humans may result in future climate change. Such anthropogenic change to climate may occur at a faster rate than has previously occurred naturally. Climate change may involve both changes in average conditions and changes to the frequency of occurrence of extreme events.
4. Response of organisms to future climate change (however caused) is likely to differ from that in the past, because it will occur in a highly modified landscape in which the distribution of natural communities is highly modified. This may limit the ability of organisms to survive climate change through dispersal (Brasher and Pittock, 1998; Australian Greenhouse Office, 1998). Species at risk include those with long generations, poor mobility, narrow ranges, specific host relationships, isolated and specialised species and those with large home ranges (Hughes and Westoby, 1994). Pest species may also be advantaged by climate change.

A greenhouse gas assessment was undertaken by PAE Holmes for the Modification (Appendix F). Section 4.9 provides a description of the potential greenhouse gas emissions of the Modification in accordance with the DGRs (Attachment 2). Valuation of potential impacts of greenhouse gas emissions has been incorporated in the Socio-Economic Assessment (Appendix J) for the Modification.

The potential implications of climate change on local groundwater resources is addressed in Appendix B.

Measures to Maintain or Improve the Biodiversity Values of the Surrounding Region

A range of impact avoidance, mitigation and offset measures would be implemented for the Modification to maintain or improve the biodiversity values of the surrounding region in the medium to long-term, as described below.

A range of vegetation management measures would be implemented for the Modification to minimise impacts on flora, fauna and their habitats (Section 4.6.3).

High frequency fire has the potential to impact on biodiversity by reducing vegetation structure and resulting in a corresponding loss of animal species. High frequency fire is listed as a key threatening process under the TSC Act. Management measures would be implemented for the Modification to minimise the risk of bushfire and in doing so, would maintain or improve the biodiversity values of the surrounding region (Section 4.6.3).

Section 5 presents the rehabilitation strategy for the Modification. The disturbance areas associated with the Modification would be progressively rehabilitated and revegetated with species characteristic of native woodland/open forest and pasture with scattered trees.

Section 4.6.4 summarises the biodiversity offset and compensatory measures that would be used to maintain the biodiversity of the region in the medium to long-term. The Modification biodiversity offset and compensatory measures would comprise a combination of securing the long-term viability of existing woodland (i.e. Modification biodiversity offset areas), revegetation of mine landforms and existing agricultural lands within the biodiversity offset area (Section 4.6.4).

The biodiversity offset proposal for the Modification involves conserving areas (including areas with existing conservation values) and providing active management to maintain and enhance their values.

Terrestrial flora and fauna and aquatic ecology management measures including the biodiversity offset and the BRMP (BHP Billiton, 2012h) are described in Section 4.6.3.

Valuation

One of the common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations.

In the past, some natural resources have been misconstrued as being free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of the environment, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environment considerations in decision making, as required by ESD.

While historically, environmental costs have been considered to be external to project development costs, improved valuation and pricing methods attempt to internalise environmental costs and include them within project costing.

The Socio-Economic Assessment (Appendix J) undertakes an analysis of the Modification and incorporates environmental values via direct valuation where practicable (e.g. greenhouse gas emissions of the Modification). Furthermore, wherever possible, direct environmental effects of the Modification are internalised through the adoption and funding of mitigation measures by HVEC to mitigate potential environmental impacts (e.g. biodiversity offsets).

The benefit cost analysis in Appendix J indicates a net production benefit of approximately $1,021M, which would be forgone if the Modification is not implemented.

6.2.5 Consideration of the Modification against the Objects of the EP&A Act

Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development, and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The Modification is considered to be generally consistent with the objects of the EP&A Act, because it is a Modification which:

- incorporates:
  - measures for the management and conservation of resources including water, agricultural land and natural areas (Section 4);
  - development of the State's mineral resources (i.e. coal resources) (Section 3);
  - measures to minimise potential amenity impacts associated with noise, air quality and visual impacts on surrounding land uses (Section 4); and

  - significant employment and other socio-economic benefits to the community (Sections 4.16 and 4.17);
- would allow for the economic use and development of land, while maintaining key existing land uses including grazing uses on surrounding HVEC-owned lands;
- would support the provision of community services and facilities through significant contributions to State royalties, State taxes, Commonwealth tax revenue and any applicable contributions to local councils (Appendix J and Section 6.2.1);
- incorporates a range of measures for the protection of the environment, including the protection of native plants and animals, threatened species and their habitats (Section 4.6);
- incorporates relevant ESD considerations (Section 6.2.4);
- consultation with all levels of government and a range of stakeholders has been undertaken and issues raised have been considered and addressed where relevant (Section 1.3); and
- includes public involvement and participation through the EA consultation programme (Section 1.3), the public exhibition of the EA document and DP&I assessment of the Modification in accordance with the requirements of the EP&A Act.

6.2.6 Consideration of the Consequences of not Carrying out the Modification

In accordance with clause 7 of Schedule 2 of the EP&A Regulation, an assessment of the consequences of not proceeding with the Modification has been conducted. Were the Modification not to proceed, the following consequences are inferred:

- Operation of the Modification is likely to result in an average annual stimulus of up to approximately 2,715 direct and indirect jobs in the local region, and some 9,071 direct and indirect jobs in NSW (Appendix J).
- The benefit cost analysis in Appendix J indicates that a net benefit of $1,021M would be forgone if the Modification is not implemented (Appendix J).
- Tax revenue from the Modification would not be generated (Appendix J).
- Royalties to the State of NSW would not be generated (Appendix J).
- The potential environmental and social impacts described in this EA for the Modification would not occur.
- The Modification biodiversity offset and other revegetation areas would not be established.