Referral of proposed action

Project title: Vickery Extension Project

1 Summary of proposed action

1.1 **Short description**

Background

The approved but yet to be developed Vickery Coal Mine, owned by Whitehaven Coal Limited (Whitehaven) is an open cut coal mining operation situated in the Gunnedah Coalfield approximately 25 kilometres (km) north of Gunnedah in north-eastern New South Wales (NSW) (Figure 1).

The Vickery Coal Mine is approved under the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) via Development Consent (SSD-5000) to extract up to 4.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and to transport the ROM coal, by road, to the Whitehaven coal handling and preparation plant (CHPP) located in Gunnedah where it will be processed and loaded onto trains for rail transport to the Port of Newcastle via the Werris Creek Mungindi Railway.

The Vickery Coal Project was previously referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) in January 2012 and was determined to be not a Controlled Action if implemented in a particular manner (EPBC 2012/6263). The decision stipulated measures to be undertaken to avoid significant impacts on the Winged Pepper-cress (*Lepidium monoplocoides*), a listed threatened flora species.

Whitehaven is seeking approval from the NSW Minister for Planning for a new Development Consent under the EP&A Act for the Vickery Extension Project which also includes the Vickery Coal Project (EPBC 2012/6263). The Action, the subject of this Referral, does not include the components and operations of the Vickery Coal Project (EPBC 2012/6263), whether or not those components or operations have been constructed or commenced, and whether or not the components of the Vickery Extension Project are to be carried out or occur within the area of the Vickery Coal Project.

Referral

This referral is for the Vickery Extension Project (the Action). The Action is separate from, but related to, the Vickery Coal Project (EPBC 2012/6263). The Action would include an extension of open cut mining operations at the Vickery Coal Project, including (Figures 2 and 3):

- physical extensions to the approved mine footprint, including open cut and waste rock emplacement areas;
- construction of a primary infrastructure area;
- construction and operation of an on-site CHPP and train load-out facility;
- development of the Blue Vale Road diversion to the east of the Vickery open cut; and
- construction and operation of a rail spur and loop connecting to either the Maules Creek Mine and Boggabri Coal Mine spur (northern rail investigation corridor) or the Werris Creek Mungindi Railway (western rail investigation corridor).

1.2 Latitude and longitude

Table 1
Location of the Action

Location Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	30	37	23.62022	150	5	17.40085
2	30	38	54.83377	150	9	10.61393
3	30	39	58.64925	150	10	17.72971
4	30	41	5.705247	150	10	47.14148
5	30	43	14.15003	150	10	32.41991
6	30	44	4.626522	150	12	1.454992
7	30	46	32.86467	150	14	24.90214
8	30	48	4.510234	150	14	20.09858
9	30	48	4.735268	150	10	37.332
10	30	48	56.63329	150	10	35.37037
11	30	51	42.82824	150	5	27.19557
12	30	51	41.22015	150	4	33.50681
13	30	50	42.39537	150	4	34.70037
14	30	48	16.35826	150	9	28.62753
15	30	47	0.607901	150	9	35.56786
16	30	45	52.82364	150	7	47.99886
17	30	43	47.26124	150	7	53.1791
18	30	43	48.8039	150	8	34.5961
19	30	43	15.13487	150	9	8.22988
20	30	41	16.25291	150	9	31.55873
21	30	40	6.335721	150	8	45.00696
22	30	39	42.55786	150	8	9.869391
23	30	38	24.71678	150	4	52.86152
24	30	38	9.552031	150	3	41.21635
25	30	38	15.17011	150	3	26.85097
26	30	37	16.77383	150	3	1.009569
27	30	37	10.27455	150	3	46.98002

1.3 Locality and property description

The Action area is located approximately 25 km north of the town of Gunnedah in NSW within the NSW Gunnedah Coalfield (Figure 1). The Action area is located approximately 10 km east of the town of Boggabri (Figure 1). The majority of the Action area is comprised of privately-owned land. Land to the north-east, and outside of the Action area, comprises land reserved as Vickery State Forest (Figures 1 and 2).

The land within the indicative rail investigation corridors is owned by Whitehaven, Idemitsu Boggabri Coal, and some private landholders. The corridors also traverse some parcels of crown land. The northern rail investigation corridor would traverse a portion of the offset areas established under the EPBC Act approval for the Boggabri Coal Mine Extension Project (EPBC 2009/5256) as shown in Niche (2013). Whitehaven would consult with Boggabri Coal Pty Ltd regarding potential impacts to the offset areas.

The Action is situated within the Gunnedah and Narrabri Local Government Areas (LGAs) (Figure 1). The proposed mining area would be located within Coal Lease (CL) 316, Mining Lease (ML) 1471, ML 1718 and Exploration Licence (EL) 7407 (Figure 2). It would also involve mining related activities within the same tenements.

1.4	**Size of the development footprint or work area (hectares)**	The size of the proposed mining and infrastructure areas (Figure 2) is approximately 1,371 hectares (ha). The extent of disturbance of the proposed northern rail corridor (Figure 3) is approximately 190 ha and the extent of disturbance of the proposed western rail corridor (Figure 3) is approximately 194 ha.
1.5	**Street address of the site**	Located via Blue Vale Road, Gunnedah NSW 2380.

1.6 **Lot description**

The Action would involve development within CL 316, ML; 1471 and 1718 and EL 7407 (Figures 2 and 3). Relevant lot and deposited plan numbers for parcels of land within the area of the Action are shown on Figure 4 and provided in Attachment B.

1.7 **Local Government Area and Council contact (if known)**

The Action is situated within the Gunnedah and Narrabri LGAs. The Action is not subject to local government planning approval, but requires planning approval from the NSW Minister for Planning and Environment (or delegate).

1.8 **Time frame**

The Action is proposed to commence as soon as practicable after all the necessary approvals have been obtained and any prerequisite conditions fulfilled.

The Action is proposed to have an operational life of approximately 25 years.

1.9	**Alternatives to proposed action**		No
		✓	Yes, you must also complete section 2.2
1.10	**Alternative time frames etc**	✓	No
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.11	**State assessment**		No
		✓	Yes, you must also complete Section 2.5

1.12	**Component of larger action**	✓	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals**		No
		✓	Yes, provide details: The Vickery Coal Project is approved under Development Consent (SSD-5000), granted by the NSW Minister for Planning on 19 September 2014. The Vickery Coal Project was previously referred under the EPBC Act in January 2012 and was determined to be not a Controlled Action if implemented in a particular manner (EPBC 2012/6263). The northern rail investigation corridor would traverse a portion of the offset areas established under the EPBC Act approval for the Boggabri Coal Mine Extension Project (EPBC 2009/5256), as described in Section 1.3.
1.14	**Australian Government funding**	✓	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park**	✓	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

The Vickery Coal Project is approved under Development Consent (SSD-5000), granted by the NSW Minister for Planning on 19 September 2014. The Vickery Coal Project was previously referred under the EPBC Act in January 2012 and was determined to be not a Controlled Action if implemented in a particular manner (EPBC 2012/6263).

The main activities associated with the Vickery Coal Project include:

- Use of conventional mining equipment, haul trucks and excavators to remove waste rock and coal from the planned open cut.
- Development and operation of external waste rock emplacements to the west and east of the planned open cut (i.e. Western Emplacement and Eastern Emplacement).
- Development of an infrastructure area including coal crushing and screening facilities.
- Construction and use of soil stockpile areas.

Whitehaven is seeking approval from the NSW Minister for Planning for a new Development Consent under the EP&A Act for the extension of open cut mining operations at the approved Vickery Coal Project, including the construction and operation of an on-site CHPP and rail spur. The Action is separate from, but related to, the Vickery Coal Project. The Action would include:

- physical extensions to the previously referred mine footprint, including open cut and waste rock emplacement areas;
- construction of a primary infrastructure area;
- construction and operation of an on-site CHPP and train load-out facility;
- development of the Blue Vale Road diversion to the east of the Vickery open cut; and
- construction and operation of a rail spur and loop connecting to either the Maules Creek Mine and Boggabri Coal Mine spur (northern rail investigation corridor) or the Werris Creek Mungindi Railway (western rail investigation corridor).

The Action, the subject of this Referral, does not include the components and operations of the previously referred Vickery Coal Project (EPBC 2012/6263), whether or not those components or operations have been constructed or commenced, and whether or not the components of the Vickery Extension Project are to be carried out or occur within the area of the Vickery Coal Project.

Figures 2 and 3 show the indicative general arrangement of the Action which is the subject of this Referral.

Open Cut Mining Operations

The Action would involve mining using conventional truck and excavator open cut methods.

Mine waste rock (including overburden and interburden) generated from the open cut would be placed in out-of-pit waste rock emplacements (i.e. within the emplacement areas shown on Figure 5) or as infill in the mine void behind the advancing mining operations (i.e. in-pit emplacement).

CHPP reject material would be produced over the life of the Action, including coarse and dewatered fine rejects. Fine rejects would be dewatered using belt press filters to decrease water demand and minimise the volume of reject material to be managed.

Infrastructure

The primary infrastructure area (Figure 5) would include:

- ROM coal and product coal handling areas and associated conveyors;
- an on-site CHPP and associated conveyors, transfer points and surge bins;
- a train load-out facility including rail spur and loop (discussed further below);
- a mine access road;
- water management infrastructure, including pumps, pipelines, upslope diversions and drains, a watercourse diversion, water storages and other water management infrastructure;
- CHPP rejects management facilities;
- administration facilities;
- employee amenities and stores buildings;
- a workshop compound;
- laydown areas;
- a bunded fuel tank area; and
- ancillary infrastructure (e.g. internal roads, remote crib huts, electrical infrastructure, site communications, potable water supply, sewage treatment, site security).

The secondary infrastructure area (Figure 5) is a component of the Vickery Coal Project (EPBC 2012/6263) and does not form part of the Action, the subject of this Referral.

The Action would include the construction and operation of train load-out facilities and rail spur and loop. The rail spur and loop would connect to either the Maules Creek Mine and Boggabri Coal Mine spur (northern rail investigation corridor) or the Werris Creek Mungindi Railway (western rail investigation corridor). The indicative rail investigation corridors are shown on Figure 3. The final alignment and connection point to the existing rail network would be subject to further detailed design and finalisation of commercial arrangements.

Water Management and Supply

The Action water management strategy would involve:

- separation of undisturbed area runoff from disturbed area runoff;
- development of upslope diversions to minimise the catchment area reporting to mine storages;
- collection and reuse of surface runoff from disturbed areas;
- capture of pit inflows and reuse as process water;
- storage of water on-site; and
- licensed water extraction to supplement water supply.

Operational water requirements would be sourced from water storages containing runoff from disturbed mine areas or mine-affected water. Additional make-up water would be sourced from water storages containing runoff from undisturbed/rehabilitated areas, from licensed bores and/or licensed extraction from the Namoi River.

A pump station and raw water supply pipeline would be installed to provide make-up water as part of the Water Management System. The pump station would be located on the bank of the Namoi River and the raw water pipeline would transfer water to the Mine Infrastructure Area.

Power Supply and Demand

The infrastructure area which is approved to be developed as a component of the Vickery Coal Mine would be connected to mains power (66 kilovolts). This existing power supply would be extended to connect with the primary infrastructure area (Figure 5). Construction and operational activities may commence through the use of generators prior to the mains power connection being established.

The power demand for the Action would increase compared to the power demand of the Vickery Coal Project with the operation of the on-site CHPP and rail load-out infrastructure.

Final Landform

Mining areas that are no longer active would be progressively rehabilitated to construct a final landform that is safe and stable, and consistent with the surrounding landscape.

