Referral of proposed action

Project title: Lake Vermont Northern Extension Project

1 Summary of proposed action

1.1 **Short description**

The proposed Lake Vermont Northern Extension Project (the Project) is located in central Queensland, approximately 18 km north-east of Dysart and 240 km west of Mackay (see Figure 1 – Regional Location Map). The Project site is situated immediately north of the existing Lake Vermont Coal Mine, forming an extension to the current operations. The Project will involve open-cut coal mining in areas north of the current Mine and the diversion of a small section of Phillips Creek in order to access the resource. The Lake Vermont Northern Extension is planned to be developed to supplement production from the existing Lake Vermont Mine, providing for an extended production life. The proposed area has been extensively cleared for pasture and is currently used for grazing cattle.

1.2 **Latitude and longitude**

Point	Longitude	Latitude
1	148.4511	-22.3487
2	148.4511	-22.3651
3	148.4344	-22.3651
4	148.4344	-22.3818
5	148.4678	-22.3818
6	148.4678	-22.3984
7	148.4844	-22.3984
8	148.4844	-22.4024
9	148.4446	-22.4315
10	148.4274	-22.4052
11	148.3844	-22.4318
12	148.3678	-22.4317
13	148.3678	-22.4249
14	148.386	-22.4188
15	148.395	-22.3931
16	148.4323	-22.3803
17	148.4301	-22.3591

Coordinates are provided in GDA94.

1.3 **Locality and property description**

The Project is located approximately 18 km north-east of Dysart and 240 km west of Mackay in central Queensland. The proposed area is situated within Mining Lease (ML) 70528 (Figure 2 – Land Tenure) covered by Mineral Development Licences (MDLs) 303 and 429, forming an extension of the existing Lake Vermont Mine, which is located immediately to the south of the Project area. The proposed site has been previously cleared for grazing with only small areas of remnant vegetation remaining. Currently the land is used for cattle grazing, and several dams, cattle yards and windmills are located on the site.

1.4 **Size of the development footprint or work area (hectares)**

The proposed Northern Extension disturbance footprint is approximately 2,500 ha.

1.5	**Street address of the site**	Golden Mile Road Dysart 4745 (no street number)

1.6 **Lot description**

Lot 2, Plan SP260662 (freehold)
Lot H, Plan SP260662 (easement)

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

The Project is located within the Isaac Regional Council area.

1.8 **Time frame**

The Northern Extension Project will extend the life of the Lake Vermont Mine by approximately 32 years (including construction). Mining activities proposed as part of the Northern Extension Project are planned to commence in Project Year 4.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?		No
		X	Yes, you must also complete section 2.2
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?	X	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** Is the action subject to a state or territory environmental impact assessment?		No
		X	Yes, you must also complete Section 2.5
1.12	**Component of larger action** Is the proposed action a component of a larger action?		No
		X	Yes, you must also complete Section 2.7
1.13	**Related actions/proposals** Is the proposed action related to other actions or proposals in the region (if known)?	X	No
			Yes, provide details:
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	X	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	X	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 Project is an extension of the existing Lake Vermont Coal Mine, operated by Bowen Basin Coal Pty Ltd (BBC). The Mine holds three MLs – ML 70331, ML 70477 (Western Extension) and ML 70528 (Northern Extension) – and is authorised by Environmental Authority (EA) EPML00659513, dated 28th September 2015. The Project site is located immediately north of the existing mine within ML 70528, encompassing an area of approximately 3,700 ha, of which 2,500 ha is proposed to be disturbed.

Key infrastructure proposed for the Project site includes:

- Additional roads, tracks, creek crossings;
- Topsoil stockpiling areas;
- Overburden emplacements;
- Phillips Creek diversion; and
- Additional water management infrastructure.

