

Coal Mines Australia Pty Ltd

**Review of Environmental Factors for
Caroona Exploration Program –
EL6505
3D Seismic Survey 2010**

Addendum

December 2010



Review of Environmental Factors for Caroona Exploration Program – EL6505 3D Seismic Survey 2010

Addendum

Prepared by

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on behalf of

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Report No.	2295/R18/Addendum/Final	Date: December 2010



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1.0 Introduction

1.1 Background

On 26 October 2010, a Review of Environmental Factors for a 3D seismic program (3D Seismic REF) in exploration licence 6505 (EL 6505) was lodged with the Environmental Sustainability Branch of the Minerals and Energy Division of the NSW Department of Industry and Investment. On 8 November, Approval pursuant to Condition 2 of EL6505 was granted for the 3D seismic program described in the 3D Seismic REF subject to seven conditions.

As outlined in the 3D Seismic REF, slashing of source and receiver lines in the forested areas is required for safety and fire prevention purposes. At the time of writing the REF it was expected that the pasture areas in the cleared paddocks in Doona Vale, the Coal Mines Australia Pty Ltd (CMAL) owned property, would not require slashing as the grass in these areas would be at a manageable height. The good rainfalls received over winter and spring have led to better than expected pasture growth and it is now necessary to slash both the receiver lines and the source lines in these areas to enable the locations of the receivers and shot holes to be surveyed and manage safety and fire hazards associated with working in long grass during summer months.

It is also proposed to locate an explosives magazine on the Doona Vale property to store explosives used in the 3D seismic program rather than transport the explosives required to load shot holes daily by road to and from magazines at nearby mines and quarries.

This addendum to the 3D Seismic REF describes the proposed changes to the approved 3D seismic program and assesses the potential environmental impacts of the modified activity.

1.2 The 3D Seismic Program

The proposed 3D seismic survey is described in detail in the 3D Seismic REF. The modifications do not alter the actual seismic program; rather the modifications relate to ancillary components of the 3D seismic program, namely the slashing of grass in cleared paddocks along the seismic source and receiver lines and the construction of a temporary explosives magazine to support the seismic program. The modifications will not alter the alignment or size of the seismic program.

The environmental impacts of the seismic program are discussed in detail in the 3D Seismic REF. This addendum to the 3D Seismic REF describes the potential environmental impacts associated with the modifications identified in **Section 2.1**. The modifications only relate to activities carried out on the Doona Vale property owned by CMAL. The modifications will not alter the carrying out of the seismic program on any other land.

1.3 Requirement for REF

Seismic surveys are categorised as a Category 2 activity under EL6505 and require approval from Industry & Investment NSW (I&I NSW). A surface disturbance notice (SDN) is required to accompany the approval processes. The 3D Seismic REF was prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of CMAL to assess the potential environmental impacts of the proposed 3D seismic survey. The 3D Seismic REF was used as a supporting document to a SDN that was lodged with I&I NSW. As the modifications proposed to the approved 3D seismic survey program will slightly alter ancillary activities described in the 3D

Seismic REF, this Addendum has been prepared to support an amended SDN for the modified 3D seismic program.

2.0 Proposed Carroona 3D Seismic Survey Activities

2.1 Modifications to Approved Seismic Activities

The approved 3D seismic program is described in Section 2 of the 3D Seismic REF. The following sections explain the proposed changes to the activities described in the 3D Seismic REF.

2.1.1 Line Establishment

The 3D Seismic REF identified that source lines and receiver lines located in cleared areas of the program, namely Doona Vale and the Feedlot owned property, would not be slashed. The exception to this was every third source line which would be slashed to a width of 2.5 metres to enable access by compressors which may remain stationary for longer periods of time and may present a grassfire risk due to long grass being in contact with exhausts and other mechanical equipment.

The good rainfalls received over winter and spring have led to better than expected pasture growth and it is now necessary to slash both the receiver lines and the source lines in these areas to enable the locations of the receivers and shot holes to be surveyed and manage safety and fire hazards associated with working in long grass during summer months. The source lines not required to be used by the compressors and the receiver lines will be slashed to a width of 1.5 metres. The location of the source and receiver lines that are now proposed to be slashed are shown in **Figure A2.1**.

No other changes are proposed to the location or establishment of other source lines, receiver lines or the perimeter lines as outlined in the 3D Seismic REF.

The environmental controls on line establishment are discussed in further detail in **Section 6.1** and are consistent with those described in Section 6.1 of the 3D Seismic REF.

2.1.2 Explosives Magazine

A magazine to store the explosives that will be used in the 3D seismic program is proposed to be constructed on Doona Vale (a CMAL owned property) rather than transport the explosives required to load shot holes daily by road to and from magazines at nearby mines and quarries. The magazine will be constructed in the approximate location shown in **Figure A2.1**.

The magazine will be constructed on a gravel base approximately 75 millimetres thick and 30 metres x 15 metres in size. Two individual magazines will be located on a ridge gravel base. The housings will have dimensions of 2.1 metres high x 2.1 metres long x 1.8 metres wide and 2.4 metres x 2.4 metres x 2.4 metres. The magazine will be constructed to meet the requirements of *Australian Standard (AS) 2187.1-1998 Explosives – Storage, Transport and Use Part 1: Storage*. The Magazine will be fenced with security fencing to the standard required by *AS 1725-2003 Chain-link fabric security fences and Gates*.

The Magazine will have capacity to store up to 5500 kilograms of explosive however will typically hold less than 2500 kilograms. Explosives will be transported to the magazine on several occasions during the 3D seismic survey period. No explosives will be left in the magazine at the completion of the 3D seismic program.



Source: LPI NSW, BHPBilliton

0 0.25 0.5 0.75 km
1:15 000

Legend

- Proposed 3D Seismic Program Area
- Proposed Receiver Line
- Proposed Source Line 1 in 3 (2.5m wide)
- Proposed Source Line 2 in 3 (1.5m wide)
- - - Area of 3D Seismic Area where Additional Line Slashing Required
- Additional Slashed Source and Receiver Lines
- Approximate Magazine Location

FIGURE A2.1

Location of Additional Activities and 3D Seismic Program

A short section of track from Doona Vale road to the Magazine will be constructed to enable access by trucks delivering explosives to the magazine. The location of the proposed access track is shown in **Figure A2.1** and will require gravel to be brought onto the site to improve the access track to enable it to support the weight of a rigid truck. The track will be approximately 20 metres long and 2.5 metres wide.

The magazine will only be used to store explosives related to the carrying out of 3D seismic activities on EL 6505. The magazine will not be used to house any other equipment or explosives unless further approval is obtained for these purposes.

It is anticipated that further 3D seismic surveys will be required to accurately determine and map geological conditions. The magazine will remain in place to enable the storage of explosives for future 3D seismic programs. The magazine will be dismantled at the end of the exploration program unless additional planning approvals for the magazine are obtained.

2.2 Justification of the Changes to the Activity

2.2.1 Additional Line Slashing

At the time of writing the 3D Seismic REF, it was contemplated that the length of the grass in the cleared areas of the 3D seismic program would not present a problem for the drilling of shot holes or the layout of geophones. Due to the good rains throughout winter and spring 2010, growing conditions in the Caroonia area have been above average; accordingly, vegetation growth in the cleared areas of the 3D seismic program has been greater than expected. **Plate A1** shows the proposed location of the magazine and the vegetation growth shown in **Plate A1** is typical of the growth across the cleared areas of the 3D seismic program. Slashing of all source and receiver lines in the cleared areas is now considered necessary for the following reasons:

- personnel safety;
- fire hazard reduction; and
- surveying.

2.2.1.1 Personnel Safety

The good grass growth is expected to increase the prevalence of snakes in the area due to an increase in the small mammal population related to the increase in feed. The long grass makes it difficult to see snakes and increases the risk of snake bite to personnel involved in the 3D seismic program.

The lower visibility due to the long grass also increases the risk posed by trip hazards such as uneven ground, survey stakes marking out the location of shot holes and geophones and the geophone lines themselves. Slashing the grass along the source and receiver lines greatly reduces the risk of personnel tripping and injuring themselves.

2.2.1.2 Fire Hazard Reduction

The good grass growth has increased the risk of grass fires. Tractors remaining stationary while drilling holes and the driving of other mobile equipment along the lines to lay out and check geophone lines and detonate shots increases the risk of fire if the equipment is in contact with long dry grass. This risk is best managed by slashing the long grass in the areas where equipment will be operating for extended periods of time.



PLATE A1
Proposed site for magazine (looking south)
Source: BHP Billiton

2.2.1.3 Surveying

From a practical perspective, it will be difficult to locate the survey pegs identifying the location of shot holes and geophones if they are located in long grass. By slashing along the receiver and source lines, the surveyed pegs will be placed in the slashed areas making them easier to locate when laying out geophones and drilling shot holes.

2.2.2 Magazine

The trial 3D seismic survey carried out in July and August 2010 used a magazine located at the Whitehaven Coal Mine near Werris Creek and transported explosives from the magazine to the trial 3D seismic program area each day and then returned the unused explosives to the magazine at Whitehaven each evening. This process required the transport of explosives along public roads daily for a number of weeks.

The use of this magazine also presented difficulties associated with access to the magazine on weekends and CMAL has been advised that access to the magazine will not be available during the weekends for the current 3D seismic program.

The construction of a magazine on land owned by CMAL and directly adjacent to the 3D seismic program will enable explosives for the program to be accessed as required for the program. The use of an on-site magazine will also remove the need for explosives being transported along public roads at the start and end of each day.

2.3 Evaluation of Alternatives

2.3.1 Slashing

There are two alternatives to the slashing program proposed: not carry out the seismic program in the unslashed grassland areas; or delay the seismic program until the grass growth has reduced through either grazing, agricultural activities or dryer conditions. Carrying out the 3D seismic program in the unslashed grass is not considered a viable option due to the safety risks presented.

The layout of the approved 3D seismic program could be modified however, as noted in Section 2.3.5.1 of the 3D Seismic REF, this would not provide CMAL with adequate information about the geological structures in the area and restrict resource definition work; accordingly, this is not considered an appropriate option.

Delaying the program will have significant logistical and financial implications as the agreement with NSW State Forests requires the seismic program to be completed in Doona State Forest within a defined timeline and, while the cleared areas are outside Doona State Forest, there are significant financial and logistical benefits in conducting the 3D seismic program over the entire area at the same time. Further, there is no clear period of delay that would result in the grassland area reducing in vegetation to a sufficient level to enable the program to be carried out safely.