The progression of the mine would result in a residual void in the south-eastern corner of the proposed Vickery open cut at the end of the mine life (within the previously referred disturbance footprint). The final void would be within the surface disturbance area of the previously referred Vickery Coal Project. The Blue Vale Extended open cut would be backfilled following completion of mining in those areas.

2.2 Alternatives to taking the proposed action

A number of alternatives were identified and explored in refining the scope and characteristics of the Action.

Alternatives to the proposed location, scale, mining methods and ROM coal transportation and processing methods have been considered by Whitehaven. An overview of the consideration of alternatives to date is provided below:

- **Location** – the location of the open cut is dictated by the presence of coal seams able to be economically mined within Whitehaven's mining tenements.
- **Scale** – the Action's mining reserve is estimated at approximately 212 million tonnes of ROM coal within the seven coal seams proposed to be mined. The mining rate of 10 Mtpa presents the most efficient and productive mining rate for the resource using the proposed mining fleet.
- **Mining Method** – up to seven coal seams are present within the coal measures at the Action, all of which are amenable to extraction by open cut mining methods. Variations in coal quality across the coal seams are managed through the preparation process to produce the required products. Underground mining would limit the resource recovery as the majority of the seams are not amenable to underground extraction.
- **Product Coal Transport** – rail transport is the most appropriate method of transporting product coal from the on-site CHPP to the regional rail network. Two rail spur corridors are being studied as part of the Environmental Impact Statement (EIS) (Figure 3).

2.3 Alternative locations, time frames or activities that form part of the referred action

There are no alternative locations, time frames or activities that form part of the referred Action.

2.4 Context, planning framework and state/local government requirements

Commonwealth Environment Protection and Biodiversity Conservation Act, 1999

The Action is being referred to the Commonwealth Minister for the Environment for consideration as to whether the Action is a 'Controlled Action' and requires approval under the EPBC Act.

NSW Environmental Planning and Assessment Act, 1979

Approval for the Action is being sought from the NSW Minister for Planning and Environment under the State Significant Development provisions (Division 4.1) of Part 4 of the EP&A Act. The EP&A Act and NSW *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) set the framework for planning and environmental assessment in NSW.

Clause 8 of the State and Regional Development State Environment Planning Policy (SEPP) provides:

(1) Development is declared to be State significant development for the purposes of the Act if:

(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and

(b) the development is specified in Schedule 1 or 2.

The Action constitutes development which is not permissible without development consent under Part 4 of the EP&A Act.

Clause 5 of Schedule 1 of the State and Regional Development SEPP provides:

5 Mining

(1) Development for the purpose of mining that:
(a) is coal or mineral sands mining, or…

The Action represents development for the purpose of coal mining and constitutes development to which Division 4.1 of Part 4 applies. Development Consent will be sought from the NSW Minister for Planning and Environment.

State Environmental Planning Policies

The following SEPPs may potentially be relevant to the Action:

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP);
- *State Environmental Planning Policy (Infrastructure) 2007*;
- *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33);
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection*; and
- *State Environmental Planning Policy No. 55 (Remediation of Land)*.

Relevant provisions and objectives of the above SEPPs would be considered in the preparation of the EIS under the EP&A Act.

Local Environmental Plans

The Development Application area is within the Narrabri and Gunnedah LGAs (Figure 1) within the lands covered by the *Narrabri Local Environmental Plan, 2012* (Narrabri LEP) and the *Gunnedah Local Environmental Plan, 2012* (Gunnedah LEP).

Mining Act, 1992

Whitehaven will lodge Mining Lease Applications (MLAs) separately with the NSW Division of Resources and Energy (DRE) (within the NSW Department of Industry) for the Action.

Under the NSW *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions attached to all mining tenements, including requirements for the submission of a Mining Operations Plan prior to the commencement of operations, as well as Annual Environmental Management Reports.

Protection of the Environment Operations Act, 1997

The NSW *Protection of the Environment Operations Act, 1997* (PoEO Act) and the NSW *Protection of the Environment Operations (General) Regulation, 2009* set out the general obligations for environmental regulation in NSW.

If the Action is approved, Whitehaven would apply for an Environment Protection Licence for the Action.

Roads Act, 1993

Whitehaven would apply for the necessary consents under section 138 of the NSW *Roads Act, 1993* associated with the construction of road diversions and intersections with public roads (including new intersections proposed for the Action).

Commonwealth Native Title Act, 1993

The Commonwealth *Native Title Act, 1993* (CNTA) provides for the recognition and protection of native title rights in Australia. The CNTA provides a mechanism to determine whether native title exists and what the rights and interests are that comprise that native title. The process is designed to ensure that indigenous people who profess an interest in the land (or any part thereof) have the opportunity to express this interest formally, and to negotiate with the Government and the applicant about the proposed grant or renewal, or consent to access Native Title land.

The *Mining Act, 1992* must be administered in accordance with the CNTA. The primary effect of the CNTA on exploration and mining approvals is to provide Native Title parties with a 'Rights to Negotiate' about the grant and some renewals by governments of exploration and mining titles.

The CNTA, where applicable, would be complied with in relation to the granting and renewal of any necessary mining tenements for the Action.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

An EIS will be prepared to accompany a Development Application for the Action pursuant to Division 4.1 of Part 4 of the EP&A Act. The EIS will consider the potential impacts of the Action by addressing the Secretary's Environmental Assessment Requirements (SEARs) to be issued by the NSW Department of Planning and Environment (DP&E).

For a description of the public consultation processes undertaken see Section 2.6 (below).

2.6 Public consultation (including with Indigenous stakeholders)

Consultation undertaken to date in relation to the Project has included:

- Initial Project briefings with the DP&E in December 2015.
- Lodgement of the Site Verification Certificate to DP&E in December 2015.
- Conceptual Project Development Plan meeting with representatives of DRE in December 2015.
- Initial engagement with Aboriginal stakeholder groups through the Aboriginal cultural heritage assessment process commenced in September 2015.

A stakeholder engagement program has been developed for the Action. Key objectives of this program are to:

- inform government and public stakeholders about the progress and nature of the Action;
- recognise and respond to local interest or concerns regarding the Action; and
- continue the ongoing dialogue between Whitehaven and stakeholders initiated through the Vickery Coal Project EIS process.

The program involves the use of a variety of consultation mechanisms which in summary include actions such as:

- public exhibition of key documents;
- provision of information on the Whitehaven website;
- ongoing consultation with the local community, business owners and landowners;
- meetings with the general community including Aboriginal groups and directly affected landowners;
- consultation with potentially affected infrastructure owners and relevant nearby resource companies;
- meetings with relevant government agencies and councils;
- public information displays; and
- community information brochures.

The consultation would include, but not necessarily be limited to, the following government agencies and authorities:

- DP&E;
- OEH;
- NSW Department of Primary Industries (DPI) (including the DPI Water and Agriculture NSW);
- NSW Trade & Investment (including the DRE);
- Narrabri Shire Council;
- Gunnedah Shire Council; and
- Transport for NSW (including the Roads and Maritime Services).

Consultation with Indigenous stakeholders is being conducted in accordance with the requirements of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010a) and clause 80C of the NSW *National Parks and Wildlife Regulation, 2009*.

Indigenous stakeholders have been identified through correspondence with the following organisations, in accordance with Section 4.1.2 of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a):

- Dubbo OEH Environment Protection and Regulation Group regional office;
- Gunnedah Shire Council;
- North West Local Land Services;
- Narrabri Shire Council;
- Native Title Services Corporation Limited (NTSCORP Limited);
- Red Chief Local Aboriginal Land Council;
- the Registrar, *Aboriginal Land Rights Act, 1983*; and
- the National Native Title Tribunal.

Written notification of the Vickery Extension Project (incorporating the Action) was provided to Indigenous stakeholders identified by the organisations listed above. These stakeholders were invited to register an interest in the process of consultation process for the Vickery Extension Project (incorporating the Action). A notice was also placed in the Namoi Valley Independent on 8 October 2015 seeking registrations of interest from any additional interested Indigenous stakeholders.

In addition to the Indigenous stakeholders being provided with the opportunity to register their interest as detailed above, all Indigenous stakeholders involved in previous consultation activities associated with the approved Vickery Coal Project were also automatically registered for the consultation process for the Action.

The following Indigenous stakeholders have registered their interest in being involved in the consultation process (in alphabetical order):

- Aboriginal Native Title Consultants;
- AGA Services;
- Alfred Priestley;
- Anthony Munro;
- AT Gomilaroi Cultural Consultancy;
- Aunty Joan Suey;
- Aunty Joyce Dorrington;
- Bigundi Biame Traditional People;
- Bill Mitchell;
- Brian Draper;
- Bronwyn Spearim;
- Bullen Bullen Consultants;
- Buwarra Consultants;
- Cacatua Culture Consultants;
- Cindy Foley;
- Darryl Crowley;
- Deslee Talbott Consultants;
- Dulcie Robinson;
- Edgerton-Kwiemble Environmental Heritage and Cultural Aboriginal Corporation;
- Giwiir Consultants;
- Gomeroi Namoi Traditional Owners;
- Gomeroi Native Title Applicants C/- Sam Hegney Solicitors;
- Gomery Cultural Consultants;
- Gunida Gunyah Aboriginal Corporation;
- Gunjeewong Cultural Heritage Corporation;
- Gunnedah Elders Justice Committee;
- Hunter Valley Cultural Consultants;
- Jacko Woodbridge;
- James Foley;
- Jinbai McGrady;
- Jordan Green;
- Judith Walters;
- Kim Mitchell-Robinson;
- Linda Roser;
- Loretta Long;
- Lorraine Robinson;
- Madeline McGrady;
- Marvonia Welsh;
- Matthew Green Senior;
- Matthew Walters;
- Min-Min Aboriginal Corporation;
- Minnga Consultants;
- Muswellbrook Cultural Consultants;
- Nakita Silver;
- Natasha Rodgers;
- Ngurrimbaa-Gunidjaa Traditional Owners;
- Patrica Reynolds;
- Raymond Welsh Junior;
- Raymond Welsh Senior;
- Red Chief Local Aboriginal Land Council;
- Reg Talbott;
- Robert Miller;
- Robert Mitchell-Robinson;
- Roger Matthews;
- Ronald Long;
- Shirley Talbott;
- Sonny Fitzroy;
- Stacey Walters;
- Stephen Matthews;
- T&G Culture Consultants;
- T'N'L Site Trackers;
- Traditional Owner of Gomeroi Country;
- Tyan Silver;
- Uncle Henry Roser/Talbott;
- Upper Hunter Heritage Consultants;

- Veronica Long;
- Wade Natty;
- White Cockatoo;
- WY Rodgers Consultant; and
- Yinarr Cultural Services.

All Indigenous stakeholders were provided with a Proposed Methodology (i.e. draft assessment methodology) for the Aboriginal Cultural Heritage Assessment for their review and comment. The next steps in the consultation programme include the undertaking of field surveys and for the Indigenous stakeholders to review and provide comment on the draft Aboriginal Cultural Heritage Assessment (including the provision of any comments regarding the cultural significance of any Aboriginal object(s) and/or place(s) in the Action area).

In parallel to the consultation process described above and following further detailed mine planning, Whitehaven has identified additional potential alignments for the proposed rail spur. In this regard, an additional and parallel registration process has commenced to identify any additional Aboriginal persons or groups who may hold cultural knowledge relevant to, or who have a right or interest in, determining the cultural heritage significance of Aboriginal objects and/or places in these additional areas.