The existing Lake Vermont Mine produces hard coking coal (HCC) and pulverised coal injection (PCI) for steel production. Truck and excavator methods will continue to be utilised to mine target coal resources predominantly in the Leichhardt and Lake Vermont Seams of the Rangal Coal Measures. As an extension of the existing open-cut coal mine into new mining areas to the north, the Project will supplement current production by developing a resource of approximately 64 Million tonnes (Mt) of HCC and PCI coal within the Rangal Coal Measures. Project production life is anticipated to be greater than 25 years based on current economic assessment of the resource.

Coal mined from the Project will be transported in trucks for processing though the existing Lake Vermont Mine infrastructure. Overburden will be drilled and blasted to the extent necessary to allow its efficient handling by truck and excavator, with the options of using draglines and electric shovels at a future time. Overburden will be relocated from above the coal seams to in-pit dumps and in out-of-pit spoil dumps located on site and contiguous with pit excavations. Interburden spoil and partings will be removed from the coal seam in a similar manner to overburden and placed within the pit. Spoil dumps will be constructed to achieve the same final landform criteria as the Lake Vermont Mine.

No changes to processing activities or approved rates of production have been proposed. Activities associated with the existing coal handling and preparation include:

- ROM coal crushing, conveying, blending and feeding to the preparation plant;
- Coal handling and preparation plant (CHPP) product transfer and stockpiling including stockpile bases;
- Product coal stockpile reclamation and train loading;
- Disposal (storage) of coarse and fine rejects;
- Return of water recovered from rejects emplacements to an environmental dam for recycling;
- Power, pumping and instrumentation requirements; and
- Reticulation of services and lighting within plant and relevant adjacent areas.

Handling of CHPP rejects will continue in accordance with current management practices using existing approved co-disposal cells on the Lake Vermont Mine.

Access to the coal resource will require diversion of a section of Phillips Creek approximately 2.45 km in length. The permanent diversion will be a regulated structure in natural ground, designed and managed in accordance with the Queensland Department of Natural Resources and Mines *Guideline – Works that interfere with water in a watercourse: watercourse diversions*. The diversion has been designed to achieve dynamic equilibrium with the adjacent channel. Rehabilitation of the diversion area will be conducted to achieve similar conditions to the existing stream.

2.2 Alternatives to taking the proposed action

Without the Northern Extension Project the existing Lake Vermont mine would continue to the end of its economic mine life (estimated to be 15 years), at which point the Mine would reach closure. The consequences of not proceeding with the Project are associated with a significant coal resource remaining undeveloped and economic proceeds through taxation and royalties not being realised for the State of Queensland. There is a

significant opportunity cost to both State and Federal revenues without the development of the Lake Vermont Northern Extension.

The availability of existing process facilities and product transport infrastructure at the Lake Vermont Mine is limited to the economic life of the operating Lake Vermont Mine. Should the Northern Extension development be deferred to a later date, the use of existing coal processing and transport infrastructure is not guaranteed. The feasibility of a deferred Project, without transport and processing facilities is highly uncertain.

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

Not Applicable.

2.4 Context, planning framework and state/local government requirements

Commonwealth

A pre-referral meeting was held on 26th June 2014 with the Department of the Environment (DoE) in Canberra. Assessment of potential impacts on Matters of National Environmental Significance (MNES) determined that a significant impact on 'water resources' was likely to be triggered. A subsequent phone meeting was also held on 2nd December 2015 to update DoE on changes prior to lodgement of this referral.

At the time of this referral, the Bilateral Agreement (environmental approvals) did not apply to the Queensland approval process for the Project (Major amendment with no EIS requirement). If the Project is declared a controlled action, it will be subject to a separate assessment and approval process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Under the EPBC Act, a number of assessment processes may be implemented by the Commonwealth Government. Although yet to be determined, BBC considers that the most likely assessment pathways are either assessment based on referral information, or assessment based on preliminary documentation.

A detailed MNES Assessment Report (provided in Attachment B) has been included for submission with this EPBC Referral with the intention of enabling the DoE to make an assessment based on referral information alone.