The slashing is a temporary impact and will not involve any surface disturbance and the vegetation in the slashed areas is expected to fully recover in a short period of time (probably only 2-3 months). As discussed in **Section 6**, the impact of the activity on the environment is not likely to be significant and is similar to existing agricultural activities which have historically been carried out in the cleared areas; accordingly, there is limited environmental benefit in delaying the 3D seismic program for an unknown period of time.

2.3.2 Explosives Magazine

There are two alternatives to the location of the magazine identified in **Figure A2.1**:

- use an existing magazine and transport the explosives to site each day by road and return unused explosives by road back to the licensed magazine each evening; or
- locate the magazine in an alternate location on CMAL owned land.

The trial 3D seismic program used the magazine located at the Whitehaven owned mine at Werris Creek and explosives for the loading of shot holes were transported over 30 kilometres to the site daily and any unused explosives were returned to the magazine in the evening. The transport route was along public roads. As identified in **Section 2.2.2**, weekend access to this magazine is no longer available and an alternate magazine location is required. The nearest alternate magazine is located over 60 kilometres away to the north of Gunnedah.

The use of a magazine located in close proximity to the 3D seismic program means that vehicle movements along public roads associated with the 3D seismic program will be minimised. Locating the magazine on site also has the advantage of reducing the number of times explosives will be transported along public roads from one to two movements daily to a single consignment every two to three weeks. While explosives must be transported in specially licensed vehicles designed to safely hold explosives, the risk presented by moving explosives by road is not negligible and the reduction in the number of movements of vehicles containing explosives has public safety benefits.

The preferred location of the magazine was selected based on the following criteria:

- on CMAL owned land and not proximate to any privately owned land or publically accessible areas;
- close proximity to an existing access road;
- the flatness of the terrain;
- significant distance from other buildings and residences;
- minimal conflicts with existing land uses;
- ecology impacts; and
- security considerations

The preferred location was located close to Doona Vale Road and required only minimal works to establish a road to the preferred site and it was sufficiently level to remove the need for preparatory groundwork. The site is also located approximately 500 metres from the farm buildings on Doona Vale which is sufficient to minimise the risks to people working in or around those building in the unlikely event that an explosion occurs at the magazine. The paddocks to the east and west of the preferred location are also being actively used by the farmer managing Doona Vale and given the magazine will remain in place for subsequent 3D seismic programs, locating it in this location as opposed to other potentially suitable areas will reduce the impact on the farming activities being carried out.

Other potential locations along Doona Vale Road examined were considered unsuitable either because the slope required the bulldozing of a flat pad or other flat areas were too close to drainage lines.

An additional benefit of the preferred location is that it is reasonably central in Doona Vale and located in an area that is highly visible from the areas where the 3D seismic program will be carried out; this is a significant security feature as it reduces the likelihood of theft or other illegal tampering with the magazine. Other locations to the north of the Doona Vale buildings and closer to other property boundaries were discounted due to security or hazard management concerns.

Other locations were actively considered due to the proposed magazine being located in vegetation potentially comprising the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* CEEC listed under the *Environment Protection Biodiversity Conservation Act 1999*. The preferred site is located in an area of vegetation that is heavily infested by Patterson's Curse (*Echium plantagineum*) and is an area of the potential derived grassland community that is heavily disturbed.

It is considered that the location of the magazine in the proposed location is preferable to the alternatives that exist.

3.0 Regulatory Requirements

3.1.1 EL Requirements

Condition 2 of EL6505 requires the licence holder to submit a Surface Disturbance Notice (SDN) for all Category 2 and Category 3 exploration activities. The Category 2 or 3 activity covered by the SDN must be approved by I&I NSW before the activity can be carried out. Category 2 activities are defined in EL6505 as operations which have potential for moderate disturbance to the land surface, native vegetation or other environmental values, including:

- operations under Category 1 (c) to (h) within or adjacent to Sensitive Areas;
- **seismic surveys;**
- excavating or bulk sampling not exceeding 60 cubic metres;
- drilling involving no more than moderate site preparation, excluding drilling holes exceeding 400 millimetre diameter;
- camp construction; and
- **access tracks, drill pads or line slashing involving no more than moderate native vegetation disturbance.** (emphasis added)

The proposed 3D seismic program is seismic survey and is therefore considered to be a Category 2 exploration activity. The line clearing for the receiver and source lines could also be considered to be moderate vegetation disturbance.

Before a SDN can be approved, I&I NSW must assess the activity in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Part 5 requires I&I NSW to have regard to the likely impacts of the proposed activity on the environment to the fullest extent possible (section 111 EP&A Act) before determining the application (refer to **Section 4.2.2**). The 3D Seismic REF was considered by I&I NSW and the 3D seismic program approved on 12 November 2010. This addendum has been prepared to enable I&I NSW to assess the environmental impact of the proposed changed to the approved 3D seismic program.

3.1.2 Seismic Survey in Exempted Areas

None of the proposed amendments to the 3D seismic program will involve works in an exempted area. Accordingly, no further approval is required under s. 30 of the *Mining Act 1992*.

3.1.3 Exploration Environmental Management Plan

Condition 11, Section C, of EL6505 requires that:

Environmental management of operations must be carried out according to a specific Environmental Management Plan covering all exploration activities (including categories 1 to 3) prepared by the licence holder which is acceptable to the Department.

A comprehensive Exploration Environmental Management Plan (EEMP) was prepared by Umwelt (2006) on behalf of the licence holder and approved by the Department of Primary Industries (now I&I NSW).

The purpose of the EEMP is to provide the framework for environmental management of exploration activities in the EL area and to detail the control measures to be implemented to ensure that exploration activities are conducted in an environmentally responsible manner.

The EEMP applies to all exploration activities conducted by CMAL in the EL area. It includes an outline of the environmental statutory responsibilities for the project and identifies key environmental controls to be implemented during exploration. A series of exploration planning, operational control, and post-exploration decommissioning and remediation checklists are used to ensure the controls outlined in the EEMP are implemented. CMAL will adhere to the EEMP in the carrying out of the seismic activities subject to any modified requirements identified in the 3D Seismic REF and this Addendum.

3.1.4 Environmental Considerations

Condition 13, Section C, of EL 6505 provides:

13 Threatened Species, Populations, Ecological Communities and their Habitats, and Critical Habitat

- a) Prior to carrying out any prospecting operations the licence holder must consider potential impacts on threatened species (of plants, animals and fish), populations and ecological communities and their habitats, and critical habitat, and plan the activities to minimise any such impacts.
- b) Threatened species populations and ecological communities and their habitats, and critical habitat, must be satisfactorily addressed in any notification under Condition 2 of this licence.
- c) The licence holder must comply with legislation relating to threatened species, populations, ecological communities and their habitat, and critical habitat. Should prospecting operations require a licence under the National Parks and Wildlife Act 1978 or the Threatened Species Conservation Act 1995 then the licence holder must obtain such a licence.

The potential impacts of the proposed 3D seismic program on threatened species (of plants, animals and fish), populations and ecological communities and their habitats, and critical habitat was discussed in detail in Section 6.1 of the 3D seismic REF. **Section 6.1** of this Addendum assesses any additional impacts that may be associated with the additional slashing and construction of the magazine as part of the amended 3D seismic program.

4.0 Planning Context and Consultation

4.1 Commonwealth Legislation

A summary of the Commonwealth legislation potentially relevant to the proposed amendments to the 3D seismic program is provided in **Table 4.1**.

Table 4.1 - Relevance of Commonwealth Legislation to the Project

Act	Comments	Approval Required for the Project?
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>Under the EPBC Act the approval of the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities is required for any action that may have a significant impact on matters of National Environmental Significance, including World Heritage properties, National Heritage Places, Ramsar wetlands, cetaceans, migratory species, threatened species, critical habitats or ecological communities listed in the EPBC Act, Commonwealth land, marine areas or reserves and nuclear actions.</p> <p>The only matters of National Environmental Significance with potential relevance to the project are those related to ecological values. The ecological assessment for the 3D seismic survey program, including the additional activities, (refer to Section 6.1) has found that the 3D seismic survey program is not likely to significantly impact on any matters of National Environmental Significance prescribed by the EPBC Act. Consequently, approval from the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities is not required for the proposed exploration activities.</p>	No
<i>Native Title Act 1993</i>	<p>The Commonwealth government enacted the <i>Native Title Act 1993</i> in response to the High Court of Australia decision in <i>Mabo</i> (1992). The Act is administered by the National Native Title Tribunal. The Act prescribes that Native Title can be extinguished under certain circumstances, including the granting of freehold land.</p> <p>The additional proposed activities are all located on privately owned land over which Native Title is considered to have been extinguished.</p>	No

4.2 NSW Legislation

4.2.1 Approvals Process

Section 381 of the *Mining Act 1992* excludes prospecting from requiring development consent under Part 4 of the EP&A Act unless a State Environmental Planning Instrument provides otherwise.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Minerals SEPP) was gazetted in February 2007. With regards to mining and related activities, the Minerals SEPP outlines where various minerals activities are permissible both with and without development consent. The Minerals SEPP also defines mining developments that are prohibited, exempt or complying developments.

Clause 6(a) of the Minerals SEPP identifies that development for the purposes of ‘mineral exploration and fossicking’ can be undertaken without development consent. The 3D seismic program described by the 3D Seismic REF is development for the purposes of exploration and did not require development consent. The additional activities are development for the purposes of mineral exploration; accordingly, the 3D seismic program, as modified, does not require development consent under the EP&A Act.

As discussed in **Section 2.1.1**, the 3D seismic survey is a Category 2 prospecting operation as defined in EL6505. In accordance with Condition 2 of Section A of EL6505, Category 2 activities require additional approval from I&I NSW before they can be undertaken. Given that development consent was not required for the 3D seismic program, the consideration of the 3D seismic survey was assessed by I&I NSW in accordance with Part 5 of the EP&A Act. As the additional activities will require a modification of the approved 3D seismic program, any assessment of these activities by I&I NSW will also be subject to the requirements of Part 5 of the EP&A Act.

This Addendum, together with the 3D Seismic REF have been prepared to support the application to carry out the modified 3D seismic program and enable I&I NSW to have regard to the likely environmental impacts of the proposed activity and satisfy its obligations under Part 5 of the EP&A Act (refer to **Section 4.2.2** below).

4.2.2 EP&A Act Environmental Assessment Requirements

In accordance with Section 111 of the EP&A Act, the 3D seismic REF and Addendum examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity, including the matters outlined in **Table 4.2**.