2.7 A staged development or component of a larger project

The Action is not a staged development or a component of a larger action.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

No World Heritage Properties are situated in the Action area or surrounds. The closest World Heritage Property to the Action is the Gondwana Rainforests of Australia, situated, at its closest point, approximately 150 km to the east of the Action (Commonwealth Department of the Environment [DotE], 2015a).

Nature and extent of likely impact

The Gondwana Rainforests of Australia is situated, at its closest point, approximately 150 km east of the Action and, therefore, a considerable distance from the area of any potential direct or indirect effect of the Action. Secondary effects, including the Action's contribution to global greenhouse gas emissions, would be relatively small.

The Action would not have a significant impact on the World Heritage values of the Gondwana Rainforests of Australia given the Action would not cause one or more of the World Heritage values to be lost, one or more of the World Heritage values to be degraded or damaged, or one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

3.1 (b) National Heritage Places

Description

No National Heritage Places are situated in the Action area or surrounds. The closest National Heritage Place is the Warrumbungle National Park, situated approximately 100 km south-west of the Action (DotE, 2015b).

Nature and extent of likely impact

As stated above, Warrumbungle National Park is situated a considerable distance from the area of any potential direct or indirect effect of the Action. Secondary effects, including the Action's contribution to global greenhouse gas emissions, would be relatively small.

The Action would not cause one or more of the National Heritage values to be lost, one or more of the National Heritage values to be degraded or damaged, or one or more of the National Heritage values to be notably altered, modified, obscured or diminished. Accordingly, the Action would not have a significant impact on the National Heritage values of the Warrumbungle National Park.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

The closest Ramsar wetland is the Little Llangothlin Nature Reserve, which is approximately 150 km north-east of the Action (OEH, 2015a). The nature reserve is part of the larger New England Lagoons system and extends over 100 km along the Great Dividing Range (OEH, 2015a).

Nature and extent of likely impact

Little Llangothlin Nature Reserve is situated approximately 150 km north-east of the Action and it is unlikely that the Little Llangothlin Nature Reserve will be affected by any potential direct (e.g. vegetation disturbance) or indirect (e.g. potential impacts on hydrology) effect of the Action. Secondary effects, including the Action's contribution to global greenhouse gas emissions, would be relatively small.

The Action would not have a significant impact on the ecological character of the Little Llangothlin Nature Reserve Ramsar site.

3.1 (d) Listed threatened species and ecological communities

Description

Threatened Fauna

Previous flora surveys of the Action area and surrounds have been undertaken by Cenwest Environmental Services between 28 March and 2 April 2011 (Cenwest Environmental Services, 2011). Numerous fauna surveys in the vicinity of the Action have also been undertaken (Countrywide Ecological Services, 2004; 2006; 2007a; 2007b; 2009a; 2009b; RPS Harper Somers O'Sullivan, 2010).

More recently, Future Ecology undertook a fauna survey of the Action area and surrounds in October 2015 including targeted searches for threatened species listed under the EPBC Act in consideration of the Commonwealth survey guidelines (*Survey Guidelines for Australia's Threatened Reptiles* [Commonwealth Department of Environment, Water, Heritage and the Arts {DEWHA}, 2011a], *Survey Guidelines for Australia's Threatened Bats* [DEWHA, 2010a], *Survey Guidelines for Australia's Threatened Birds* [DEWHA, 2010b], *Survey Guidelines for Australia's Threatened Mammals* [DEWHA, 2011b] and *Survey Guidelines for Australia's Threatened Frogs* [DEWHA, 2010c]).

Survey techniques included active searches, bird surveys, spotlighting, call play-back, bat call detection, motion detection cameras, scat analysis and trapping (cage traps, hair tubes, harp traps). Future Ecology will also be undertaking fauna surveys for the indicative rail investigation corridors during February 2016 using similar survey techniques.

Ecological surveys (using similar techniques to those undertaken by Future Ecology) have also been completed in the vicinity of the indicative rail investigation corridor for the northern rail option for the following reports:

- *Boggabri Coal – Biodiversity Monitoring, February 2006 - August 2012* (Parsons Brinckerhoff, 2011).
- *Continuation of Boggabri Coal Mine – Biodiversity Impact Assessment* (Parsons Brinckerhoff, 2010).
- *Flora and Fauna Summary of the Boggabri Coal Project* (Parsons Brinckerhoff, 2005).
- *Results of Fauna survey work undertaken by the NSW National Parks and Wildlife Service within Leard State Forest* (Pennay, 2001).
- *Report on the botany, wildlife and ecology of the Leard State Forest. Draft Environmental Impact Statement for Amax-BHP Joint Venture Boggabri Coal Project* (James B. Croft and Associates, 1983).

Table 2 provides a list of EPBC Act listed threatened species identified during the EPBC Act Protected Matters Search (DotE, 2015c) and other relevant database searches. Desktop assessment indicates that a total of 15 species could potentially occur within the wider search area covering the Action. This includes one fish, one amphibian, two reptiles, five birds and six mammals. Not all of these species are likely to be relevant to the Action area as outlined in Table 2.

Table 2
Threatened Fauna Species Database Search Results

Scientific Name	Common Name	Conservation Status under the EPBC Act[1]	Species Records			Survey Records[5]	Relevance to Action
			EPBC Act Protected Matters Search[2]	OEH Atlas of NSW Wildlife[3]	Birdlife Australia[4]		
Fish							
Maccullochella peelii	Murray Cod	V	●	-	-	-	One database record of this species is located within the proposed western rail investigation corridor and a second database record is located approximately 10 km west of the Action area (DPI Fisheries, 2016). Potential habitat for this species surrounding the Action area is restricted to the surrounding watercourses (e.g. the Namoi River to the west of the Action and Driggle Draggle Creek, to the north).
Amphibians							
Litoria booroolongensis	Booroolong Frog	E	●	-	-	-	The Booroolong Frog occurs along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses (Anstis 2002; Robinson 1993). This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 60 km north of the Action (OEH, 2015d).
Reptiles							
Underwoodisaurus sphyrurus	Border Thick-tailed Gecko	V	●	●	-	-	The Border Thick-tailed Gecko is most commonly found in undisturbed habitat remnants on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland (DotE, 2015d). This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 10 km east of the Action (OEH, 2015b).
Aprasia parapulchella	Pink-tailed Legless Lizard	V	●	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 25 km south of the Action (OEH, 2015b).
Birds							
Leipoa ocellata	Malleefowl	V	●	-	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 30 km south-west of the Action (OEH, 2015b). In addition, habitat for this species (i.e. mallee vegetation) is not present within the Action area (Figure 6).

Table 2 (Continued)
Threatened Fauna Species Database Search Results

Scientific Name	Common Name	Conservation Status under the EPBC Act[1]	Species Records			Survey Records[5]	Relevance to Action
			EPBC Act Protected Matters Search[2]	OEH Atlas of NSW Wildlife[3]	Birdlife Australia[4]		
Rostratula australis	Australian Painted Snipe	E	●	-	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 25 km north-west of the Action (OEH, 2015d). In addition, habitat for this species (e.g. wetlands, lakes, swamps and clay pans) is not present within the Action area (Figure 6).
Lathamus discolour	Swift Parrot	E	●	●	-	-	This species has not previously been recorded within the Action area or surrounds and the species is infrequently recorded in the wider locality. The nearest database record is approximately 25 km south of the Action (OEH, 2015b). Potential habitat for this species (dry sclerophyll eucalypt forests and woodlands) occurs within the Action area (Figure 6) but is much more widespread throughout the rest of NSW and Australia.
Anthochaera phrygia	Regent Honeyeater	CE	●	●	-	-	This species has not previously been recorded within the Action area or surrounds and the species is infrequently recorded in the wider locality. The nearest database record is approximately 10 km east of the Action (Figure 7). Potential habitat for this species (i.e. Ironbark and Box-Gum woodlands) occurs within the Action area (Figure 6) but is much more widespread throughout the rest of NSW and Australia.
Grantiella picta	Painted Honeyeater	V	●	●	●	-	One database record of this species is located less than 1 km north of the indicative rail investigation corridor for the northern rail option (Figure 7). Potential habitat for this species (i.e. dry open forests and woodlands) occurs within the Action area (Figure 6) but is much more widespread throughout the rest of NSW and Australia.
Mammals							
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tailed Quoll	E	●	●	-	-	Two database records of this species are located within approximately 15 km of the Action, one to the east and one to the west (Figure 7). Potential habitat for this species occurs outside the Action area, particularly within the Vickery State Forest .
Phascolactos cinereus	Koala	V	●	●	-	A	This species has been recorded on two occasions within the Action area adjacent the Namoi River (Figure 7). Additional records also occur in the wider surrounds, predominantly close to watercourses or along roadways. Most recently, Future Ecology recorded this species across the Namoi River from the Action using call playback (Future Ecology, pers. comm.).

Table 2 (Continued)
Threatened Fauna Species Database Search Results

Scientific Name	Common Name	Conservation Status under the EPBC Act[1]	Species Records			Survey Records[5]	Relevance to Action
			EPBC Act Protected Matters Search[2]	OEH Atlas of NSW Wildlife[3]	Birdlife Australia[4]		
Petrogale penicillata	Brush-tailed Rock-wallaby	V	●	●	-	-	One database record of this species is located approximately 15 km north-east of the Action within the Kelvin Range (Figure 7). There is no suitable habitat for this species within the Action area.
Pteropus poliocephalus	Grey-headed Flying-fox	V	●	-	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 55 km north of the Action (OEH, 2015d).
Nyctophilus corbeni	Corben's Long-eared Bat	V	●	●	-	A^, B^, C^, D^, E^	One database record of a *Nyctophilus sp.* (potentially the Corben's Long-eared Bat) is located less than 2 km south of the indicative rail investigation corridor for the northern rail option (Figure 7). Potential habitat for this species (i.e. box, ironbark and cypress pine woodlands) occurs within the Action area (Figure 6) and surrounds. In addition, this species was possibly recorded within the Action area and surrounds (Future Ecology, pers. comm.).
Chalinolobus dwyeri	Large-eared Pied Bat	V	●	●	-	-	The closest survey record of this species is located within the Vickery State Forest, immediately adjacent the Action area (Figure 7). Potential foraging (i.e. Box-Gum woodlands) habitat for this species occurs within the Action area (Figure 6) but is much more widespread throughout the rest of NSW and Australia. Breeding habitat consists of caves, overhangs, abandoned mine tunnels (DECCW, 2004a), which are not located in the Action area.

^ = recording of a *Nyctophyllus sp*. (potentially the Corben's Long-eared Bat) by bat recording devices.

Notes:

1 Threatened species status under the Commonwealth EPBC Act (current as at January 2016).

2 DotE (2015c).

3 OEH (2015b).

4 Birdlife Australia (2015).

5 Relevant references:

A = Surveys in 2015 by Future Ecology.

B = Countrywide Ecological Service (2004) *Fauna Study and Assessment of the Proposed Canyon Extension Whitehaven Coal Mine near Gunnedah, NSW.*

C = Countrywide Ecological Service (2009a) *Fauna Monitoring Whitehaven Summer 2008-09.*

D = Countrywide Ecological Service (2009b) *Fauna Monitoring Whitehaven Early Spring 2009.*

E = Countrywide Ecological Service (2006) *Whitehaven Coal Mine Canyon Extension: Pre-start Survey Early Autumn 2006.*

Threatened Flora

Previous flora surveys of the Action area and surrounds have been undertaken by Niche Environment and Heritage (2013) and FloraSearch (2011). More recently, FloraSearch undertook a preliminary flora survey of the Action area and surrounds in November 2015. The recent survey specifically included targeted surveys for potentially occurring threatened flora species listed under the EPBC Act. No EPBC Act listed threatened flora species have been reported during these flora surveys (FloraSearch, pers. comm.).