State (Queensland)

An EA Amendment Application (Major Amendment) was submitted to the Queensland Department of Environment and Heritage Protection (EHP) in October 2014, in accordance with the requirements of the Queensland *Environmental Protection Act 1994* (EP Act). EHP issued an Information Request on 8th January 2015, to which a Response to Information Request was submitted on 8th May 2015.

The following specialist studies were completed to support the EA Amendment application:

- Flora and Fauna Assessment (AustralAsian Resource Consultants Pty Ltd (AARC)), reissued in April 2016;
- Aquatic Ecology and Stream Morphology Assessment (AARC), reissued in April 2016;
- Soil and Land Suitability Assessment (AARC);
- Groundwater Assessment (JBT Consulting Pty Ltd (JBT)), reissued in April 2016;
- Geochemical Waste Rock Characterisation (MBS Environmental);
- Phillips Creek Diversion Functional Design Report (WRM Water & Environment Pty Ltd (WRM)), reissued in April 2016;
- Surface Water Impact Assessment (WRM), reissued in April 2016;
- Air Quality Impact Assessment (ASK Consulting Engineers);
- Noise and Vibration Assessment (ASK Consulting Engineers); and
- Environmental Offsets Strategy (AARC), reissued in April 2016.

These specialist studies provide supporting information to the EA Amendment Application for the Northern Extension Project. Studies relating to flora and fauna, aquatic ecology, groundwater, surface water and environmental offsets were also designed to assess potential for significant impacts on MNES (in accordance with relevant guidelines). These reports were reissued in April 2016 for submission with this EPBC Referral. Updates to the original reports include figures, references to Project staging, and references to MLs to reflect the approval of the Northern Extension ML.

Following a public notice period, EHP approved the EA amendment application on 28th September 2015. Specific conditions were added for management and mitigation of impacts on both State and Commonwealth environmental values. Activities with potential to impact on MNES will not be undertaken until the required Commonwealth approvals are in place.

An application for an additional ML was submitted for the Northern Extension area under the *Mineral Resources Act 1989* on 8th October 2014 and was subsequently approved on 21st March 2016.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

The environmental impact assessment of the Project was undertaken in accordance with the Queensland EP Act. An EA Amendment Application (Major Amendment) was submitted in October 2014. A Response to an Information Request was submitted to EHP in May 2015.

Consultation with the affected landowner and Isaac Regional Council was undertaken at different stages throughout the approval process. The application was publicly notified in conjunction with the resource tenure application, in accordance with section 252A of the Mineral Resources Act. No submissions were received. EHP approved the EA Amendment Application on 28th September 2015 (date of granted EA).

A number of additional environmental studies have previously been completed for the existing Lake Vermont Mine, as part of the 2004 Environmental Impact Statement (EIS). The 2004 EIS process also included consultation and public notice.

2.6 Public consultation (including with Indigenous stakeholders)

Consultation was undertaken with Project stakeholders including the underlying landholder, the Isaac Regional Council and Queensland Government departments. Affected persons were notified of the application during the Certificate of Public Notice process. No submissions or objections were received.

BBC has undertaken consultation with the registered Traditional Owners. A Cultural Heritage Management Plan (CHMP) has been negotiated over all mining and exploration tenements which form part of the Lake Vermont Project. Consultation will be ongoing as per the requirements of the CHMP.

2.7 A staged development or component of a larger project

The Project is an extension of the existing Lake Vermont Mine, which commenced mining operations in September 2008 and is currently operating under EA EPML00659513.

Environmental studies previously undertaken for the Lake Vermont Mine's EIS (2004) assessed the impacts of this well-established mine. The Lake Vermont Mine did not previously require referral to the Commonwealth, as environmental studies determined that no significant impacts to MNES existed at the time of application.