Table 4.2 - EP&A Act Section 111 Requirements

Matters to be Considered in the Review of Environmental Factors	Relevance
2a) any conservation agreement entered into under the <i>National Parks and Wildlife Act 1974</i> and applying to the whole or part of the land to which the activity relates, and	The proposed 3D seismic survey will not impact on any areas to which a conservation agreement applies.
2b) any plan of management adopted under that Act for the conservation area to which the agreement relates, and	The proposed 3D seismic survey will not impact on any areas to which a conservation agreement applies.
2c) any joint management agreement entered into under the <i>Threatened Species Conservation Act 1995</i> ; and	No joint management agreements are applicable to the proposed 3D seismic survey area.
2d) any bio-banking agreement entered into under Part 7A of the <i>Threatened Species Conservation Act 1995</i> that applies to the whole or part of the land to which the activity relates.	There is no bio-banking agreement entered into which applies to the land on which the proposed 3D seismic survey will be undertaken.
2e) the effect of an activity on any wilderness area (within the meaning of the <i>Wilderness Act 1987</i>) in the locality in which the activity is intended to be carried on.	There are no wilderness areas within the locality to which this activity relates.
4a) the effect of an activity on critical habitat.	There are no areas of critical habitat within the locality to which this activity relates.

Table 4.2 - EP&A Act Section 111 Requirements (cont)

Matters to be Considered in the Review of Environmental Factors	Relevance
4b) in the case of threatened species, populations and ecological communities, and their habitats, whether there is likely to be a significant effect on those species, populations or ecological communities, or those habitats, and	An assessment of the likely impacts of the 3D seismic program on threatened species, populations and ecological communities listed under the <i>Threatened Species Conservation Act 1995</i> (TSC Act) was carried out in the 3D Seismic REF and concluded that the approved 3D seismic program would not significantly affect threatened species, populations or ecological communities. The additional activities will not be carried out in any threatened ecological community listed under the TSC Act. The potential impacts of the additional activities (including cumulative impacts) threatened species, populations and ecological communities is discussed in Section 6.1 . The additional slashing and the construction of the magazine proposed as part of this modification will impact on a vegetation community that may comprise derived native grassland which is a Critically Endangered Ecological Community (CEEC) listed under the EPBC Act. The impacts on the Commonwealth listed CEEC are discussed in Section 6.1 .
4c) the effect of an activity on any other protected fauna or protected native plants within the meaning of the <i>National Parks and Wildlife Act 1974</i> .	The effect of this proposal on any other native fauna and flora is discussed in Section 6.1 .

The Department of Urban Affairs and Planning (DUAP now Department of Planning) guideline '*Is an EIS Required – Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979*' (DUAP, date unknown) was used to determine whether or not the modified activity are likely to have a significant impact on the environment and whether or not an Environmental Impact Statement (EIS) is required. An issues checklist from this guideline (refer to **Appendix 1**) was used to:

- identify the characteristics of the activities that are likely to result in environmental impacts; and
- determine whether the activities are likely to affect environmentally sensitive areas.

From the issues identified in the checklist, it was concluded that the modified exploration activities will not have a significant environmental or social impact and the preparation of an EIS is not required. This Addendum provides a detailed assessment of the relevant issues identified in the checklist.

This Addendum has also been prepared to consider the factors outlined in Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) (refer to **Table 4.3**).

Table 4.3 - EP&A Regulation Clause 228 Requirements

Matters to be Considered in the Review of Environmental Factors	REF Section
Clause 228 of <i>Environmental Planning and Assessment Regulation 2000</i> requires that the following matters be taken into consideration in Part 5 Assessment	
any environmental impact on a community,	Section 6
any transformation of a locality,	Section 6
any environmental impact on the ecosystems of the locality,	Section 6, in particular 6.1
any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality,	Section 6
any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations,	Section 6, in particular 6.2
any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>),	Section 6, in particular 6.1
any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air,	Section 6, in particular 6.1
any long-term effects on the environment,	Sections 6 and 7
any degradation of the quality of the environment,	Sections 6 and 7
any risk to the safety of the environment,	Section 6, in particular 6.6
any reduction in the range of beneficial uses of the environment,	Section 6
any pollution of the environment,	Section 6
any environmental problems associated with the disposal of waste,	Section 6, in particular 6.6
any increase demands on resources (natural or otherwise) that are, or are likely to become, in short supply,	Section 6, in particular 6.5 and 6.6
any cumulative environmental effect with other existing or likely future activities.	Section 6, in particular 6.11

4.3 Summary of Other State Legislation

A summary of the other State legislation potentially applicable to the new proposed activities is included in **Table 4.4** (also refer to **Appendix 2**), with an indication of the requirements specific to the proposed activities.

Table 4.4 - Summary of State Legislation and Relevance to the Proposed Activities

Act	Is a Specific Approval Required?	Comments
<i>Water Management Act 2000</i>	No	No approvals are required under the <i>Water Management Act 2000</i> as the proposed activities will not impact on any relevant matters identified in the Water Sharing Plan for the Phillips Creek, Mooki River, Quirindi Creek and Warrah Creek Water Sources 2003.
<i>Water Act 1912</i>	No	No approvals are required under the <i>Water Act 1912</i>
<i>Fisheries Management Act 1994</i>	No	A permit under this Act is not required as no works will be undertaken in natural drainage lines within EL6505 and no aquatic reserves are in the locality to which the proposed activities relate.
<i>National Parks and Wildlife Act 1974</i>	No	The proposed additional activities will not result in any impacts to national parks. The proposed activities will be excluded from areas identified as an Aboriginal site or potential site and, accordingly, the additional activities will not result in disturbance to any identified Aboriginal objects or places and therefore approval under the <i>National Parks and Wildlife Act 1974</i> is not required (refer to Section 6.2).
<i>Heritage Act 1977</i>	No	No heritage items will be impacted by the proposed activities and as such no approval under this Act is required (refer to Section 6.2).
<i>Threatened Species Conservation Act 1995</i>	No	None of the additionally proposed activities will be carried out in a TSC Act listed threatened ecological community. The assessment of potential impacts in Section 6.1 found that the proposed activities will not result in a significant impact on any TSC Act listed threatened species, populations or ecological communities and therefore approval under the TSC Act is not required.
<i>Roads Act 1993</i>	No	The proposed 3D seismic program will not affect any roads.
<i>Explosives Act 2003</i>	Yes	Licences will be required to store explosives in the proposed magazine. Persons handling and transporting explosives will also be required to be appropriately licensed.

As indicated in **Table 4.4**, the only additional approval required for the amended activity that was not required for the approved 3D seismic Program is a licence under the *Explosives Act 2003* to store explosives in the proposed magazine.

4.4 Zoning

The additional proposed slashing and the proposed magazine site will be within agricultural land owned by CMAL, which is zoned 1(a) – Rural (Agricultural Protection) under the Gunnedah LEP. The proposed activities are not inconsistent with the objectives of this zone.

4.5 Stakeholder Consultation

Community engagement regarding the proposed 3D seismic activities, including the proposed modifications will be carried out as described in the 3D Seismic REF and any conditions of approval on the SDN.

5.0 Overview of Existing Environment

The existing environment is described in detail in Section 5.0 of the 3D Seismic REF.

6.0 Environmental Impacts and Management

6.1 Ecology

Condition 13, Section C, of the EL6505 specifies that prior to carrying out any prospecting operations the licence holder must consider potential impacts on threatened species, populations and ecological communities and their habitats. Pursuant to section 111 of the EP&A Act, an assessment of the impact of the proposed amendments to the approved 3D seismic program on flora and fauna generally is also required.

The 3D Seismic REF assessed the likely impacts of the approved 3D seismic program. This Addendum assesses the additional impacts associated with the slashing in the cleared areas of the 3D seismic survey area and the construction of the temporary explosive magazine, including an assessment of cumulative impacts.

6.1.1 Flora

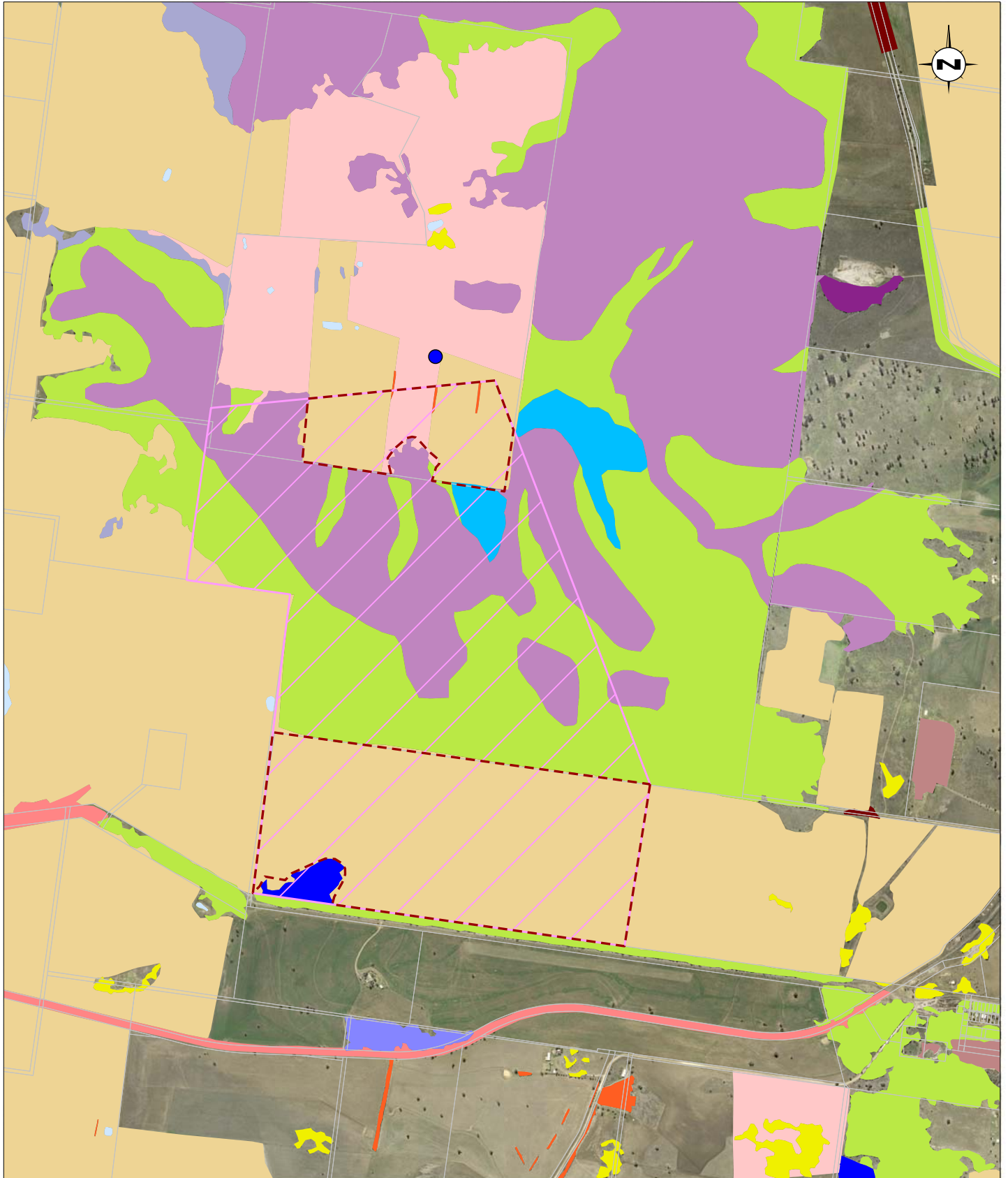
The 3D seismic program will be limited to the Doona Ridge in the location shown in Figure 1.4 of the 3D Seismic REF. The following vegetation communities are identified as occurring in the 3D seismic program area and will therefore be potentially impacted by the program:

- Yellow Box Woodland
- White Cypress Pine Woodland;
- White Box - White Cypress Pine Woodland;
- Red Gum Woodland;
- Ironbark - White Cypress Pine Forest;
- Derived Native Grassland;
- Planted (including wind breaks); and
- Non-native Pasture and Crops.