FloraSearch will also be undertaking flora surveys of the indicative rail investigation corridors for the western and northern rail options during February 2016 using similar survey techniques.

Ecological surveys (using similar techniques to those undertaken by FloraSearch) have also been completed in the vicinity of the indicative rail investigation corridor for the northern rail option for the following reports:

- Boggabri Coal – Biodiversity Monitoring, February 2006 - August 2012 (Parsons Brinckerhoff, 2011).
- *Continuation of Boggabri Coal Mine – Biodiversity Impact Assessment* (Parsons Brinckerhoff, 2010).
- *Preliminary vegetation mapping and survey report for Boggabri Coal lease* (Parsons Brinckerhoff, 2009).
- *Flora and Fauna Summary of the Boggabri Coal Project* (Parsons Brinckerhoff, 2005).
- *Report on the botany, wildlife and ecology of the Leard State Forest. Draft Environmental Impact Statement for Amax-BHP Joint Venture Boggabri Coal Project* (James B. Croft and Associates, 1983).

Table 3 provides a list of EPBC Act listed threatened species identified during the EPBC Act Protected Matters Search (DotE, 2015c) and other relevant database searches. Desktop assessment has indicated that a total of 10 species could potentially occur within the wider search area covering the Action. Not all of these species are likely to be relevant to the Action area as outlined in Table 3.

Table 3
Threatened Flora Species Database Search Results

Scientific Name	Common Name	Conservation Status under the EPBC Act [1]	Species Records		Previous Survey Records[4]	Relevance to Action
			EPBC Act Protected Matters Search[2]	OEH Atlas of NSW Wildlife[3]		
Cadellia pentastylis	Ooline	V	●	●	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 25 km south of the Action (OEH, 2015b).
Euphrasia arguta	-	CE	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is over 100 km south-east of the Action (OEH, 2015b).
Homopholis belsonii	Belson's Panic	V	●	●	-	This species has been recorded within the Vickery State Forest, approximately 5 km east of the Action (Figure 7) (OEH, 2015b). The Action does not include any disturbance of the Vickery State Forest.
Lepidium monoplocoides	Winged Pepper-cress	E	-	-	A	This species has been recorded at two locations within the Action area and surrounds (Figure 7). Approximately 50 plants were recorded within the previously referred disturbance area (i.e. outside the Action area) and approximately 418 plants were recorded outside the proposed additional disturbance area.

Table 3 (Continued)
Threatened Flora Species Database Search Results

Scientific Name	Common Name	Conservation Status under the EPBC Act[1]	Species Records		Previous Survey Records[4]	Relevance to Action
			EPBC Act Protected Matters Search[2]	OEH Atlas of NSW Wildlife[3]		
Philotheca ericifolia	-	V	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 35 km west of the Action within the Pilliga State Forest (OEH, 2015d).
Prasophyllum sp. Wybong (C. Phelps ORG 5269)	-	CE	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is over 150 km south-east of the Action (OEH, 2015d).
Prasophyllum petilum	Tarengo Leek Orchid	E	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and there are no database records within approximately 150 km of the Action (OEH, 2015d).
Swainsona murrayana	Slender Darling Pea	V	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 55 km north-west of the Action (OEH, 2015d).
Thesium australe	Austral Toadflax	V	●	-	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 75 km north-east of the Action (OEH, 2015d).
Tylophora linearis	-	E	●	●	-	This species is not considered relevant to the Action as it has not previously been recorded within the Action area or surrounds and the nearest database record is approximately 5 km north of the indicative rail investigation corridor for the northern rail option. (OEH, 2015b). The Action does not contain habitat for this species.

Notes:
1 Threatened species status under the Commonwealth EPBC Act (current as at January 2016).
2 DotE (2015c).
3 OEH (2015b).
4 Relevant references:
A = Niche Environment and Heritage (2013).

Flora surveys conducted in the area surrounding the Action by Niche Environment and Heritage (2013) identified one threatened species, the Winged Pepper-cress (*Lepidium monoplocoides*), which is listed as 'Endangered' under the EPBC Act. The local population of the Winged Pepper-cress (*Lepidium monoplocoides*) occurs in two patches (Figure 7). These consist of one patch of approximately 20 metres (m) x 20 m containing approximately 50 plants located in the north of the Western Emplacement (i.e. inside the previously referred disturbance area), and one patch within an area of 50 m x 10 m containing approximately 418 individual plants located to the north-west of the Western Emplacement (i.e. outside the Action area). In accordance with the referral decision for the Vickery Coal Project (EPBC 2012/6263), neither patch of the Winged Pepper-cress would be adversely impacted by the Action.

Threatened Ecological Communities

Table 4 provides a list of EPBC Act listed threatened ecological communities identified during the EPBC Act Protected Matters Search (DotE, 2015c) and other relevant database searches.

Table 4
Threatened Ecological Communities Database Search Results

Scientific Name	Conservation Status under the EPBC Act[1]	EPBC Act Protected Matters Search[2]
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	●
Weeping Myall Woodland	E	●
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	CE	●
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	●
Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	E	●
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	CE	●

Notes:
1 Threatened species status under the EPBC Act (current as at January 2016).
2 DotE (2015c).

Regional vegetation mapping (i.e. the *Border Rivers Gwydir and Namoi Regional Vegetation Map*) (OEH, 2016) indicates the potential presence of Weeping Myall Woodland Endangered Ecological Community (EEC) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland (Box-Gum Woodland Critically Endangered Ecological Community [CEEC]) within the Action area. The *Border Rivers Gwydir and Namoi Regional Vegetation Map* was developed from a process using vegetation surveys, remote sensing derivations, visual interpretation and spatial distribution models (OEH, 2016).

The land within the indicative rail investigation corridors for the western and northern rail options is comprised predominantly of non-native vegetation and cleared land with some areas of native grassland and small patches of scattered trees remaining along the corridor. Formal vegetation mapping of the Action area and indicative rail investigation corridors is still being developed based on the ground-truthed vegetation surveys.

Nature and extent of likely impact

This section addresses the potential impacts on threatened species and communities under the EPBC Act and identifies the nature and extent of likely impacts in accordance with DotE (2013) *EPBC Act Policy Statement – Matters of National Environmental Significance – Significant Impact Guidelines 1.1*.

EPBC Act Threatened Fauna

The Action is not likely to have a significant impact on a 'Critically Endangered' or 'Endangered' fauna species listed under the EPBC Act as it is unlikely that the Action would:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of any threatened fauna species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of any threatened fauna species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that any threatened fauna species is likely to decline;

- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause any threatened fauna species to decline; or
- interfere with the recovery of any threatened fauna species.

The Action is not likely to have a significant impact on a 'Vulnerable' fauna species listed under the EPBC Act as it is unlikely that the Action would:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of any threatened fauna species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that any threatened fauna species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause any threatened fauna species to decline; or
- interfere substantially with the recovery of any threatened fauna species.

This is because:

- With the exception of the Koala (further discussed below), no threatened terrestrial fauna species listed under the EPBC Act have been positively recorded within the Action area.
- No important populations or habitat critical to the survival of a fauna species would be significantly impacted by the Action.
- Undisturbed land (such as the Vickery State Forest) provides higher quality habitat than that which occurs in the Action area. The fauna species which could potentially occur are all mobile species with the ability to access habitat surrounding the Action area.
- The Action would not disturb vegetation that is unique to the Action area hence, alternative habitat is available.
- Activities associated with the Action are unlikely to result in invasive species or disease becoming established in the Action area.

Koala

As shown on Figure 7, two database records of the Koala occur within the Action area adjacent the Namoi River. There are more than 25 records of the Koala occur within approximately 15 km of the Action, predominantly close to watercourses or along roadways. Most recently, Future Ecology (pers. comm.) recorded a Koala (via call playback) across the Namoi River from one of their survey sites in the south-west of the Action area (Figure 7). The two locations where the Koala has been recorded within the Action area are located within the proposed rail investigation corridor, not within the open cut pit extent. The detailed design of the rail would seek to avoid Koala habitat near these recorded Koala locations, where practicable.

The Action would remove known habitat for this species (e.g. eucalypt woodlands) however, in consideration of the DotE (2013) *EPBC Act Policy Statement – Matters of National Environmental Significance – Significant Impact Guidelines 1.1*, the Action is unlikely to significantly impact the Koala. This is due to the large areas of suitable habitat in the wider locality which would not be disturbed by the Action, demonstrated by the large number of records in the wider area.

EPBC Act Threatened Flora

The Action is not likely to have a significant impact on a 'Critically Endangered' or 'Endangered' flora species listed under the EPBC Act as it is unlikely that the Action would:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of any threatened flora species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of any threatened flora species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that any threatened flora species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause any threatened flora species to decline; or
- interfere with the recovery of any threatened flora species.

The Action is not likely to have a significant impact on a 'Vulnerable' flora species listed under the EPBC Act as it is unlikely that the Action would:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of any threatened flora species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that any threatened flora species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause any threatened flora species to decline; or
- interfere substantially with the recovery of any threatened flora species.

This is because:

- No threatened flora species have been recorded within the Action area despite targeted surveys.
- No important populations or habitat critical to the survival of a species would be significantly impacted by the Action.
- Activities associated with the Action are unlikely to result in invasive species or disease becoming established in the Action area.

Winged Pepper-cress

The threatened species Winged Pepper-cress (*Lepidium monoplocoides*) has been recorded outside the Action area (Figure 7). Targeted surveys for this species have been undertaken by FloraSearch and it has not been recorded within the Action area.

In accordance with the referral decision for the Vickery Coal Project (EPBC 2012/6263), neither patch of the Winged Pepper-cress known to occur outside the Action area would be adversely impacted. The larger Winged Pepper-cress patch is located on Whitehaven owned land within which grazing has been excluded. The area has also been fenced to avoid accidental disturbance.

The Action is not expected to significantly impact this species.

EPBC Act Threatened Ecological Communities

The Action is not likely to have a significant impact on a 'Critically Endangered' or 'Endangered' threatened ecological community listed under the EPBC Act as it is unlikely that the Action would:

- significantly reduce the extent of any threatened ecological community;
- significantly fragment or increase fragmentation of any threatened ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of any threatened ecological community;
- 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;
- cause a substantial change in the species composition of an occurrence of any threatened ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- cause a substantial reduction in the quality or integrity of an occurrence of any threatened ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to any threatened ecological community, to become established; or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into any threatened ecological community which kill or inhibit the growth of species in an ecological community; or
- significantly interfere with the recovery of any threatened ecological community.

This is because:

- Threatened ecological communities potentially present (i.e. Weeping Myall Woodland EEC and Box-Gum Woodland CEEC) would not be limited to the Action area and would all be more widely dispersed in the general locality.
- The threatened ecological communities potentially present in the Action area are not likely to be critical to the survival of the communities.
- The rail corridor would be designed to minimise disturbance to wooded vegetation.
- No important populations or habitat critical to the survival of a threatened ecological community would be significantly impacted by the Action.
- The Action will not disturb vegetation that is exclusive to the Action area hence, alternative habitat is available.
- Activities associated with the Action are unlikely to result in invasive species or disease becoming established in the Action area.

Box-Gum Woodland CEEC

As indicated above, regional vegetation mapping (i.e. the *Border Rivers Gwydir and Namoi Regional Vegetation Map*) indicates that the Box-Gum Woodland CEEC could potentially be present within the Action area (west of Braymont Road).