This EPBC Referral describes additional impacts of the Lake Vermont Northern Extension only (the application area). The existing Lake Vermont Mine was previously approved and has been operating since 2008. It is not considered that 'splitting' the larger action will impact the objectives of the EPBC Act.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

The closest World Heritage Property to the Project site is the Great Barrier Reef (GBR) Marine Park, located approximately 110 km directly to the east.

Nature and extent of likely impact

Any runoff from the proposed development area will enter the Isaac River catchment, and then flow south-east into the Fitzroy River. The Fitzroy River ultimately flows into the Coral Sea at Rockhampton, approximately 260 km south-east of the Project site.

The *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a) define significant impact criteria for the assessment of impacts to World Heritage Properties. Although the Fitzroy River Basin is the largest catchment draining into the GBR, the catchment does not contribute significant freshwater flows in comparison to other river systems located further north. The contribution of the Lake Vermont Northern Extension to sediment loads, nutrient loads and heavy metal concentrations entering the GBR at Rockhampton are likely to be negligible.

Investigations into the cumulative impacts of coal mining within the Fitzroy Basin on water quality were conducted by the Queensland Government in 2008. Outcomes of the investigation included a set of water conditions for the management of water discharges in order to achieve the Water Quality Objectives (WQOs) of the Queensland *Environmental Protection (Water) Policy 2009* (EPP (Water)).

Where controlled releases are conducted, they will be required to meet these WQOs. No uncontrolled releases are likely to occur. Further discussion of water management and potential surface water impacts are discussed in the MNES Assessment Report (Attachment B).

No impacts on any of the world heritage values of the GBR are likely to occur as a result of the Lake Vermont Northern Extension.

3.1 (b) National Heritage Places

Description

The nearest National Heritage listed places to the Project are the GBR and the Middle Percy Island and Pine Inlet (approximately 210 km from the Project site).

Nature and extent of likely impact

Any runoff from the proposed development area will enter the Isaac River catchment, and then flow south-east into the Fitzroy River. The Fitzroy River ultimately flows into the Coral Sea at Rockhampton, approximately 260 km south-east of the Project site.

The *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a) define significant impact criteria for the assessment of impacts to National Heritage places. Although the Fitzroy River Basin is the largest catchment draining into the GBR, the catchment does not contribute significant freshwater flows in comparison to other river systems located further north. The contribution of the Lake Vermont Northern Extension to sediment loads, nutrient loads and heavy metal concentrations entering the GBR at Rockhampton are likely to be negligible.

Investigations into the cumulative impacts of coal mining within the Fitzroy Basin on water quality were conducted by the Queensland Government in 2008. Outcomes of the investigation included a set of water conditions for the management of water discharges in order to achieve the WQOs of the EPP (Water).

Where controlled releases are conducted, they will be required to meet these WQOs. No uncontrolled releases are likely to occur. Further discussion of water management and potential surface water impacts are discussed in the MNES Assessment Report (Attachment B).

No impacts on any of the national heritage values of the GBR are likely to occur as a result of the Lake Vermont Northern Extension.

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

Description

There are no Wetlands of International Importance identified within 100 km of the Project site.

Nature and extent of likely impact

No impact on any Wetlands of International Importance is likely to occur as a result of the Lake Vermont Northern Extension.

3.1 (d) Listed threatened species and ecological communities

Description

Threatened Ecological Communities

The Protected Matters Search (provided in Attachment B – Appendix I) identified five threatened ecological communities that could potentially occur on or within 100 km of the Project site. These communities are listed in Table 1.

Table 1 Threatened Ecological Communities within 100 km

Community Name	Status
Brigalow (*Acacia harpophylla* dominant and co-dominant)	E
Broad Leaf Tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland	E
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	E
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	E
Weeping Myall Woodlands	E

Note: E – Endangered

A specialist Flora and Fauna Study formed the basis of assessment of Project impacts on threatened ecological communities. The MNES Assessment Report (Attachment B) and Flora and Fauna Study (Attachment B – Appendix F) provide detailed descriptions of the environmental values of the Northern Extension site and assessments of the likelihood, nature and extent of impacts.