The location of the additional slashing required for source and receiver lines and the location of the proposed magazine in relation to these vegetation communities is shown in **Figure A6.1**.

All of the proposed additional slashing will be carried out in cleared land that has been heavily disturbed by agricultural activities since at least the late 1950s (LPI, 1958). Part of the additional slashing will be carried out in a cleared paddock that has been identified as potentially comprising Derived Native Grassland consistent with the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) listed critically endangered ecological community (CEEC): *White Box- Yellow Box – Blakely’s Red Gum Woodland* EEC and the *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland*.

The additional activities will not impact on any NSW *Threatened Species Conservation Act 1995* (TSC Act) listed threatened ecological communities (TECs). The vegetation potentially comprising derived native grassland is not listed as a threatened ecological community under the TSC Act and no other locally occurring TECs will be affected.



Source: LPI NSW, BHPBilliton

0 400 800 1200m
1:28 000

Legend

- Approved 3D Seismic Program Area
 - Proposed Additional Slashing of Source & Receiver Lines
 - Proposed Location of Magazine
- Vegetation Communities:
- Bimble Box Woodland
 - Derived Native Grassland
 - Disturbed/Urban
 - Ironbark - White Cypress Pine Forest
 - Modified White Box Woodland
 - Native Grassland on Cracking Clay Soil
 - Planted
 - Pasture/Cropping
 - Red Gum Woodland
 - Water
 - White Box - White Cypress Pine Woodland
 - White Box Woodland
 - White Cypress Pine Forest
 - Yellow Box - Red Gum Woodland
 - Yellow Box Woodland

FIGURE A6.1

**Preliminary Vegetation
Communities Mapping**

6.1.1.1 Potential Impacts

The additional proposed slashing and construction of the explosives magazine have the potential to impact on vegetation in the following ways:

- Slashing of vegetation along source and receiver lines using a tractor or bobcat mounted slasher will cut tall grass including seed heads. Access tracks along fence lines will also be constructed to facilitate the slashing of receiver and source lines.
- There is potential for weeds to be introduced to the area through movement of vehicles and equipment between disturbed grassland and agricultural areas to native woodland and grassland areas.
- The construction of the magazine will involve the deposition of approximately 75 millimeters of gravel over an area of approximately 30 metres x 15 metres. The gravel base will prevent vegetation from growing in the magazine compound while the magazine remains in place.
- The construction of the access track for the magazine will result in gravel being deposited over grass which will limit grass growth along the track alignment.
- Both the magazine site and access track will be slashed and raked prior to any gravel being laid.

The modification will not alter the layout of the 3D seismic program nor the number or location of shot holes or geophones. The additional activities proposed will not result in any additional ground disturbance to that which is described in the 3D seismic REF however the construction of the magazine and associated access track will include the depositing of gravel on the surface which will prevent vegetation growth in affected areas. As the additional slashing is restricted to the cleared paddock areas, the removal of the fallen timber and stumps from the source and receiver lines is not required. The amended activities will not require the removal of any juvenile or mature trees.

6.1.1.2 Environmental Controls

The following controls will be placed on the seismic program:

- receiver line corridors will be limited to a width of 1.5 metres;
- source line corridors will be limited to a width of 1.5 metres except corridors required for compressors. The compressors will operate along a central source line 2.5 metres wide and will supply compressed air to drilling rigs located in the source lines adjacent to the line used by the compressors. Every third source line will be used by compressors (the slashing of the source lines required for compressors through grassland was addressed in the 3D Seismic REF);
- vehicles will be washed prior to entry to the 3D seismic program area to remove foreign seeds. Vehicles moving between cleared paddocks and forested areas will be checked twice a day for build up of vegetation propagules and washed if necessary; and
- the location of the magazine will be limited to the more disturbed areas of vegetation with a high proportion of weed species. The associated access track will be similarly located in the most direct route that avoids the less disturbed native grassland areas.

6.1.1.3 Impact Assessment

The amount of vegetation disturbance associated with the slashing of source and receiver lines, along the fence lines and the construction of the magazine and associated road in the cleared grassland areas in Doona Vale is approximately 6.8 hectares; this includes the 2.3 hectares of slashing already approved. Of the additional approximately 4.5 hectares to be slashed in Doona Vale, approximately 0.7 hectares comprises vegetation which potentially conforms to the Derived Native Grassland community which forms part of the EPBC Act listed *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* CEEC; the other approximately 3.7 hectares is non-native pasture/cropping vegetation.

An additional 9.8 hectares of slashing along receiver and source lines in the Feedlot owned land may also be required if the 3D seismic program in this area cannot be timed to coincide with the stripping of the crop currently being grown in this area and vegetation in the paddock has re-grown to such an extent after harvesting that the 3D seismic activities cannot be carried out safely.

The maximum amount of additional slashing that would be required if all of the feed lot lines required slashing is approximately 13.5 hectares.

The area of disturbance associated with the construction of the magazine is approximately 0.05 hectares.

The total maximum area of ground disturbance (stump removal, estimated disturbance from fallen timber removal from lines and drilling) and vegetation disturbance in each of the vegetation communities (total of slashing, estimated disturbance from shrub and small tree removal and ground disturbance) for the 3D seismic program incorporating the additional impacts proposed is shown in **Table 6.1**.

Table 6.1 – Cumulative Areas of Disturbance (Vegetation Type)

Vegetation type	Surface Disturbance (Ha)					Vegetation Disturbance	
	Receiver lines*	1.5m source lines*	2.5m Source lines & perimeter and fence lines*	Magazine	Total	Additional activities	Total (Ha)
Yellow Box Woodland	0.01	0.01	0.02 (0.19)	0	0.04	0	0.21
White Box - White Cypress Pine Woodland	0.28	0.364	0.35 (3.50)	0	0.99	0	4.14
Red Gum Woodland	0.01 (0.28)	0.02 (0.17)	0.02 (0.16)	0	0.046	0	0.19
Planted (wind breaks)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (0.01)	0	<0.1	0	0.01
Non-native Pasture/ Cropping (Doona Vale)	0 (1.66)	0.05 (1.09)	0.06 (3.13)	0	0.11	3.68	5.88
Non-native Pasture/ Cropping (Feedlot)	0 (5.92)	0 (3.89)	0.15 (3.25)	0	0.15	9.81	13.06
Ironbark - White Cypress Pine Forest	0.23 (4.77)	0.30 (2.99)	0.30 (2.98)	0	0.83	0	10.74

Table 6.1 - Areas of Disturbance (Vegetation Type) (cont)

Vegetation type	Surface Disturbance (Ha)					Vegetation Disturbance	
	Receiver lines*	1.5m source lines*	2.5m Source lines & perimeter and fence lines*	Magazine	Total	Additional activities	Total (Ha)
Not vegetated	0	0.	<0.01	0	<0.01	0	N/A
Derived Native Grassland	0 (0.31)	0.01 (0.19)	0.01 (0.42)	0.05 (0.05)	0.23	0.69	0.92

* Numbers in parentheses represents area of vegetation disturbance from slashing

The Derived Native Grassland community is generally consistent with the Commonwealth EPBC Act listed *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* CEEC. A substantial proportion of Doona Vale has been identified as containing vegetation potentially consistent with the Derived Native Grassland community. As shown in **Figure A6.1**, one paddock in the south of Doona Vale which is partly impacted by the 3D seismic program has been mapped as potentially comprising the *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* CEEC due to the presence of a grassland community generally consistent with the Derived Native Grassland community. Approximately 0.23 hectares of slashing in the Derived Native Grassland community has been approved for the 3D seismic program. The additional activities will require the slashing of a further 0.69 hectares of Derived Native Grassland of which 0.05 hectares is associated with the proposed magazine and associated access track.

The location of the proposed magazine and access track has been chosen due to it being the most disturbed area of vegetation close to Doona Vale Road and the area least likely to be considered to comprise Derived Native Grassland due to the prevalence of exotic species, predominately Patterson’s Curse (*Echium plantagineum*). The proposed location of the magazine is shown in **Plate A1**.

The total area of vegetation disturbance in the area of potential CEEC associated with the 3D seismic program is approximately 5.3 hectares. Approximately 1.1 hectares of the CEEC will be subject to ground disturbance and, of this, only 0.05 hectares associated with the construction of the magazine will have a semi-permanent impact and this has been restricted to a heavily disturbed area of potential Derived Native Grassland; the ground disturbance associated with the drilling and line establishments works in the forested areas (discussed in Section 6.1 of the 3D Seismic REF) is expected to recover within a short period of time (less than 6 months) after completion of the 3D seismic program. The proposed slashing in this vegetation community will have a temporary impact on the community, as rootstock will be retained and the species currently present are likely to recover.

An Assessment of Significance under the EPBC Act was undertaken to assess impacts on the *White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland* CEEC, which is provided in **Appendix 2**. The assessment determined that seismic activities are unlikely to have a significant impact on this CEEC.

The additional proposed seismic activities will also require the slashing of groundcover species in paddocks containing non-native pasture/cropping vegetation. This additional activity will not have a significant adverse impact on this vegetation. The proposed slashing is similar in impact to many routine agricultural activities that would regularly occur in the affected areas but has been temporarily excluded while the 3D seismic program is being carried out.