Surveys will be undertaken to confirm the exact extent of the Box-Gum Woodland CEEC in the Action area (if any occurs). The area of Box-Gum Woodland CEEC to be cleared is not expected to result in a significant impact on the community given:

- The extent at which the community is mapped on the regional vegetation map and the extent to which the community occurs outside the Action area (i.e. throughout the rest of Australia and NSW).
- The regional mapping indicates the Box-Gum Woodland CEEC is present in small patches within the Action area (Figure 6).
- The extent over which clearing would occur would only be a portion of the overall clearance associated with the Action.
- The extent to which land clearance, associated with past agricultural land use (e.g. grazing), has occurred within the locality.

As such, the Action is unlikely to have a significant impact on the Box-Gum Woodland CEEC.

Weeping Myall Woodland EEC

As indicated above, regional vegetation mapping (i.e. the *Border Rivers Gwydir and Namoi Regional Vegetation Map*) indicates that the Weeping Myall Woodland EEC could potentially be present within the southern extent of the Action area (Figure 6).

Surveys will be undertaken to confirm the exact extent of the Weeping Myall Woodland EEC in the Action area (if any occurs). The area of Weeping Myall Woodland EEC to be cleared is not expected to result in a significant impact on the community given:

- The extent at which the community is mapped on the regional vegetation map (Figure 6) and the extent to which the community occurs outside the Action area (i.e. throughout the rest of Australia and NSW).
- The regional mapping indicates the Weeping Myall Woodland EEC is present in small patches within the southern extent of the Action area (Figure 6).
- The extent over which clearing would occur would only be a small portion of the overall clearance associated with the Action.
- The extent to which land clearance, associated with past agricultural land use (e.g. grazing), has occurred within the locality.

As such, the Action is unlikely to have a significant impact on the Weeping Myall Woodland EEC.

3.1 (e) Listed migratory species

Description

Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations (DotE, 2015d). A total of four migratory species have previously been recorded in the Action area and surrounds, namely the Rainbow Bee-eater (*Merops ornatus*), Great Egret (*Ardea alba*), Cattle Egret (*Ardea ibis*) and the White-throated Needletail (*Hirundapus caudacutus*). Table 5 shows migratory species identified during the EPBC Act Protected Matters Search (DotE, 2015c).

Table 5
Migratory Species Protected Matters Search Results

Scientific Name	Common Name	Source of Record	
		Protected Matters Search[1]	Previous Survey Records[2]
Migratory Terrestrial Species			
Merops ornatus	Rainbow Bee-eater	●	A, B
Motacilla flava	Yellow Wagtail	●	-
Rhipidura rufifrons	Rufous Fantail	●	-
Apus pacificus	Fork-tailed Swift	●	-
Ardea alba	Great Egret	●	B
Ardea ibis	Cattle Egret	●	B
Hirundapus caudacutus	White-throated Needletail	●	B
Myiagra cyanoleuca	Satin Flycatcher	●	-
Migratory Wetlands Species			
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	●	-
Pandion haliaetus	Osprey	●	-

[1] DotE (2015c).

[2] Previous survey results have been sourced from the following:

A = Cenwest Environmental Services (2011).

B = Niche Environment and Heritage (2013).

Nature and extent of likely impact

The Action is not likely to have a significant impact on migratory species listed under the EPBC Act as it is unlikely that the Action would:

- substantially modify, destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.

This is because:

- The Action is not located at the limit of these species known migratory ranges.
- Important habitat for these species is not located in the Action area given the extent of suitable habitat throughout the rest of NSW and Australia and the wide-ranging nature of each of the species identified above.
- Activities associated with the Action are unlikely to result in invasive species or disease becoming established in the Action area.
- The Action area does not constitute an area of important habitat for any of these species.
- An ecologically significant proportion of the population of any of these species is not located within the Action area.

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

There are no Commonwealth Marine Areas located in the vicinity of the Action. The Commonwealth Marine Area generally stretches from 3 to 200 nautical miles from the Australian coast (DotE, 2015c). As the Action is not located within a Commonwealth Marine Area, the Action is unlikely to impact marine species within a Commonwealth Marine Area.

Nature and extent of likely impact

The Action is unlikely to impact on a Commonwealth Marine Area, and accordingly, will not have, or is unlikely to have, a significant impact on any Commonwealth Marine Areas.

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

A search of the EPBC Act database using the Protected Matters Search Tool indicates that no areas of Commonwealth land occur within the Action area (DotE, 2015c).

Nature and extent of likely impact

The Action is unlikely to impact on Commonwealth land, and accordingly, will not have, or is unlikely to have, a significant impact on any Commonwealth land.

3.1 (h) The Great Barrier Reef Marine Park

Description

The Action is not within the Great Barrier Reef Marine Park (DotE, 2015c).

Nature and extent of likely impact

The Action will not impact the Great Barrier Reef Marine Park.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

Surface Water

The Action area is situated within the Namoi River Catchment. The Namoi River is located to the south-west of CL 316 (Figure 2) and generally flows in a north-westerly direction from its headwaters in the Great Dividing Range.

The Action mining areas are located near the edge of the Namoi River floodplain. The western rail option would traverse the Namoi River floodplain.

Driggle Draggle Creek flows in a westerly direction to the north of the Action area and is an ephemeral watercourse in the vicinity of the Action. The headwaters of Driggle Draggle Creek and a number of other un-named ephemeral streams originate in the slopes of the nearby Vickery State Forest (Figure 2). As they descend onto the flatter areas they become less well defined drainage paths which become expansive, ponded, overland flow areas during and following heavy rainfall. These flows slowly move down gradient and merge with the Namoi River.

Bollol Creek rises in the north-south trending range further north of the Action area and is an ephemeral waterway which flows south and west through a confined valley before dispersing onto the alluvial flats. Flows in Bollol Creek generally continue as overland flow in a south-westerly direction to eventually reach Barbers Lagoon, which flows into the Namoi River. In its headwaters and mid-reaches, Bollol Creek exhibits small confined channels with occasional pockets of adjoining floodplain. As it descends onto the alluvial flats, Bollol Creek transitions into a relatively poorly defined drainage path, which becomes an expansive ponded overland flow area during and following heavy rainfall events. Anecdotal advice from local landholders and nearby operations is that Bollol Creek is highly ephemeral.

Groundwater

A conceptual hydrogeological model developed by HydroSimulations (formerly Heritage Computing) for the area, based on mapping from the NSW Office of Water (2010) and the Vickery Coal Project Groundwater Assessment (Heritage Computing, 2013), indicates that two groundwater systems are associated with the Action area:

- a porous rock groundwater system; and
- an alluvial groundwater system.

The Action coal resource is located within the Maules Creek sub-basin of the Early Bellata Group which is within the porous rock (i.e. sedimentary rock) groundwater systems of the Gunnedah Basin and lies within the boundary defined in the *Water Sharing Plan for the NSW Murray-Darling Basin Porous Rock Groundwater Sources 2011*. The Action coal resource is wholly located within the Gunnedah-Oxley Basin Murray-Darling Basin (MDB) Groundwater Source.

Alluvial sediments associated with the Namoi River are located to the north, south and west of the Action. These alluvial sediments are part of the Upper Namoi Alluvium within Upper Namoi Zone 4, Namoi Valley (Keepit Dam to Gin's Leap) Groundwater Source of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Source, 2003*. The Vickery and Blue Vale open cuts would not extend into the Upper Namoi Alluvium.

The Upper Namoi Alluvium groundwater system occurs within the alluvial sediments associated with the Namoi River and its floodplain. The Upper Namoi Alluvium is Cainozonic in age and consists of two principal zones: an upper zone of clays with minor sand and gravel beds which is widespread; and a lower zone of predominantly gravel and sand which to the west is confined to a deeper 'palaeochannel'. These two zones of the alluvium groundwater system are known as the Narrabri Formation (upper zone) and Gunnedah Formation (lower zone).

The groundwater in the regolith materials in the area located immediately south of the open cut is saline on most occasions and would not be suitable for agricultural or farming purposes (e.g. the median electrical conductivity and salinity values during the 2012 sampling were 13,600 microseimens per centimetre and 9,000 milligrams per litre respectively). The groundwater system is also low yielding in this area (e.g. a pumping test conducted at bore VKY3092 in August 2012 indicated a yield of 0.25 litres per second). These results are consistent with the experience of the local farmers who run cattle in this area (under licence to Whitehaven), and who have indicated that the one bore equipped with a windmill in the area is low yielding and poor quality. These groundwater quality characteristics suggest low permeability strata, lack of groundwater flushing action and very old groundwater near the boundary between the Maules Creek Formation and the Upper Namoi Alluvium in the vicinity of the southern extent of the planned open cut (Heritage Computing, 2013).

A bore census was conducted for the approved Vickery Coal Project to establish the location and currency of use of groundwater bores/windmills in the area. The bore census indicated that there are currently no active windmills or bores in the Action mining areas.

There are currently no high priority groundwater dependent ecosystems identified in the Upper Namoi Groundwater Sources or Porous Rock Groundwater Sources in the Action area. No stygofauna were recorded in the eight bores sampled in August 2012.

Relevant Data and Information

The Vickery Coal Project EIS, including the Groundwater Assessment (Heritage Computing, 2013) and the Surface Water Assessment (Evans & Peck, 2013), is available from the link below:
http://www.whitehavencoal.com.au/environment/vickery_project_environmental_management.cfm

Surface Water

Evans & Peck (2013) analysed data made available by Commonwealth and State government agencies, Whitehaven, and surface water reports from surrounding mining operations, including:

- monthly potential evapotranspiration for Climatic Atlas of Australia: Evapotranspiration (Bureau of Meteorology [BoM], 2002);
- rainfall and evaporation records from the BoM weather stations;
- rainfall intensity-frequency-duration data from the BoM weather stations;
- DPI Water gauging station flow data on the Namoi River and Maules Creek;
- local surface water quality data collected by Whitehaven and Idemitsu Boggabri Coal Pty Ltd for the Tarrawonga Coal Mine, Rocglen Coal Mine and Boggabri Coal Mine;
- data collected by Whitehaven from five Vickery Coal Project surface water quality monitoring sites;
- historical surface water quality data presented in the original Vickery Coal Mine EIS (Vickery Joint Venture, 1986);
- water usage data from the Tarrawonga Coal Mine;
- Namoi Catchment Water Study Phase 2 Report (Schlumberger Water Services, 2011); and
- other additional geological and regional topographic mapping data.

Groundwater

Previous groundwater studies and monitoring programs have been reviewed by Heritage Computing (2013) and the available data evaluated in order to develop a comprehensive understanding of the groundwater resources within the Action area and surrounds. The baseline data review included information from the following sources:

- geological and geophysical data and logs from the Vickery exploration programs and previous mining operations;
- results of searches of the DPI Water PINNEENA Groundwater Works Database including registered bores and continuous monitoring data;
- previous groundwater assessments at Vickery;
- groundwater modelling, monitoring, and assessments undertaken at the mining operations surrounding the Vickery Coal Project, including the Canyon, Tarrawonga and Rocglen Coal Mines;
- DPI Water (then NSW Department of Natural Resources) Upper Namoi Groundwater Flow Model: Model Development and Calibration (McNeilage, 2006); and
- other additional geological and regional topographic mapping data.