The Flora and Fauna Study determined that no vegetation communities of conservation significance under the EPBC Act were identified on the Project site or will be impacted by Project development. Although Brigalow was identified as the dominant tree species of portions of a community of regrowth on the Project site, it is not considered to meet the requirements of an Endangered Ecological Community under the EPBC Act, as outlined in the *Brigalow (Acacia harpophylla dominant and co-dominant) information sheet* (Environment Australia 2001). The Brigalow-dominant regrowth is less than 15 years old, of a poor quality, and does not require a clearing permit under Queensland law.

On this basis it is concluded that the Northern Extension Project will not impact on any listed threatened ecological communities.

Threatened Species

The Protected Matters Search (provided in Attachment B – Appendix I) identified 30 threatened species that could potentially occur on or within 100 km of the Project site. Queensland Government database searches identified an additional EPBC Act listed threatened species potentially occurring within 100 km of the Project site. These species are listed in Table 2.

Table 2 Threatened Species within 100 km

Threatened Species	EPBC Act Status
Birds	
Star Finch (eastern) (*Neochmia ruficauda ruficauda*)	Endangered
Red Goshawk (*Erythrotriorchis radiatus*)	Vulnerable
Australian Painted Snipe (*Rostratula australis*)	Endangered
Black-throated Finch (southern) (*Poephila cincta cincta*)	Endangered
Squatter Pigeon (southern) (*Geophaps scripta scripta*)	Vulnerable
Painted Honeyeater (*Grantiella picta*)	Vulnerable
Masked Owl (northern) (*Tyto novaehollandiae kimberli*)	Vulnerable
Mammals	
South-eastern Long-eared Bat (*Nyctophilus corbeni / timoriensis*)	Vulnerable
Koala (*Phascolarctos cinereus*)	Vulnerable
Northern Quoll (*Dasyurus hallucatus*)	Endangered
Northern Hairy-nosed Wombat (*Lasiorhinus krefftii*)	Endangered
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Vulnerable
Reptiles	
Ornamental Snake (*Denisonia maculata*)	Vulnerable
Yakka Skink (*Egernia rugosa*)	Vulnerable
Dunmall's Snake (*Furina dunmalli*)	Vulnerable

Threatened Species	EPBC Act Status
Collared Delma (*Delma torquata*)	Vulnerable
Fitzroy River Turtle (*Rheodytes leukops*)	Vulnerable
Southern Snapping Turtle (*Elseya albagula*)	Critically Endangered
Allan's Lerista / Retro Slider (*Lerista allanae*)	Endangered
Plants	
Aristida annua	Vulnerable
Cadellia pentastylis (Ooline)	Vulnerable
Cycas megacarpa	Endangered
Cycas ophiolitica	Endangered
Daviesia discolor	Vulnerable
Dichanthium queenslandicum (King Bluegrass)	Endangered
Dichanthium setosum (Bluegrass)	Vulnerable
Eucalyptus raveretiana (Black Ironbox)	Vulnerable
Omphalea celata	Vulnerable
Phaius australis (Lesser Swamp-orchid)	Endangered
Phalaenopsis rosenstromii (Native Moth Orchid)	Endangered
Samadera bidwillii (Quassia)	Vulnerable

The field survey methodology for the Project was based on the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Department of Science, Information Technology, Innovation and the Arts (DSITIA) 2012). Targeted fauna techniques for reptiles, birds and Koalas are based on the methods prescribed in the *Survey Guidelines for Australia's Threatened Reptiles* (DSEWPAC 2011d), *Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010a) and *EPBC Act referral guidelines for the vulnerable Koala* (DoE 2014a), respectively. The *Survey Guidelines for Australia's Threatened Mammals* (DSEWPAC 2011e) were not consulted as no mammal species identified in database searches at the time of the field survey (other than the Koala and bats) were considered likely to occur on the Project site. Acoustic detection methods were employed to target bat species likely to occur on the Project site.