6.1.2 Fauna

6.1.2.1 Potential Impacts

The potential impacts on fauna from the additional activities are expected to be minimal and are largely limited to temporary disturbance impacts. The potential impacts identified are:

- the slashing of grasslands may disturb species using the grass as habitat or for nesting purposes;
- the slashing of grass may remove some vegetation used as a feed source by animals, and particularly macropods and domestic stock; and
- the slashing is likely to stimulate a green fresh pick in the grasses in the weeks following the slashing which is likely to provide a higher quality feed source for fauna and particularly macropods and domestic stock.

All negative impacts are likely to be temporary and the risk of fauna mortality from the proposed activities is considered to be low as the noise from slashing activities is likely to cause fauna species to move to adjoining vegetation unaffected by the slashing activities.

6.1.2.2 Environmental Controls

No additional controls to those identified in the 3D Seismic REF and EEMP are considered necessary to manage the potential impacts on fauna given the low likelihood of any adverse impacts.

6.1.2.3 Impact Assessment

Impacts on Threatened Fauna Species

An assessment of the likelihood of an impact occurring on the threatened fauna species known, or considered to have potential, to occur is provided in **Table 6.2**.

Table 6.2 – Potential for threatened fauna species to be impacted by additional proposed activities

Scientific Name	Common Name	TSC Act	EPBC Act	Potential to be impacted by additional activities
<i>Glossopsitta pusilla</i>	little lorikeet	V		No
<i>Neophema pulchella</i>	turquoise parrot	V		No
<i>Climacteris picumnus victoriae</i>	brown treecreeper (eastern subspecies)	V		No
<i>Chthonicola sagittata</i>	speckled warbler	V		No
<i>Melanodryas cucullata cucullata</i>	hooded robin (south-eastern form)	V		No
<i>Pomatostomus temporalis temporalis</i>	grey-crowned babbler (eastern subspecies)	V		No
<i>Stagonopleura guttata</i>	diamond firetail	V		No
<i>Daphoenositta chrysoptera</i>	varied sittella	V		No
<i>Circus assimilis</i>	spotted harrier	V		No

Table 6.2 – Potential for threatened fauna species to be impacted by additional proposed activities (cont)

Scientific Name	Common Name	TSC Act	EPBC Act	Potential to be impacted by additional activities
<i>Hieraaetus morphnoides</i>	little eagle	V		No
<i>Dasyurus maculatus maculatus</i>	spotted-tailed quoll (SE mainland)	V	E	No
<i>Phascolarctos cinereus</i>	koala	V		No
<i>Mormopterus norfolkensis</i>	eastern freetail-bat	V		No
<i>Chalinolobus dwyeri</i>	large-eared pied bat	V	V	No
<i>Myotis adversus</i>	large-footed myotis	V		No
<i>Scoteanax rueppellii</i>	greater broad-nosed bat	V		No
<i>Vespadelus troughtoni</i>	eastern cave bat	V		No

Notes: V = vulnerable
E = endangered

The additional proposed slashing of grass and other groundcover species in cleared areas will not impact threatened fauna species considered likely to occur in the area as these grassland communities do not represent preferred breeding habitat for any species and the temporary nature of the impact. Given the abundance of vegetation in both the forested and cleared areas (necessitating the need for the slashing), the additional slashing in the cleared areas is not likely to result in a significant reduction in potential foraging habitat for threatened fauna species.

The 3D seismic program activities, including the additional slashing in the cleared areas and the construction of the magazine are unlikely to have a significant impact on threatened fauna species.

General Impacts

Fauna disturbed by the slashing associated with the additional activities will be able to seek refuge in the undisturbed areas immediately adjacent to the lines. No shrubs, immature or mature trees (including stags) will be removed by the additional slashing activities or construction of the magazine.

The slashing of vegetation will not remove a significant amount of potential feed for herbivores. The fresh growth stimulated by the slashing and limited ground disturbance is likely to provide a 'fresh pick' in affected areas which may be used by macropods and stock in the impacted areas.

The proposed additional activities will not result in a significant impact on flora or fauna species or communities.

6.2 Heritage

The potential impacts of slashing and other 3D seismic activities were discussed in Section 6.1 of the 3D seismic program. As identified in the 3D Seismic REF, appropriate due diligence inspections will be carried out in relation to the proposed 3D seismic activities in accordance with relevant NSW legislative requirements and guidelines. Representatives of

the Walhallow community and a qualified archaeologist will conduct these site inspections and advise on the cultural significance of the areas affected by the 3D seismic program and the location of activities adjusted to avoid any identified impacts. These controls will apply to the additional activities covered by this Addendum.

6.3 Noise and Vibration

6.3.1 Noise

Noise from machinery involved in slashing and construction of the magazine have some limited potential to affect the amenity of the area.

These impacts are consistent with the impacts considered in the 3D Seismic REF. The noise impacts from the 3D seismic program including the additional activities are consistent with the existing rural nature of the area and are unlikely to have a significant impact on the amenity of the area when carried out in accordance with the controls identified in the 3D Seismic REF.

6.3.2 Vibration and Air Blast Pressure

The additional activities are not expected to have any vibration impacts.

The magazine will be designed and managed in accordance with relevant Australian Standards for explosive storage and all legislative requirements. The risk of explosion at the magazine and resultant air blast pressure impacts is considered extremely low.

6.4 Air Quality

Potential impacts on air quality associated with the additional slashing are expected to be minimal as no earth works will be required for the proposed slashing.

Air quality impacts will be generally limited to the establishment of the magazine base and access road when ridge gravel will be deposited and spread out over an area of approximately 500 square metres. These impacts are expected to be minimal due to the coarse nature of the material being laid.

Other sources of air quality impacts are from wheel generated dust from the vehicles moving along unsealed roads and exhaust emissions from plant. These potential impacts are expected to be minimal as the vehicles will adhere to a 40 kilometres per hour speed limit on unsealed roads in Doona State Forest and private roads and plant will be maintained in good working order. The additional proposed activities are unlikely to generate more than 30 additional vehicle movements over unsealed roads and any additional impact from these vehicle movements is likely to be offset by the consequent reduction in vehicle movements associated with the daily transport of explosives two and from the site from the Werris Creek mine.

In accordance with Section 6.8.2 of the EEMP (Umwelt 2006) the 40 kilometres per hour speed limits on tracks will be adhered to at all times to minimise dust generation. If wheel generated dust controls are not working effectively and excessive dust levels are being created, additional controls will be implemented (e.g. use of water cart) until dust levels can be effectively controlled.

As a result of the operational controls that will be implemented it is considered that the potential impacts of the 3D seismic survey, including the additional activities, on air quality will be minimal.

6.5 Water Resources

The additional slashing will retain a short groundcover which will minimise the risk of soil erosion from any water runoff. The site of the proposed magazine has been selected to avoid drainage lines.

The additional activities covered by this Addendum are not expected to have any adverse impacts on surface water or groundwater resources.

6.6 Hazardous Substances

6.6.1 Storage of Explosives

The proposed 3D seismic program will require the storage and use of up to 5,500 kilograms of Class 1.1B explosives. Although State Environmental Planning Policy No. 33 Hazardous and Offensive Development (SEPP 33) does not apply to activities assessed and approved under Part 5 of the EP&A Act, the risk screening procedure outlined in the Department of Planning guideline '*Applying SEPP 33: Hazardous and Offensive Development*' has been used to provide an assessment framework for the storage and use of explosives for the 3D seismic program. As the magazine will contain, as a maximum, 5500 kilograms of Class 1.1 explosive and is located over 500 metres away from the nearest residence (which is uninhabited) or farm building, the proposed magazine is below the risk screening requirements of SEPP 33 and a detailed hazard assessment under SEPP33 is not required.

The transport of explosives to and from the magazine and the construction and management of the magazine will conform with the following legislative and good practice requirements:

- *Australian Code for the Transport of Explosives by Road and Rail (Third Edition)*;
- *Australian Standard 2187.1-1998 Explosives – Storage, Transport and Use Part 1: Storage*;
- *Australian Standard 2187.2-2006 Explosives – Storage, and Use Part 2: Use of Explosives*;
- *Australian Standard 1725.1-2010 Chain-link fabric security fences and Gates*;
- *Explosives Act 2003*; and
- *Explosives Regulation 2005*.

Consistent with the conditions imposed on the approval of the SDN for the 3D seismic program, a risk assessment of the use of explosives as part of the exploration program and a blast management plan will be forwarded to I&I NSW prior to any explosives being stored or used on site.

The magazine will be fenced with security fencing and built to the required security standards to prevent unauthorised access. The magazine and compound will be locked at all times.

Any remaining explosives that are not used at the end of the 3D seismic program will be returned to the supplier or other licensed magazine. No explosives will be stored in the magazine following completion of the 3D seismic program.

The storage and use of explosives on site when managed in accordance with relevant regulatory codes and as identified above is not considered likely to significantly affect the environment.

6.6.2 Waste Management

Wastes generated by the seismic activities will be managed in accordance with the process outlined in the EEMP (Umwelt, 2006) and 3D Seismic REF (Section 6.6.2).

6.7 Soils, Land Use and Natural Resources

The potential impacts of the additional activities on soils, land use and natural resources are consistent with those of the approved 3D seismic program. The controls discussed in Section 6.7 of the 3D Seismic REF will also apply to the additional proposed slashing and construction of the magazine. The additional proposed activities, when considered in addition to the 3D seismic program already approved, are not likely to have a significant impact on soils, land use and natural resources.

6.8 Bushfire Risk

There are three potential sources of bushfire risk associated with the proposed 3D seismic program:

- the exhaust pipes or other hot components of machinery coming into contact with vegetation for an extended period of time;
- the detonation of explosives, whether deliberately or by accident; has the potential to start a fire; and
- cigarettes and fires started by personnel for cooking or other purposes.

Due to good rainfall over the past five months, there has been strong grass growth in the proposed seismic area remove extra space and this increases the risk of grass and forest fires, particularly as the weather warms up in the summer months and the grasses dry off.

The following controls will be implemented to manage the risk of fire:

- Source lines used by compressors will be slashed to a width of 2.5 metres in all vegetation communities. This slashing is specifically designed to reduce the risk of grass being in extended contact with the compressors which may be operating in a stationary position for an extended period of time.
- All source and receiver lines in cleared paddocks will be slashed to minimise the risk of exhaust initiated fires from vehicles moving along these lines.
- A 2.5 metre wide perimeter line along fences in cleared paddock areas will also be cleared to enable vehicles to move between lines without the need to drive through long grass. The resultant 5 metre cleared area along fence lines will also present a significant

fire break should a fire start in any of the cleared areas and, together with the 2.5 metre perimeter line, can be used as a back burning line if necessary.