Based on the desktop review of the existing hydrogeological and monitoring information, a Groundwater Investigation Program was undertaken in order to gather additional information and to establish additional monitoring bores within and adjacent to the Vickery Coal Project area. The Vickery Coal Project Groundwater Investigation Program included the following activities:

- installation of three vibrating wire piezometers (i.e. VKY3033, VKY3041 and VKY3053) and five standpipes (i.e. VKY3034, VKY3035, VKY3036, VKY3042 and VKY3043) within the Maules Creek Formation within the proposed open cut;
- drilling and geological logging of 34 shallow investigation drillholes within the Upper Namoi Alluvium and weathered Maules Creek Formation strata within, and to the south of, the proposed open cut;
- conversion of four of the above shallow investigation holes to standpipe bores (i.e. TR7, TR18, TR26 and TR35);
- a pumping test at one of the drillholes to the south of the proposed open cut (i.e. VKY3092);
- drilling and logging of a shallow investigation drillhole within the Upper Namoi Alluvium to the west of the Western Emplacement (i.e. VNW385);
- monitoring of groundwater levels from installed bores;
- hydraulic testing and monitoring of some of the installed monitoring bores; and
- hydraulic testing of selected drillhole core from the Maules Creek Formation.

Application of Appropriate Methods and Interpretation of Model Outputs

Surface Water

Evans & Peck (2013) have undertaken modelling to characterise the flow regime for the Vickery Coal Project area using the Australian Water Balance Model (AWBM). Historical rainfall and evaporation data, in conjunction with 24 years of recorded daily flow data from Maules Creek (approximately 28 km north) have been used to derive model parameters that represent local runoff conditions.

A water balance model of the Vickery Coal Project has been set up to represent the daily inflows and outflows from each of the separate elements of the water management system and to reflect the changes in the structure of the water management system over the life of the Vickery Coal Project. The model has been set up in a manner that permits an assessment of the risk of shortfall or discharge at any stage of the mine life. This is achieved by modelling the progressive development of the mine over 30 years combined with 110 climate scenarios representing all the different sequences of 30 years of rainfall represented in the historic climate record. The model utilises 112 years of the daily rainfall record from Boggabri (Retreat) which commenced recording in 1899.

Groundwater

The groundwater modelling undertaken by Heritage Computing (2013) used the Groundwater Vistas (Version 6.22) software interface in conjunction with MODFLOW-SURFACT (Version 4). MODFLOW-SURFACT is a three-dimensional modelling program that is able to simulate variably saturated flow and can accommodate desaturation and resaturation of multiple aquifers.

The regional numerical groundwater model covered an area of approximately 957 km squared (i.e. 33 km east-west and 29 km north-south). The model area incorporated the Tarrawonga and Rocglen Coal Mines as well as local groundwater extraction from the Upper Namoi Alluvium groundwater system by farmers for agricultural purposes. The model included 14 layers. The top two layers comprised alluvium, regolith (i.e. weathered Maules Creek Formation) or overburden in different parts of the model. Where the layers represent alluvium, they were assigned to be generally consistent with the DPI Water regional groundwater model for the Upper Namoi Alluvium.

The groundwater model was calibrated using:

- a steady state calibration simulation; and
- transient calibration simulation (based on available data from January 2006 to December 2011).

Dr Frans Kalf reviewed the calibration information and concluded the following (Kalf & Associates, 2012):

> *The hydraulic parameters derived are plausible and simulation of the measured water levels is acceptable.*
>
> *The overall calibration performance statistics of 2.8m RMS and 2.6% SRMS obtained is a very good result although of course not necessarily unique.*

The modelling included assessment of a Vickery Coal Project-only scenario, plus a cumulative scenario (i.e. the Vickery Coal Project operating in conjunction with the nearby Rocglen and Tarrawonga Coal Mines). Cumulative modelling indicated there is no interaction between the Namoi Alluvium drawdowns associated with each of the mines.

In order to check whether the assumed irrigation pumping rates from the Upper Namoi Alluvium groundwater had any effect on predicted mining-induced drawdowns, simulations for the prediction phase were also conducted for continuous pumping at the average rate that occurred at each production bore from 2006 to 2010 (1.9 times higher than the 2009-2010 base rate). The sensitivity analysis demonstrated that the 1 m drawdown contour is almost identical in each case, and remains confined to the Maules Creek Formation. Heritage Computing (2013) concluded that the predicted drawdown extent due to mining is insensitive to the assumptions made for the magnitude of irrigation pumping in the Upper Namoi Alluvium.

Nature and extent of likely impact

Surface Water

The Action water management strategy would involve:

- separation of undisturbed area runoff from disturbed area runoff;
- collection and reuse of surface runoff from disturbed areas;
- capture of pit inflows and reuse as process water;
- storage of water on-site; and
- licensed water extraction to supplement water supply.

Operational water requirements would be sourced from water storages containing runoff from disturbed mine areas or mine-affected water. Additional make-up water would be sourced from water storages containing runoff from undisturbed/rehabilitated areas, from licensed groundwater bores and/or surface water licensed extraction from the Namoi River.

Whitehaven holds a number of Water Access Licences (WALs) for extraction from the Namoi River. Water would be extracted from the Namoi River in accordance with the WALs and the rules prescribed in the relevant water sharing plan (i.e. the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*). Where required, Whitehaven would secure additional allocations of relevant water licences to meet the requirements of the Action. As all extraction from the Namoi River would be conducted in accordance with the licensed entitlements issued by the DPI Water, and in accordance with the rules in the water sharing plan, impacts to the Namoi River water source are not anticipated to be significant.

The existing site water balance model would be updated for the Action as part of the EIS.

The Action would also involve a number of watercourse crossings for the construction of the proposed rail spur. This would include a crossing over the Namoi River (for the western rail corridor option) or Driggle Draggle Creek (for the northern rail corridor option). The rail bridges would be designed to allow flows in the Namoi River, and other relevant watercourses, to be maintained, therefore minimising the potential impact on surface water flows.

Evans & Peck (2013) concluded that the approved Vickery Coal Project would result in a low risk of adverse water quality impacts from controlled releases at licensed discharge points. Releases from passively managed storages are also considered to have a very low risk of adversely affecting downstream waters. Given the water management strategy for the Action is consistent with the principles of the approved Vickery Coal Project, the Action is unlikely to have a present a significant risk to downstream water quality due to controlled releases or passively managed storages. Whitehaven would operate the Action in accordance with the requirements of an EPL issued under the NSW *Protection of the Environment Operations Act, 1997*.

The Action is unlikely to have a significant impact to the aquatic flora and fauna of the Namoi River system, given the limited potential impacts on groundwater and surface water.

Consistent with Condition 30 of the Vickery Coal Project Development Consent (SSD-5000), Whitehaven would prepare a Water Management Plan (including a Site Water Balance, Surface Water Management Plan and a Groundwater Management Plan) for the Action, in consultation with the DPI Water, to the satisfaction of the DP&E.

Groundwater

Whitehaven currently holds volumetric licence allocation in the Upper Namoi Zone 4 – Namoi Valley (Keepit Dam to Gin's Leap) Groundwater Source (alluvial) and Gunnedah Oxley Basin MDB Groundwater Source (porous rock). It is anticipated that the existing licensing allocations held by Whitehaven would be sufficient for the Action. Notwithstanding, if required, additional groundwater licences for the Action open cut would be sought and obtained from the DPI Water pursuant to the NSW *Water Management Act, 2000*.

The regional numerical groundwater model developed by Heritage Computing (2013) (i.e. Dr Noel Merrick) for the Vickery Coal Project would be updated for the Action. The Vickery Coal Project Groundwater Assessment was Peer Reviewed by Dr Frans Kalf, who concluded that the model is "fit-for-purpose" for mining impact assessment at the Vickery Coal Project.

The groundwater modelling for the approved Vickery Coal Project predicts:

- The zone of groundwater drawdown surrounding the Vickery Coal Project open cut during operations and post-closure would be largely restricted to the Maules Creek Formation.
- One privately-owned bore within the island of Maules Creek Formation in which the Vickery Coal Project is located (i.e. Bore SK1) is predicted to experience a drawdown of 1 to 5 m. For Bore SK1, Whitehaven would provide mitigation/compensation/offset measures commensurate with the level of impact.
- No privately-owned census bores within the Upper Namoi Alluvium groundwater system surrounding the Project are predicted to be materially impacted during mining operations or post closure (i.e. any drawdown effect would be less than 1 m and is therefore considered to be negligible). The Vickery Coal Project would therefore not impact the agricultural use of the Upper Namoi Alluvium groundwater system for irrigation or other agricultural purposes.

Consistent with previous groundwater modelling (Heritage Computing, 2013), it is expected the magnitude of the predicted groundwater take (e.g. leakage) in the Upper Namoi Alluvium is such that it would not cause a measurable drawdown effect in the Upper Namoi Alluvium surrounding the Action.

Driggle Draggle Creek has been assessed by Heritage Computing (2013) as having a baseflow of approximately 0.2 megalitres per day (ML/day) (Heritage Computing, 2013). Barbers Lagoon was assessed as receiving about 0.01 ML/day (Heritage Computing, 2013). Consistent with previous groundwater modelling (Heritage Computing, 2013), no change to the amount of baseflow entering either of these surface water features, or impact on their water quality, is predicted to occur as a result of the Action during operations or post-closure.

The Action open cut would act as a groundwater sink during operations and post-closure. This would cause a localised change in groundwater flow direction, generally a reversal of direction due to the depth and direction of excavation. There would also be a change in hydraulic properties over the mine footprint where mine waste rock is used to infill the open cut.

Preliminary groundwater modelling (using the existing numerical model) has been conducted by HydroSimulations (formerly Heritage Computing) to determine the incremental difference in impacts to groundwater (including leakage between alluvium and Permian) and baseflow in the Namoi River and surface water due to the Action when compared with the original approved Vickery Coal Project (Heritage Computing, 2013). The model results indicate:

- The maximum annual groundwater take over the life of the Action is unlikely to increase as a result of the Action, but mine inflows would be higher compared with the original mine scenario in the first five years of mining.
- The southern extension of the Vickery Open Cut alone results in a very minor to negligible change in baseflow to the Namoi River. The Blue Vale Open Cut results in a small loss compared to the 10-year average daily flow in the Namoi River at Gunnedah (1,084 ML/day). The predicted additional river loss over the rest of the model domain due to the Action is negligible.
- Mining of the Blue Vale Open Cut results in a predicted increase in groundwater leakage from the alluvium to the Maules Creek Formation of about 0.2 ML/day, in line with the predicted loss from the Namoi River to the south-west of the Blue Vale Open Cut.
- In the area south of the Vickery Open Cut, the southern pit extension will result in a small increase in seepage from the alluvium to the Maules Creek Formation, in the order of 0.1 ML/day.
- There is negligible predicted change in the groundwater flow between the alluvium and the Maules Creek Formation in the northern alluvium area. This is expected given that the main changes to approved mining areas are in the south of the mining and exploration tenements.

Conclusion

Considering the *significant impact guidelines: Coal seam gas and large coal mining developments - impacts on water resources* (DotE, 2015e), Whitehaven has formed the opinion, that beyond the existing approved impacts associated with Development Consent (SSD-5000), the Action is:

- unlikely to directly or indirectly result in a substantial change in the hydrology of water resources; and
- unlikely to directly or indirectly result in a substantial change in water quality of water resources.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))		

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))		

3.3 Other important features of the environment

3.3 (a) Flora and fauna

Threatened fauna and flora species that are known to occur or could possibly occur within the Action area and surrounds are described in Section 3.1(d). The general kinds of fauna and flora that occur in the Action area and surrounds are summarised below.

Regional and Local Setting

The Action is located within the Brigalow Belt South Bioregion as defined in the *Interim Biogeographic Regionalisation of Australia* (Department of Sustainability, Environment, Water, Populatino and Communities, 2012). It is also located in the Namoi Catchment Management Authority (CMA) planning region and North West Local Land Service region.