A specialist Flora and Fauna Study formed the basis of assessment of Project impacts on threatened species. The MNES Assessment Report (Attachment B) and Flora and Fauna Study (Attachment B – Appendix F) provide detailed descriptions of the environmental values of the Northern Extension site and assessments of the likelihood, nature and extent of impacts.

The Flora and Fauna Study determined that no flora species of conservation significance under the EPBC Act were identified on the Project site or are likely to be impacted by Project development. One fauna species listed as vulnerable under the EPBC Act – the Squatter Pigeon (southern subspecies) – was identified in small numbers during the field survey of the Northern Extension area.

Nature and extent of likely impact

The southern Squatter Pigeon typically occurs on the inland slopes of the Great Dividing Range, from the Burdekin-Lynd divide in central Queensland, west to Charleville and Longreach, east to the coastline between Proserpine and Gladstone, and south to scattered sites throughout south-eastern Queensland (DoE 2013b). In areas north of the Tropic of Capricorn, however, the southern Squatter Pigeon is considered to be locally common and the population is currently considered stable (DoE 2013b).

Southern Squatter Pigeons inhabit a range of habitats, including grassy woodlands, open forests and disturbed areas (including heavily grazed areas, roads and railways). The southern Squatter Pigeon is commonly observed close to waterbodies (DoE 2013b). Southern Squatter Pigeons feed on seeds and insects, for which they forage on the ground. Suitable habitat for the southern Squatter Pigeon exists throughout the Project site, close to water. Given that only a small number of individuals were observed during the survey, it is unlikely that the Project site is of particular importance to this species. Suitable habitat is extensive throughout the local area including immediately adjacent to the Project site.

The majority of the Project site has been subject to vegetation clearing to allow cattle grazing and is dominated by non-remnant grassland (predominantly Buffel grass). Consequently, only small areas of remnant and regrowth vegetation exist on the site, generally confined to the banks of Phillips Creek, the two large dams, and the area around Lake Vermont.

No Essential Habitat for the threatened fauna species was mapped within the Project site. Significant suitable habitat for the southern Squatter Pigeon exists in pasture areas and woodlands (near water) in the broader region and on directly adjacent land. Furthermore, as only a small number of individuals (three) were recorded during the survey, it is unlikely that the Project site is of specific importance to the species. In addition, the southern Squatter Pigeon's classification as a High Mobility Taxon and its ability to utilise disturbed habitats preclude any significant impacts to the species as a result of the Northern Extension Project.

Important populations of the southern Squatter Pigeon include the sparsely distributed sub-populations in southern Queensland (typically south of the Carnarvon Ranges) and northern New South Wales. The closest important populations to the Project are those occurring on the Darling Downs and within the Condamine River catchment (DoE 2015a).

When assessed against the *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a), the Northern Extension Project is not considered to result in any significant impact to the southern Squatter Pigeon, nor is it likely to significantly impact the area of available habitat. No impact on population continuity or gene flow, and no interference with any ecologically significant locations for the species, is expected. The Northern Extension Project is unlikely to introduce pest or diseases affecting the Squatter Pigeon. As such, no significant residual impact is considered likely for the Squatter Pigeon.

On this basis, the Northern Extension Project will not result in a significant impact on any listed threatened species.

3.1 (e) Listed migratory species

Description

The Protected Matters Search (Attachment B – Appendix I) identified a total of 15 listed migratory species that may inhabit the Project region. A full list of these species is presented in Table 3.