- A trailer containing water and a water pump will be available to douse any smouldering vegetation if required. All vehicles working in the area will also include a hand held extinguisher.
- The pad around the magazine has been designed to be larger than the magazines themselves to operate as a fire break should a grass fire occur. This will help reduce the risk of explosion as a result of a grass fire.

The use of explosives within the proposed 3D seismic area has the theoretical potential to generate an ignition source for bushfires however the experience from the trial 3D seismic program suggests that the chance of this occurring is remote. The design and management of the magazine will similarly reduce the risk of explosion at the magazine to negligible levels. In the unlikely event that the detonation of explosives as part of the 3D seismic program does cause an explosion on the surface, the slashing of source, receiver, fence and perimeter lines means the risk of vegetation catching fire or any fire spreading is reduced.

6.9 Visual

The visual impacts of the additional slashing proposed is expected to be minimal as the vegetation impacted is expected to recover quickly and, are restricted to land owned by CMAL.

The location of the magazine has been designed to be visible from most areas in the south of the Doona Vale property to enable monitoring of the magazine while the 3D seismic program is being carried out and explosives are present in the magazine. There is only limited visibility of the magazine from adjoining properties, including the State forest. The magazine will be removed following completion of the exploration program.

The additional proposed activities are considered unlikely to have a significant visual impact on the environment.

6.10 Traffic

Traffic impacts from the proposed 3D seismic program are discussed in Section 6.10 of the 3D Seismic REF. While there will be several additional heavy vehicle movements associated with the construction of the magazine and delivery of explosives to the magazine, there will be a resultant drop of two vehicle movements between Werris Creek and the 3D seismic site each day over a 6-8 week period while shots are being loaded.

The traffic impacts associated with the additional activities are not predicted to be significantly different to those described in the 3D seismic REF.

6.11 Community

The additional slashing activities will have a negligible impact on the community beyond that described in Section 6.11 of the 3D Seismic REF.

It is possible that the community may have concerns about the use of an explosives magazine at Doona Vale. The magazine is located approximately 1.7 kilometres from the

nearby feedlot and over 2 kilometres from the nearest residence. The nearby sections of Doona State Forest will be closed to the public while explosives are present at the magazine.

The use of the magazine also has the advantage that it reduces the number of vehicle movements containing explosives along public roads. The risk associated with the transport of explosives along public roads each day is considered to be much greater than any risk presented by the presence of a magazine on Doona Vale and this aspect of the proposed additional activities is considered to be a positive improvement on the currently approved activity.

Consistent with the approval of the SDN for the 3D seismic program, the Feedlot, residents within 200 metres of the 3D seismic program and the Walhallow community will be advised of the presence of the magazine. The Caroon Community Consultative Committee will also be advised of the presence of the magazine as part of the 3D seismic program and the controls that will apply to the magazine to manage the risk to the public.

6.12 Cumulative Impacts

The controls outlined in the 3D Seismic REF, this Addendum and the EEMP (Umwelt 2006) have been designed to minimise potential cumulative impacts from exploration activities. The controls outlined in the EEMP will be implemented for all seismic activities during the Caroon exploration program. Seismic activities will be of a relatively short term nature in any one area and as demonstrated in this Addendum, the proposed changes to the approved program have limited potential for adverse environmental impacts.

Due to the location of the proposed survey, the low potential for environmental impacts, the duration of the seismic activities, and the controls to be implemented during the survey, the cumulative impacts of the Caroon exploration operations are not predicted to be significant.

7.0 Rehabilitation

The slashed source and receiver lines in the cleared areas are expected to recover naturally and will be monitored to ensure this is the case. Any areas that fail to recover within an acceptable time period will be rehabilitated in accordance with the EEMP.

The magazine will remain in place until the completion of the exploration program which is likely to include subsequent rounds of 3D seismic survey. The magazine housing will then be transported from site. The ridge gravel base will be removed from the surface. As the gravel base will be placed over the existing soil profile, the removal of the gravel will be carried out in a manner that minimises disturbance to the largely undisturbed soil profile below. As this area has been identified as potentially comprising Derived Native Grassland consistent with the EPBC Listed *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* CEEC, natural regeneration is preferred to seeding with non-indigenous seed stock. Existing seed stock on the undisturbed soil below the gravel should ensure the site regenerates naturally however this will be closely monitored as the site has been selected due to the highly disturbed nature of the vegetation community in this area, there is a high likelihood of exotic weed growth in this area following removal of the gravel. Weed growth may require control with selective herbicide.

8.0 Conclusions

The proposed 3D seismic survey will provide additional and necessary information for the modelling of the coal resource by defining the location of geological structures with approximately 514 hectares covered by the approved 3D seismic survey program.

Due to the exceptional growing season currently being experienced in the Carroona area, it is now considered necessary to slash additional areas of grassland in existing cleared areas to facilitate the carrying out the approved 3D seismic program in these areas. It is also proposed to construct an explosive magazine near to the 3D seismic area to accommodate the explosives that will be used for the seismic survey.

The proposed amended 3D seismic program is not expected to have a significant impact on any threatened flora or fauna species or populations or threatened ecological communities and there is no critical habitat present in or within the immediate vicinity of the program area. The program is not expected to have a significant impact on any flora or fauna species or vegetation communities that may be present in or near the seismic program area.

The EL area contains a number of previously recorded Aboriginal archaeological sites, including grinding grooves, scarred trees, artefact scatters, rock engravings and stone arrangements. Archaeological due diligence inspections will be undertaken across the 3D seismic area by an archaeologist and representatives of the Walhallow-Carroona Aboriginal community to identify any archaeological sites or areas of potential archaeological deposit that may be impacted by the proposed 3D seismic program and the program will be altered to avoid any impacts.

Potential amenity impacts including air, noise and vibration have been assessed as part of this Addendum and have been found to be minimal and to meet the relevant criteria.

The operational controls outlined in the 3D Seismic REF, this Addendum and the EEMP (Umwelt 2006), along with the conditions contained in EL6505 have been designed to minimise potential impacts of the 3D seismic program on the environment and community; this includes measures to minimise impacts on TECs and exempted areas. This Addendum has found that the proposed minor changes to the approved 3D seismic activities are unlikely to have a significant impact on the local environment. With the proposed controls in place, the impacts of the amended seismic program on the local environment and community are not predicted to be significant and an Environmental Impact Statement is not required.

9.0 References

Australian Code for the Transport of Explosives by Road and Rail (Third Edition);

Australian Standard 1725-2003 Chain-link fabric security fences and Gates.

Australian Standard 2187.1-1998 Explosives – Storage, Transport and Use Part 1: Storage.

Land and Property Information (LPI), 1958, Aerial photography.

Umwelt (Australia) Pty Limited, 2006. *Exploration Environmental Management Plan for the Caroon Project – EL 6505.* Report prepared for BHP Billiton.

Umwelt (Australia) Pty Limited, 2010. *Review of Environmental Factors for Caroon Exploration Program Trial 3D Seismic Survey 2010.* Report prepared for BHP Billiton.

APPENDIX 1

Issues Identification Checklist

Appendix 1 – Issues Identification Checklist

The Department of Urban Affairs and Planning's (now the Department of Planning) guideline 'Is an EIS required? – Best Practice Guideline for Part 5 of the *Environmental Planning and Assessment Act 1979*' has been used to compile the following checklist to ensure all relevant issues have been appropriately identified for assessment in the main text of the Addendum. The checklist used is that relating to the identification of issues. A description of the proposed activity is provided in **Section 2.0** of the Addendum. The detailed assessment of all relevant issues as identified in the table is provided in the main text of the Addendum.

Table 1 – Identification of the Issues

Characteristics of the Activity (during construction & operation)	Potential Issues
How is the proposal likely to affect the physical aspects of the environment or introduces pollution or safety risk factors?	
1. Disturbs the topography or above or below ground features including filling, excavation, dredging, tunnelling; eg landforming, site preparation, quarrying, reclamation, creation of islands, waterbodies, etc; involves the disposal of large quantities of spoil.	The construction of the magazine will involve the construction of a gravel pad over the existing terrain. No excavation works are proposed. The additional proposed slashing is not expected to cause any ground disturbance.
2. Affects a natural waterbody, wetland or groundwater aquifer or the natural water drainage pattern; affects the quality or quantity of water in the systems.	Potential surface and groundwater impacts are assessed in Section 6.5 of the Addendum as minimal.
3. Uses groundwater or surface water from a natural waterbody; stores water in a dam or artificial waterbody.	The additional activities will not require the use or storage of water.
4. Changes the flood or tidal regimes or be affected by the flooding or tides.	The proposed 3D seismic program will have no impact on the flooding or tidal regimes.
5. Uses, stores, disposes or transports hazardous substances (flammable, explosive, toxic, radioactive, carcinogenic or mutagenic substances); uses or generates pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment.	Refer to Section 6.6 of the Addendum – management controls in place for hazardous substances. Any soils potentially contaminated by contact with chemicals will be reclaimed and disposed of at an appropriate waste facility, as discussed in Section 6.6 of the 3D Seismic REF. No significant impacts to the environment are anticipated.
6. Generates or disposes of gaseous, liquid or solid waste (industrial, medical or domestic waste, sewage, sludge or effluent, spoil or overburden); generates greenhouse gas emissions or releases chemicals which affect the ozone layer or are precursors to photochemical smog; generates or disposes of hazardous waste.	Liquid wastes will not be generated from the proposed additional activities. Any other wastes generated by the additional activities, including the construction of the magazine, will be collected, segregated and stored in properly constructed containers and removed to an approved landfill or other disposal site in accordance with statutory requirements. Refer to Section 6.6 of the Addendum.