The Action is located in the Gunnedah Coalfield, approximately 25 km north of Gunnedah and 18 km south-east of Boggabri, in north-eastern NSW. The Action area would be located within CL 316, ML 1471, ML 1718 and EL 7407.

Flora

The land to the north, south and west of the Action area is generally flat to slightly undulating and predominantly cleared due to a long history of grazing and cultivation. The largest area of existing woodland occurs to the east of the Action area (i.e. the Vickery State Forest) and predominately consists of White Cypress Pine (*Callitris glaucophylla*), White box (*Eucalyptus albens*) and Narrow-leaved Ironbark (*Eucalyptus creba*).

More sparse open vegetation occurs in the west and north of the Action area, the majority comprising of various combinations of Poplar Box (*Eucalyptus populnea*), White Cypress Pine (*Callitris glaucophylla*), White Box (*Eucalyptus albens*) and Silver-leaved Ironbark (*Eucalyptus melanophloia*).

The majority of the Action area is comprised of previously cleared agricultural areas and rehabilitated open cut workings from prior mining activities.

The land within both the proposed indicative railway investigation corridors is comprised predominantly of previously cleared land with some scattered trees remaining.

Fauna

Broad fauna habitat types that occur within the Action area and surrounds include remnant and regrowth woodland/forest habitats, cleared grasslands, farm dams and ephemeral drainage lines. The fauna which use these habitat types are represented by amphibians, reptiles, woodland birds, ground dwelling mammals and bats.

A number of introduced pest species are either known or expected to occur in the greater area including Common Starling (*Sturnus vulgaris*), House Mouse (*Mus musculus*), Red Fox (*Vulpes vulpes*), Brown Hare (*Lepus capensis*), Rabbit (*Oryctolagus cuniculus*), Goat (*Carpa hircus*) and Pig (*Sus scrofa*) (Cenwest Environmental Services, 2011).

3.3 (b) Hydrology, including water flows

Proposed Mining Area

The Action is located within the Namoi River Catchment. The Namoi River is located to the south-west of CL 316 (Figure 2) and the western rail investigation corridor includes a rail crossing over the Namoi River. The Namoi River generally flows in a north-westerly direction from its headwaters in the Great Dividing Range and ultimately into the Barwon River.

The headwaters of Driggle Draggle Creek and a number of un-named ephemeral drainage lines originate in the slopes of the Vickery State Forest. As they descend onto the flatter areas to the north and south of the Action area they become less well defined drainage paths which become expansive, ponded, overland flows areas during and following heavy rainfall.

The Action coal resource is located within the Maules Creek sub-basin of the Early Bellata Group which is within the porous rock (i.e. sedimentary rock) groundwater systems of the Gunnedah Basin and lies within the boundary defined in the *Water Sharing Plan for the NSW Murray-Darling Basin Porous Rock Groundwater Sources 2011.* The coal resource is wholly located within the Gunnedah-Oxley Basin MDB Groundwater Source.

Alluvial sediments associated with the Namoi River are located to the north, south and west of the Action. These alluvial sediments are part of the Upper Namoi Alluvium within Upper Namoi Zone 4, Namoi Valley (Keepit Dan to Gin's Leap) Groundwater Source of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Source, 2003*. The Vickery and Blue Vale open cuts would not extend into the Upper Namoi Alluvium.

Proposed Rail Spur Corridors

The indicative rail investigation corridor for the northern rail option traverses flatter land near Driggle Draggle Creek, Bollol Creek and Gins Creek before turning to the west and joining the common section of the Maules Creek Mine and Boggabri Coal Mine rail spur.

The indicative rail investigation corridor for the western rail option crosses the Namoi River and flatter land to the west before crossing Deadmans Gully and joining the Werris Creek Mungindi Railway.

3.3 (c) Soil and Vegetation characteristics

The study area occurs within the Namoi CMA region, the North West Local Land Service region and the Gunnedah Basin geological formation on the NSW North West Slopes and Plains. The Gunnedah Basin developed in a trough between the Lachlan Fold Belt to the west and the New England Fold Belt on the eastern side of the Mooki Thrust (Pratt, 1998). The Gunnedah Basin lies within the Namoi River catchment that is bounded by the Liverpool Range to the south, the Great Dividing Range to the east, the Nandewar Range to the north and the Pilliga Scrub to the west.

Most of the lower lying areas of the Namoi Valley comprise Quaternary alluviums from which the native vegetation has been almost completely cleared for agriculture. Within the Gunnedah Basin native vegetation persists on the steep terrain of small inselbergs, such as Mount Binalong and Goonbri Mountain that respectively comprise remnants of former Jurassic and Tertiary volcanic landscapes, and the poorer soils of Early Permian sediments, such as the Maules Creek, Goonbri and Leard Formations of the Leard and Vickery State Forests.

The Action is located within the Gunnedah Basin, which contains sedimentary rocks, including coal measures, of Permian and Triassic age.

Regionally, there are two coal-bearing sequences in the Gunnedah Basin, namely:

- Early Permian Bellata Group (comprising the Maules Creek sub-basin and Mullaley sub-basin, separated by the Boggabri Ridge); and
- Late Permian Black Jack Group.

The Action coal resource is located within the Maules Creek sub-basin of the Early Permian Bellata Group. The target coal seams within the Maules Creek sub-basin are contained within the Maules Creek Formation.

Remnant native vegetation in the Action area is described in Section 3.1(d).

3.3 (d) Outstanding natural features

The Pilliga Nature Reserve occurs approximately 30 km to the west of the Action area. The Pilliga Nature Reserve is an expansive heathland, home to over 350 species of fauna (OEH, 2015c). Mount Kaputar National Park is located approximately 40 km north of the Action area and approximately 25 km north of the indicative rail investigation corridor for the northern rail option and is well recognised for the Nandewar Ranges within, formed by volcanic eruptions (OEH, 2015c).

3.3 (e) Remnant native vegetation

Refer to Sections 3.1(d), 3.3(c).

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The topography of the central part of the Action area comprises rolling hills (partly due to the landform associated with the previous mining activities), with flatter areas to the north and south.

The elevation of the south-eastern part of the Action area ranges from approximately 330 m Australian Height Datum (AHD) near the boundary of the Vickery State Forest, to around 270 m AHD at the southern extent of the Vickery open cut. Red Hill is located at the very northern extent of the Vickery open cut, rising to an elevation of approximately 310 m AHD.

3.3 (g) Current state of the environment

The majority of the Action area is comprised of previously cleared agricultural areas and rehabilitated open cut workings from prior mining activities. Rainfed crop production would most likely have occurred historically on the flatter areas within the north-western part of CL 316.

Rainfed cropping and grazing of cattle is conducted to the north and south of the Action area on lands classified as Central Mixed Soil Floodplains to the west of the Namoi River.

The Vickery State Forest is located to the immediate east of the Action area. No mining, overburden emplacement or disturbance is proposed within the Vickery State Forest.

Open cut and underground mining activities were previously conducted in the Action area by Rio Tinto in the late 1990s. Three areas associated with historical open cuts and associated waste rock emplacements (the Red Hill Pit, Greenwood/Shannon Hill Pit and Blue Vale Pit) are located within CL 316. In addition, part of the final void associated with the Canyon Coal Mine (extraction ceased in 2009) occurs in the north-western portion of the Action area (Figure 5).

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

As described in Section 3.1(b), no National Heritage Places are situated in the Action area or either of the indicative rail investigation corridors or surrounds. The closest National Heritage Place is the Warrumbungle National Park, situated approximately 100 km south-west of the Action. The Action is unlikely to cause one or more of the National Heritage values to be lost, one or more of the National Heritage values to be degraded or damaged, or one or more of the National Heritage values to be notably altered, modified, obscured or diminished. Accordingly, the Action would not have, or is not likely to have, a significant impact on the National Heritage values of the Warrumbungle National Park.

3.3 (i) Indigenous heritage values

An Aboriginal Cultural Heritage Assessment would be prepared for the Action, as a component of the EIS for the Vickery Extension Project (incorporating the Action). The assessment would include the development of surface disturbance protocols, including salvage or demarcation of sites where applicable.

Aboriginal heritage sites have been previously identified within and in proximity to the Action area as a result of past Aboriginal cultural heritage surveys and investigations. These sites will be investigated and assessed in the Aboriginal Cultural Heritage Assessment, as well as a consideration of any new sites identified in the field surveys undertaken for the Action.

There are no indigenous land use agreements or joint management arrangements existing over the Action area.

3.3 (j) Other important or unique values of the environment

Vickery State Forest is located within the vicinity of the proposed mining area component of the Action (Figure 2). Reserved areas in the surrounds include the Boonalla CCA Zone 2 Aboriginal Area approximately 14 km to the east of the Action area and the Leard State Forest, which is located approximately 10.5 km to the north of the Action area (Figure 1). As described in Section 3.3(d), the Pilliga Nature Reserve and Mount Kaputar National Park are also located approximately 30 km west and 40 km north (respectively) of the Action area.

3.3 (k) Tenure of the action area (e.g. freehold, leasehold)

Relevant lot and deposited plan numbers for parcels of land within the area of Action are provided in Attachment B.

3.3 (l) Existing land/marine uses of area

Proposed Mining Area

As described in Section 3.3 (g), the majority of the Action area is comprised of previously cleared agricultural areas and rehabilitated open cut workings from prior mining activities by Rio Tinto in the late 1990's. The area is now predominately used for cattle grazing. Rainfed crop production is conducted on the Central Black Earth Floodplains to the west of the Namoi River, outside the Action area.

Rainfed cropping and grazing of cattle is conducted to the north and south of the Action area on lands classified as Central Mixed Soil Floodplains to the west of the Namoi River.

The Vickery State Forest is located to the immediate east of the Action area. No mining, overburden emplacement or disturbance is proposed within the Vickery State Forest.

Open cut and underground mining activities were previously conducted in the Action area by Rio Tinto in the late 1990s. Three areas associated with historical open cuts and associated waste rock emplacements (the Red Hill Pit, Greenwood/Shannon Hill Pit and Blue Vale Pit) are located within CL 316 (Figure 5). In addition, part of the final void associated with the Canyon Coal Mine (extraction ceased in 2009) occurs in the north-western portion of the existing approved mining area.

Operating mines in the vicinity of the Action include (Figure 1):

- Rocglen Coal Mine, approximately 5 km east (Whitehaven owned);
- Tarrawonga Coal Mine, approximately 10 km north (Joint Venture between Whitehaven and Boggabri Coal Pty Ltd);
- Boggabri Coal Mine, approximately 12 km north (owned by Boggabri Coal Pty Ltd); and
- Maules Creek Coal Mine, approximately 15 km northwest (Joint Venture between Whitehaven and other parties).

Existing and/or approved development in and surrounding the Action includes:

- electricity transmission lines and water infrastructure;
- the Blue Vale Road diversion;
- the Maules Creek Mine and Boggabri Coal Mine spur of the Werris Creek Mungindi Railway; and
- the Whitehaven Private Haul Road.

3.3 (m) Any proposed land/marine uses of area

Land to the north, south and west of the Action area is predominantly active agricultural land. The Canyon Coal Mine (ceased operation in 2009) is located to the immediate north of the Action area. The Vickery State Forest is located outside and immediately east of the Action area. The operating Rocglen Coal Mine is located on the eastern edge of the Vickery State Forest, approximately 5 km from the Action area.