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
7. Emits dust, odours, noise, vibrations, blasts, electromagnetic fields or radiation in the proximity of residential areas or landuses likely to be affected.	Sections 6.3 and 6.4 of the Addendum describes appropriate management measures to ensure the impacts of the additional activities on noise and dust amenity will be minimal.
8. Any other matters.	No other potential impacts identified.
How is the proposal likely to affect the biological aspects of the environment?	
1. Clears or modifies (including by modifying the drainage) native vegetation (including trees, shrubs, grasses, herbs or aquatic species).	The additional activities will involve minor slashing of native grassland, and the construction of a gravel pad over a disturbed area of native grassland vegetation. Refer to Sections 2.1 and 6.1 of the Addendum.
2. Displaces or disturbs fauna (terrestrial or aquatic) or creates a barrier to fauna movement; clears remnant vegetation or wildlife corridors.	Refer to Section 6.1 of the Addendum.
3. Introduces noxious weeds, vermin, feral species or disease or releases genetically modified organisms.	Mitigation measures to avoid introduction of weeds to sites are described in Section 6.1 of the Addendum. No other potential impacts identified.
4. Undertakes activity which affects revegetation or replenishment of native species following a disturbance.	Slashed areas will be left to rehabilitate naturally. The magazine and gravel base will be removed following completion of the exploration program. These controls are discussed in Section 6.1 and Section 7 of the Addendum.
5. Introduces high bushfire risk factors or change the fire regime.	The slashing of the grass is required to reduce the risk of grassfire from vehicles involved in the 3D seismic program. Other controls in place to manage fire risks are discussed in Section 6.8 of the Addendum.
6. Any other issues.	No other issues identified.
How is the proposal likely to affect natural or community resources?	
1. Uses or results in the use of community services or infrastructure including roads, power, water, drainage, waste management, education, medial, social services.	The construction of the magazine is expected to have a slight beneficial effect on the number of vehicle movements when compared to the approved 3D seismic program by removing the need for the daily transport of explosives to and from the program area by public road (refer to Section 6.10). There will be negligible impact on education, medical or social services.
2. Uses or results in the use of natural resources including water (ground or surface), fuels, timber, extractive material, minerals, prime agricultural land, etc.	The preparation of the source and receiver lines will involve slashing of groundcover, to facilitate access, as described in Sections 2.1 and 6.1 . Impacts on agricultural land and enterprises is discussed in Section 6.6 . No other potential impacts on natural resources were identified.

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
3. Affects future potential of commercial deposits of minerals or extractive material or areas important for fishing, agriculture or forestry.	As part of the ongoing exploration program, the proposed seismic program better defines the coal resource, therefore the program positively impacts the future potential of commercial deposits of minerals in the area. The 3D seismic survey will have minimal impact on the future potential of other commercial use of natural resources such as agriculture or forestry, as discussed in Section 6.6 of the Addendum.
4. Changes the demographics of an area.	No potential impacts identified.
5. Changes in the transport requirements of an area.	No potential impacts identified.
6. Creates a new route alignment for the provision of infrastructure (e.g. rail, roads, power, etc.).	No potential impacts identified.
7. Any other issues.	No potential impacts identified.
How is the proposal likely to affect the community?	
1. Generates population movements including influx or departure of the workforce.	No potential impacts identified.
2. Changes the workforce or industry structure of the area/region; affects employment opportunities.	No potential impacts identified.
3. Affects areas of high population densities or established development patterns.	No potential impacts identified.
4. Affects or affecting access to an area, building or items of aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, aesthetic or social significance or other special value for present or future generations.	There is the potential that the proposed 3D seismic survey could impact upon Aboriginal and non-Aboriginal cultural heritage. However, all potential impacts of this nature will be avoided by utilising due diligence inspections conducted by an archaeologist and representatives of the Walhallow Aboriginal community and designing the program to avoid impacts. Due diligence inspections for cultural heritage are discussed in Section 6.2 of the Addendum.
5. Affects the visual or scenic landscape (including major cuts/fills, towers, projects on escarpments etc).	The location of the magazine has been selected based on it being in a highly visible location from within the Doona Vale property to improve security. It is not proximate to any public areas or private residences. Visual impacts management and mitigation measures are discussed in Section 6.9 of the Addendum.
6. Affects sunlight or views of another property	
7. Affects the amenity of publicly owned land (particularly recreational areas, national parks or reserves).	No potential impacts identified. The additional activities will not be carried out on publically owned land.

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
8. Changes land use from the surrounding uses as a direct or indirect result of the activity; forms a barrier to movement within the community or access to existing properties; leads to a loss of housing.	Prior to the commencement of the 3D seismic survey, the intended activities will be discussed with the relevant landholders to ensure that potential land use impacts are minimised, as discussed in Sections 4.5 and 6.11 of the Addendum.
9. Generates significant volume of traffic (road, rail, air, pedestrian etc).	The proposed 3D seismic survey will not generate significant volumes of traffic and the use of an on-site magazine as proposed will reduce traffic slightly from that predicted for the approved 3D seismic program. Refer to Section 6.10 .
10. Generates nuisance or health or safety risks including air pollution, odour, noise or vibration, blasting, electromagnetic fields or radiation or releases disease or genetically modified organisms or change the bush fire regime.	The additional activities have limited potential to impact on noise amenity and air quality. Refer to Section 6.3 and 6.4 of the Addendum.
11. Any other issues.	No further issues identified.
How is the proposal likely to affect areas sensitive because of physical factors?	
1. Coastline and dune fields, alpine areas, deserts, caves or other unique landforms.	The proposed 3D seismic survey will not impact on any coastal, alpine or desert areas, caves or any other unique landforms.
2. Land with high agricultural capability.	The additional activities are located on grazing land owned by CMAL and cropping land owned by the feedlot. Potential impacts on agriculture capability are discussed in Section 6.7 of the Addendum.
3. Natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas.	The 3D seismic survey will not adversely impact on natural waterbodies, riparian zones, wetlands, drinking water catchments or flood prone areas. Refer to Section 6.5 of the Addendum.
4. Groundwater recharge areas or areas where high water table.	Potential impacts on groundwater resources are discussed in Section 6.5 of the Addendum.
5. Erosion prone areas, areas with slopes of greater than 18 degrees.	The proposed additional activities will not be undertaken in areas of steep slope. Due to the low level of surface disturbance associated with the additional activities, there is limited potential for the activities to exacerbate erosion (Refer also to Section 6.5.1 of the Addendum).
6. Subsidence or slip areas.	No subsidence or slip areas have been identified in the EL area in areas where the additional activities will occur and therefore no impacts have been identified.

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
7. Areas where acid sulphate, sodic or highly permeable soils.	No actual or potential acid sulphate soils have been identified in the EL area. Highly permeable soils are known but not widely distributed in the EL area. Some A2 and B soil horizons may be sodic within alluvial units and distal alluvial fan footslope units within the EL area, however, the proposed additional activities will not impact on alluvial areas and will not expose significant areas or volumes of sodic or highly permeability soils, hence no significant erosion hazard will be generated from the process.
8. Areas where salinity or potential salinity problems.	Some restricted areas within alluvial soils are saline within the EL area, however as described above the additional activities will not impact on alluvial areas and will not expose any saline material, therefore no impacts on salinity or saline soils are expected.
9. Area with degraded air quality.	There are no areas in the locality with degraded air quality that would be impacted by the proposed additional activities.
10. Area with degraded or contaminated soil area with degraded or contaminated water (ground or surface).	There are no areas in the locality with degraded or contaminated soil that would be impacted by the proposed additional activities.
11. Any sensitive areas.	No other sensitive areas were identified that would potentially be impacted by the proposed additional activities.
How is the proposal likely to affect areas sensitive because of biological factors?	
1. Corals and seagrass beds, wetland communities (coastal, peatlands or inland), native forests, urban bushland, arid and semi arid communities.	The proposed additional activities will not have an adverse effect on the extent of native forest communities. Corals and seagrass beds, wetlands, urban bushland and arid and semi arid communities are not present in the locality to which this activity relates. Ecological impacts are assessed in Section 6.1 .
2. Critical habitats or the habitats of threatened fauna or flora species, populations or ecological communities (within the meaning of the TSC Act).	There are no critical habitats or threatened populations present in the EL area. The potential impacts on threatened flora or fauna species and threatened ecological communities are discussed in Section 6.1 .
3. Habitat of species listed under international agreements including Japan-Australia Migratory Birds Agreement (Jamba) and China-Australia Migratory Birds Agreement (Camba).	The habitat of species listed under international agreements will not be significantly affected by the proposed additional activities.
4. Wildlife corridors and remnant vegetation.	The impacts on flora and fauna are discussed in Section 6.1 .

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
5. Habitat of protected aquatic species (within the meaning of Fisheries Management (General) Regulation 1994) or of aquatic species having conservation status under Conference on Australian Threatened Fishes.	No works are being undertaken in areas of aquatic habitat or floodplain areas.
6. Fishing grounds and commercial fish breeding or nursery areas.	Fishing grounds and commercial fish breeding or nursery areas are not present in the locality to which this activity relates.
7. Bushfire prone areas.	The proposed additional activities will include appropriate controls to minimise bushfire risk (refer to Addendum Section 6.8).
8. Any other sensitive areas.	Other sensitive areas are not present.
How is the proposal likely to affect areas allocated for conservation purposes?	
1. National parks and other areas reserved or dedicated under the <i>National Parks and Wildlife (NPW) Act 1974</i> .	The proposed additional activities will not impact on national parks or other areas dedicated under the <i>National Parks and Wildlife Act 1974</i> .
2. Land reserved or dedicated within the meaning of the <i>Crown Lands Act 1989</i> for preservation or other environmental protection purposes	The proposed additional activities will not impact on land reserved or dedicated within the meaning of the <i>Crown Lands Act 1989</i> for preservation or other environmental protection purposes.
3. World heritage areas.	The proposed additional activities will not impact on world heritage areas.
4. Environmental protection zones in environmental planning instrument or lands protected under SEPP 14 - Coastal Wetlands or SEPP 26- Littoral Rainforests.	The proposed additional activities will not impact on environmental protection zones in environmental planning instrument or lands protected under SEPP 14 - Coastal Wetlands or SEPP 26- Littoral Rainforests.
5. Land identified as wilderness under the <i>Wilderness Act 1987</i> or declared as wilderness under the NPW Act.	There are no wilderness areas within the locality to which this activity relates.
6. Aquatic reserves reserved or dedicated under the <i>Fisheries Management Act 1994</i> .	There are no aquatic reserves within the locality to which this activity relates.
7. Wetlands areas dedicated under the Ramsar Wetlands Convention.	There are no Ramsar wetlands within the locality to which this activity relates.
8. Heritage items identified on the Register of the National Estate, under the <i>NSW Heritage Act</i> or an environmental planning instrument.	The Carroona Mission Cemetery is listed as a historical place on the Register of the National Estate. The Cemetery is located approximately 0.5 kilometres north of Carroona and will not be impacted by the proposed additional activities. The Walhallow Homestead is listed under the Quirindi LEP as a Heritage Item and is located approximately one kilometre north-west of Carroona. This Homestead will not be impacted by the proposed additional activities.

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
	<p>As described in Section 6.6 any locations in which slashing or ground disturbing works are proposed have been subject to an archaeological due-diligence inspection to identify any historic heritage values prior to the commencement of works. The controls of the EEMP (Umwelt 2006) will be implemented at each of these locations to ensure the impacts on historic heritage values as a result of the proposed additional activities will be minimal. Any potential impacts on sites recorded during future archaeological due-diligence inspections will be subject to further detailed assessment and approval from the NSW Heritage Office as required.</p> <p>Refer to Section 6.2 of the Addendum for further detail.</p>
<p>9. Community land under the Local Government Act (for which a plan of management has been prepared).</p>	<p>The proposed additional activities are not expected to adversely impact any community land under the Local Government Act for which a plan of management has been prepared.</p>
<p>10. Land subject to a 'conservation agreement' under the NPW Act.</p>	<p>The proposed additional activities will not impact on any areas to which a conservation agreement applies.</p>
<p>11. Any other factors.</p>	<p>No other factors were identified that would be impacted by the proposed additional activities.</p>
<p>How is the proposal likely to affect areas sensitive because of community factors?</p>	
<p>1. Aboriginal communities or areas subject to land rights claims.</p>	<p>A search was conducted of the National Native Title Tribunal database which indicated that the EL area is not the subject of any native title land claims. The office of the registrar of Aboriginal owners was also contacted and did not identify any Aboriginal owners within the area. The proposed additional activities will all be undertaken on private land. The proposed additional activities will not be undertaken within the Walhallow Aboriginal community land, therefore impacts on Aboriginal communities or areas subject to land rights claims will be minimal.</p>

Table 1 – Identification of the Issues (cont)

Characteristics of the Activity (during construction & operation)	Potential Issues
2. Communities with strong sense of identity.	The proposed additional activities will be undertaken in agricultural areas, and as noted above will not be located within the Walhallow Aboriginal community land or in the Caroonna village area. The seismic lines will not be located in close proximity to residences and noise, dust and visual impacts will be controlled to ensure minimal impact as described in Section 6.0 of the Addendum. No significant impacts on local communities are predicted from the proposed additional activities.
3. Disadvantaged communities (reduced economic, social or cultural indicators).	As discussed in Section 6.11 of the Addendum and above, the additional activities are not predicted to result in significant impacts on the community.
4. Areas with degraded amenity from noise, traffic congestion or odour.	There are no relevant areas of degraded amenity impacted by the proposed additional activities.
5. Areas or items of high anthropological, archaeological, architectural, cultural, heritage, historical, recreational or scientific value.	There is the potential that the proposed additional activities may impact upon Aboriginal and non-Aboriginal cultural heritage. However, all potential impacts of this nature will be avoided by utilising due diligence inspections conducted by an archaeologist and representatives of the Walhallow Aboriginal community and designing the program to avoid impacts on identified sites. Refer to the Addendum, in particular Section 6.2 for further detail.
6. Areas or items of high aesthetic or scenic value.	No significant impacts on areas of high aesthetic or scenic value are anticipated, as discussed in Section 6.9 of the Addendum.
7. Any other factors.	No other factors have been identified.

APPENDIX 2

Assessment of Significance

Appendix 2 – Assessment of Significance under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

A 3D seismic survey has been approved by Industry & Investment NSW to be undertaken over an approximate 5 km² area within the Carroona EL. The approved seismic survey will require the slashing of multiple corridors through woodland and grassland communities as well as land utilised for agricultural purposes, such as cropping. Ground disturbance will also be required for the drilling of approximately 8,500 shot holes and the removal of stumps and woody debris from the slashed corridors. A modification to the approved 3D seismic program is proposed which will require the slashing of all source and receiver lines in grassland/cropping areas and the construction of an explosives magazine. The construction of the magazine will require approximately 0.5 hectares of vegetation to be covered by a gravel pad. The magazine and pad will be removed following completion of the exploration program. The proposed modifications will not have any impact on the approved activities carried out in forested areas. This Assessment of Significance assesses the likely impacts of the entire 3D seismic program including both the approved component and the additional slashing and construction of the magazine.

All proposed vegetation clearance is the minimum required to complete the seismic survey in order to limit impacts on ecological communities and fauna habitat. A full description of the 3D seismic survey is provided in Section 2.0 of the 3D Seismic REF and **Section 2.0** of the Addendum.

The *White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland* vegetation community is listed as a critically endangered ecological community (CEEC) under the EPBC Act. The community is considered to occur in the Carroona EL and it has been subject to a variety of disturbances and therefore its condition varies throughout the EL. The aim of this assessment is to determine whether the proposed seismic survey is likely to have a significant impact on the ecological community, as a listed matter of national environmental significance (MNES). The Department of Environment, Water, Population and (DEWHA) (now Department of Sustainability, Environment, Water, Population and Communities) EPBC Act Policy Statement 1.1 - Significant Impact Guidelines for MNES (2009) are addressed separately below.

Ecological due diligence inspections of the proposed seismic survey were undertaken to delineate the occurrence of the *White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland* CEEC, as well as searching for potentially occurring threatened species.

A number of mitigation measures and controls have been proposed to reduce the area of impact on the CEEC, which are described in Section 6.1 of the 3D Seismic REF and **Section 6.1** of the Addendum. The following assessment of significance has been prepared on the assumption that all mitigation measures and controls will be implemented during the proposed seismic survey.

Significant Impact Criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- **Reduce the extent of an ecological community**

Within the proposed seismic survey area, an area of approximately 5.3 hectares of vegetation potentially consistent with the *White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland* CEEC will be slashed within corridors up to 2.5 metre wide. The slashing of approximately 5.3 hectares of groundcover species as well as some shrub and juvenile trees is considered to be a temporary impact and is not considered likely to result in the loss of species or a substantial change in the species composition of the community, as the rootstock of the species present will be retained. The slashed vegetation is expected to recover following the disturbance. The slashing of approximately 5.3 hectares of groundcover species and some shrubs and juvenile trees that are likely to regenerate is not considered to reduce the extent of the ecological community.

Within the approximate 5.3 hectare area to be slashed for the proposed seismic survey, approximately one hectare will be subject to ground disturbance works. This will involve the drilling of approximately 8,500 shot holes and the removal of stumps and woody debris within one third of the slashed corridors to allow vehicle access. Within the area subject to ground disturbance works, groundcover species will be removed, however, each area subject to ground disturbance will be rehabilitated using topsoil removed from the disturbance area prior to drilling activities, in accordance with the controls described in Section 6.1 of the 3D Seismic REF and **Section 6.1** of the Addendum. With the use of the identified rehabilitation techniques, it is likely that the groundcover species removed for the proposed seismic survey will regenerate in the areas subject to ground disturbance over time. The removal of vegetation in small areas of no more than 2 m² scattered over roughly 168 hectares of the ecological community, which equates to approximately one hectare of vegetation loss, is not expected to significantly reduce the extent of the community.

An area of approximately 30 metres by 15 metres of highly disturbed Derived Native Grassland will be covered with approximately 75 mm of gravel for an explosives magazine. An associated access road approximately 20 metres long by 2.5 metres wide will also be constructed to the magazine through a disturbed area of this community. While this will diminish the area of CEEC by approximately 0.05 hectares, the impacted area is already heavily disturbed by agricultural activities and is heavily infested with exotic weed species, particularly Patterson's Curse (*Echium plantagineum*).

- **Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmissions lines**

Multiple corridors up to 2.5 metres wide will be slashed through the ecological community for the seismic survey, equating to a total area of approximately 5.3 hectares. The slashing of groundcover species and some shrubs and juvenile trees within these corridors is considered to comprise a temporary impact. As root stock will be retained within the corridor, the species currently present are likely to recover following the slashing activities. Consequently, the slashing of approximately 5.3 hectares of corridors is not likely to fragment, or increase fragmentation, of the ecological community.

Within the approximately 5.3 hectare area to be slashed for the proposed seismic survey, approximately one hectare will be subject to ground disturbance works. This will involve the drilling of approximately 8,500 shot holes and the removal of stumps with one third of the slashed corridors to allow vehicle access. Within the area subject to ground disturbance

works, groundcover species will be removed in small areas of no more than 2m², however, each area subject to ground disturbance will be rehabilitated using topsoil removed from the disturbance area prior to drilling activities, in accordance with the controls described in Section 6.1 of the 3D seismic REF and **Section 6.1** of the Addendum. The removal of vegetation in small areas of no more than 2 m² scattered over roughly 168 hectares of the ecological community, which equates to approximately one hectare of vegetation loss, is not expected to fragment, or increase fragmentation of, the ecological community.

The approximate 0.05 hectare area occupied by the magazine and associated access track are not considered likely to fragment the Derived Native Grassland community due to the small area of disturbance and the prevalence of the grassland community in the broader area.

- **Adversely affect habitat critical to the survival of an ecological community**

The proposed activity will not affect habitat critical to the survival of the ecological community. The area to be impacted by the proposed activity is not critical to the long-term survival of the community, the maintenance of genetic diversity or for the recovery of the ecological community, as the area to be impacted is minor in comparison to its extent within the remainder of the seismic survey area and in the wider region.

- **Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns**

The proposed activity will not modify or destroy abiotic factors within the proposed seismic survey area. Ground disturbance activities will comprise the drilling of approximately 8,500 shot holes at a depth of 5 metres. The drilling and blasting associated with the shot holes is not expected to modify or destroy abiotic factors necessary for the survival of the ecological community. All sites will be rehabilitated following the blasting activities in accordance with the procedure outlined in the 3D Seismic REF and Addendum. Groundwater and surface water is not expected to be significantly affected by the proposed seismic survey.

- **Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting**

The slashing of approximately 5.3 hectares of groundcover species and the removal of some shrubs and juvenile trees is not expected to result in the loss or decline of functionally important species or a substantial change in the species composition of the ecological community.

Areas subject to ground disturbance activities will be rehabilitated using topsoil from the site or will be negligible in size such that they are likely to be colonised by the surrounding groundcover species. The potential loss of groundcover species in an area approximately one hectare in size over roughly 168 hectares of the ecological community, is not expected to result in a substantial change in the species composition of the ecological community or the loss or decline of functionally important species.

- **Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:**
 - **assisting invasive species, that are harmful to the listed ecological community, to become established**

Management controls are in place to minimise the potential for introduction of invasive species during slashing operations and ground disturbance works, such as standard vehicle and plant hygiene procedures and rehabilitation using topsoil from the ground disturbance areas. It is not expected that the proposed activity will assist invasive species to become established in the community.

- **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community**

No fertilisers, herbicides or other chemicals or pollutants will be used during the proposed activity however herbicides may be used to control weed invasion of disturbed areas to assist regeneration of native species.

- **Interfere with the recovery of an ecological community**

The proposed activity will not interfere with the recovery of the ecological community. Slashed areas are expected to recover and areas subject to ground disturbance are expected to regenerate following rehabilitation undertaken in accordance with the procedures outlined in the 3D Seismic REF and Addendum and therefore the proposed activity is not expected to cause any long-term damage to the ecological community.

Conclusion

With the stated controls in place, the proposed seismic survey is not likely to result in a significant impact on the EPBC Act listed *White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland* CEEC.

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