4 Environmental outcomes

The following environmental outcomes, relevant to Matters of National Environmental Significance, would be achieved as a result of the proposed Action:

- No impacts to the World Heritage values of a declared World Heritage property.
- No impacts to the National Heritage values of a National Heritage Place.
- No impacts to the ecological character of a declared Ramsar wetland.
- No significant impacts to listed threatened species or ecological communities or their habitat.
- No significant impacts to listed migratory species.
- No impacts to the environment in a Commonwealth marine area.
- No impacts to the environment on Commonwealth land.
- No impacts to the Great Barrier Reef Marine Park.
- No significant impacts to a water resource, in relation to coal seam gas development and large coal mining development.

Also, in accordance with the referral decision for the approved Vickery Coal Project (EPBC 2012/6263), neither patch of the Winged Pepper-cress (*Lepidium monoplocoides*) known to occur in the area surrounding the Action would be adversely impacted.

5 Measures to avoid or reduce impacts

Given the early stages of planning of the Action, no management plans have been created or implemented specific to the Action. It is expected that Whitehaven will develop appropriate management measures to avoid, reduce, manage or offset any relevant impacts of the Action as part of development of the EIS required under the EP&A Act.

Measures developed to date that would form commitments of the Action, relevant to Matters of National Environmental Significance include:

- avoiding direct impacts to the Vickery State Forest;
- avoiding disturbance to the two known occurrences of the Winged Pepper-cress;
- using previously disturbed areas, including the now closed Canyon Coal Mine final void for waste rock emplacement;
- committing to avoid mature trees where possible for the rail spur corridor; and
- management of water resources including preparation of a water management plan and monitoring program.

6 Conclusion on the likelihood of significant impacts

6.1 Do you THINK your proposed action is a controlled action?

✓	No, complete section 5.2
	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

On the basis of the reasons provided in Section 3, the Action is not considered to be a controlled action as it is unlikely to have a significant impact on:

- the World Heritage values of a declared World Heritage property;
- the National Heritage values of a National Heritage Place;
- the ecological character of a declared Ramsar wetland;
- a listed threatened species or communities or their habitat;
- a listed migratory species;
- the environment in a Commonwealth marine area;
- the environment on Commonwealth land;
- the Great Barrier Reef Marine Park; or
- a water resource, in relation to coal seam gas development and large coal mining development.

6.3 Proposed action IS a controlled action

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

7 Environmental record of the responsible party

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** Whitehaven has a strong record in mine safety, environmental care and business operation. Whitehaven conducts its mining operations in accordance with a range of regulatory consents, leases and licences. After years of mining in the Northern Inland Region Whitehaven has established and is committed to continue open and constructive dialogue with the local community and stakeholders.	✓	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		✓
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?**	✓	
	If yes, provide details of environmental policy and planning framework Whitehaven has a documented Health, Safety and Environmental policy which states: *Whitehaven intends to conduct business in a way that maintains a safe and healthy workplace for its employees, contractors, visitors and the surrounding community and will protect the environment in all stages of exploration, mining, processing and train loading.* *Whitehaven aims to:* • *Achieve zero injuries and occupational illnesses.* • *Achieve zero equipment damage.* • *Achieve zero environmental incidents.* *Whitehaven will strive to achieve these goals by:* • *Ensuring health, safety and environment is considered in all planning and work activities.* • *Involve employees through regular communication, consultation and training.* • *Identifying and controlling all potential hazards in the workplace through hazard identification and risk analysis.* • *Ensuring all incidents are reported, controlled and learning's applied and shared.* • *Providing effective injury management and rehabilitation for all employees.* • *Seeking continuous improvement in performance by taking into account employee & community concerns and advances in health, safety and environment.* • *Complying with legislative and other requirements and providing necessary training and resources.*		

	Whitehaven will ensure the availability of human, financial and physical resources to maintain and implement the Health and Safety Management System. *Responsibilities of people employed at Whitehaven Coal:* *All persons employed by Whitehaven have a personal responsibility to comply with this policy and associated Health, Safety & Environment systems. No work is to be undertaken without a clear understanding of a safe method that minimizes the risk of injury, equipment damage and environmental harm.* *Whitehaven employees shall:* • *Work in a healthy, safe and environmentally responsible manner.* • *Encourage others to work in a healthy, safe and environmentally responsible manner.* • *Promptly report incidents, unsafe practices or conditions and environmental concerns as they become apparent.* • *Co-operate with Management in the support of promotion of health and safety responsible environmental management in the work place.* *This policy applies to all mines operated by Whitehaven Coal Limited and its subsidiaries.*		
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)** Vickery Coal Project (2012/6263) Rocglen Coal Mine Extension Project (2010/5502) Werris Creek Life of Mine Extension Project (2010/5571)	✓	

8 Information sources and attachments

(For the information provided above)

8.1 References

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8.2 Reliability and date of information

Information in Section 3 was sourced from previous and current surveys/assessments undertaken for the Action. Information in this referral was compiled using assessments current as at January 2016 and included:

- Whitehaven Coal project team (*project information*).
- Countrywide Ecological Service (2004; 2006; 2007a; 2007b; 2009a; 2009b), Cenwest Environmental Services (2011), Geoff Cunningham Natural Resource Consultants (2004; 2006; 2007a; 2007b; 2008; 2009; 2010), Niche Environment and Heritage (2013) and RPS Harper Somers O'Sullivan (2010).

Minimal uncertainty regarding the information used in Section 3 is expected given:

- the comprehensive nature of the studies;
- the extensive consultation process conducted with key stakeholders; and
- the mitigation measures incorporated into the Action, including the implementation of an adaptive management approach.

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Attachment A - Geographic Information System (GIS) data supply guidelines Attachment B – Preliminary Schedule of Lands
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 1 – Regional Location Figure 2 – Indicative General Arrangement – Vickery Extension Project Mining Area Figure 3 – Indicative General Arrangement Figure 4 – Land Tenure Figure 5 – Project General Arrangement – Project Mining Area Figure 6 – Regional Vegetation Mapping Figure 7 – EPBC Act Threatened Species Records
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)		
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

Project title:

9.1 Person proposing to take action

1. Name and Title:	Mr Brian Cole Executive General Manager, Project Delivery
2. Organisation:	Whitehaven Coal Limited
3. EPBC Referral Number:	
4: ACN / ABN:	68 124 425 396
5. Postal address	PO Box 600 GUNNEDAH NSW 2380
6. Telephone:	02 6741 7821
7. Email: 8. Name of designated proponent (if not the same person at item 1 above): 9. ACN/ABN of designated proponent (if not the same person named at item 1 above):	bcole@whitehavencoal.com.au
I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:	□ an individual; OR □ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR □ not applicable.
If you are small business entity you must provide the Date/Income Year that you became a small business entity:	
I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:	□ not applicable.

Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence. I agree to be the proponent for this action. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.
Signature	Date 10.2.16

9.2 Person preparing the referral information (if different from 8.1)

Name	
Title	
Organisation	Organisation name should match entity identified in ABN/ACN search
ACN / ABN (if applicable)	
Postal address	
Telephone	
Email	
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	Date

REFERRAL CHECKLIST

HAVE YOU:

- ☑ Completed all required sections of the referral form?
- ☑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ☑ Provided a map showing the location and approximate boundaries of the project area?
- ☑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ☑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ☑ Provided complete contact details and signed the form?
- ☑ Provided copies of any documents referenced in the referral form?
- ☑ Ensured that all attachments are less than three megabytes (3mb)?
- ☑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/ colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)

ATTACHMENT B

PRELIMINARY SCHEDULE OF LANDS

Table B-1
Project Mining Area Schedule of Lands

Lot	Deposited Plan Number	Tenure Type
1	DP219923	Freehold
2	DP219923	Freehold
33	DP553903	Freehold
1	DP570414	Freehold
2	DP570414	Freehold
21	DP754929	Freehold
22	DP754929	Freehold
23	DP754929	Freehold
25	DP754929	Freehold
36	DP754929	Freehold
37	DP754929	Freehold
39	DP754929	Freehold
1	DP1015797	Freehold
2	DP1015797	Freehold
1	DP1018347	Freehold
2	DP1018347	Local Government Authority
3	DP1018347	Local Government Authority
5	DP1018347	Freehold
7	DP1018347	Freehold
1	DP1038308	Freehold
2	DP1038308	Freehold
3	DP1038308	Freehold
1	DP1102940	Freehold
2	DP1102940	Freehold
4	DP1145592	Freehold
5	DP1145592	Freehold
5	DP1182289	Crown
4	DP1182289	Crown
11	DP 1182290	Crown

Other	
Gunnedah Shire Council, Narrabri Shire Council or Crown	Other roads located between or adjacent to the above parcels of land
Crown	Creeks or streams located between or adjacent to the above parcels of land

Table B-2
Rail Investigation Corridor Schedule of Lands

Lot	Deposited Plan Number	Tenure Type
5	DP115191	Freehold
6	DP115191	Freehold
15	DP113293	Freehold
16	DP113293	Freehold
17	DP113293	Freehold
1	DP185940	Freehold
A	DP367991	Freehold
1	DP605772	Freehold
1	DP622375	Freehold
12	DP625789	Freehold
120	DP754926	Freehold
121	DP754926	Freehold
9	DP754929	Freehold
20	DP754929	Freehold
21	DP754929	Freehold
22	DP754929	Freehold
25	DP754929	Freehold
31	DP754929	Freehold
34	DP754929	Freehold
36	DP754929	Freehold
39	DP754929	Freehold
41	DP754929	Crown
7	DP754940	Freehold
8	DP754940	Freehold
18	DP754940	Freehold
19	DP754940	Freehold
21	DP754940	Freehold
23	DP754940	Freehold
59	DP754948	Freehold
60	DP754948	Freehold
27	DP755495	Freehold
38	DP755495	Freehold
39	DP755495	Freehold
56	DP755495	Freehold
57	DP755495	Freehold
64	DP755495	Freehold
66	DP755495	Freehold
67	DP755495	Freehold
79	DP755495	Freehold
81	DP755495	Freehold
93	DP755495	Freehold
94	DP755495	Freehold
97	DP755495	Freehold
103	DP755495	Freehold

Table B-2 (cont.)
Rail Investigation Corridor Schedule of Lands

Lot	Deposited Plan Number	Tenure Type
105	DP755495	Freehold
120	DP755495	Freehold
211	DP755495	Freehold
216	DP755495	Freehold
217	DP755495	Freehold
218	DP755495	Freehold
219	DP755495	Freehold
301	DP755495	Freehold
302	DP755495	Freehold
303	DP755495	Freehold
304	DP755495	Freehold
249	DP755502	Freehold
1	DP929979	Freehold
1	DP970060	Freehold
1	DP1018347	Freehold
2	DP1018347	Local Government Authority
7004	DP1029299	Crown
1	DP1038308	Freehold
7003	DP1059335	Crown
9	DP1096302	Freehold
1	DP1115618	Freehold
2	DP1131282	Freehold
3	DP1131282	Freehold
4	DP1131282	Freehold
5	DP1131282	Freehold
1	DP1145592	Freehold
5	DP1145592	Freehold
2	DP1160899	Freehold
1	DP1165835	Freehold
1	DP1172361	Freehold
4	DP1182289	Crown
282	DP1196626	Freehold
12	DP1200767	Freehold
13	DP1200767	Freehold
8	DP1202450	Freehold

Other	
State Rail Authority (Crown)	Railway lands located between or adjacent to the above parcels of land
Gunnedah Shire Council, Narrabri Shire Council or Crown	Other roads located between or adjacent to the above parcels of land
Crown	Creeks or streams located between or adjacent to the above parcels of land

FIGURES

Refer to files provided seperately