Table 3 Migratory Species within the Project Region

Scientific Name	Common Name
Apus pacificus	Fork-tailed Swift
Crocodylus porosus	Salt-water Crocodile
Cuculus optatus	Oriental Cuckoo
Hirundapus caudacutus	White-throated Needletail
Merops ornatus	Rainbow Bee-eater
Monarcha melanopsis	Black-faced Monarch
Monarcha trivirgatus	Spectacled Monarch
Motacilla flava	Yellow Wagtail
Myiagra cyanoleuca	Satin Flycatcher
Rhipidura rufifrons	Rufous Fantail
Ardea alba	Great Egret
Ardea ibis	Cattle Egret
Gallinago hardwickii	Latham's Snipe
Pandion cristatus / Pandion haliaetus	Eastern Osprey
Tringa nebularia	Common Greenshank

No formal survey guidelines have been developed for migratory species.

A specialist Flora and Fauna Study formed the basis of assessment of Project impacts on Migratory Species. The MNES Assessment Report (Attachment B) and Flora and Fauna Study (Attachment B – Appendix F) provide detailed descriptions of the environmental values of the Northern Extension site and assessments of the likelihood, nature and extent of impacts.

Nature and extent of likely impact

Four migratory bird species are known to utilise habitat values of the Project site:

- White-bellied Sea Eagle (*Haliaeetus leucogaster*);
- Eastern Great Egret (*Ardea modesta*);
- Rainbow Bee-eater (*Merops ornatus*); and
- Cattle Egret (*Ardea ibis*).

The Project site itself is not considered to be important habitat. The site is heavily impacted by grazing practices and provides no unique roosting or foraging habitat for these four migratory species.

All identified species known to be generally common, widespread and highly mobile, and will be able to relocate to suitable habitat in neighbouring wetlands and farm dams, particularly along the Isaac River. The Project site is not considered to represent important or significant habitat for these species. The Northern Extension Project is considered unlikely to significantly impact on any of the four migratory bird species recorded on the Project site. Populations of migratory species identified on the site are not considered to be important to the longevity of the species.

The assessment of potential impacts to migratory species, in accordance with the criteria presented in the *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a), concluded that the presence of suitable habitat in the broader region, combined with the small, fragmented and disturbed quality of suitable habitat on the Project site, preclude any likely significant impacts to these species occurring as a result of the proposed Northern Extension.

No significant impact on listed Migratory Species is anticipated to result from development of the Northern Extension Project.

3.1 (f) Commonwealth marine area

Description

The closest Commonwealth marine area to the Project site is the GBR Marine Park, located approximately 110 km directly to the east. Watercourses associated with the Project drain into the Coral Sea approximately 260 km south-east of the site.

Nature and extent of likely impact

Any runoff from the proposed development area will enter the Isaac River catchment, and then flow south-east into the Fitzroy River. The Fitzroy River ultimately flows into the Coral Sea at Rockhampton, approximately 260 km south-east of the Project site.

The *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a) define significant impact criteria for the assessment of impacts to Commonwealth marine areas. Although the Fitzroy River Basin is the largest catchment draining into the GBR, the catchment does not contribute significant freshwater flows in comparison to other river systems located further north. The contribution of the Lake Vermont Northern Extension to sediment loads, nutrient loads and heavy metal concentrations entering the GBR at Rockhampton are likely to be negligible.

Investigations into the cumulative impacts of coal mining within the Fitzroy Basin on water quality were conducted by the Queensland Government in 2008. Outcomes of the investigation included a set of water conditions for the management of water discharges in order to achieve the WQOs of the EPP (Water).

Where controlled releases are conducted, they will be required to meet these WQOs. No uncontrolled releases are likely to occur. Further discussion of water management and potential surface water impacts are discussed in the MNES Assessment Report (Attachment B).

No impact on any Commonwealth Marine Area is likely to occur as a result of the Lake Vermont Northern Extension.

3.1 (g) Commonwealth land

Description

The Protected Matters Search (Attachment B – Appendix I) revealed that no Commonwealth land exists within a 100 km buffer of the Project.

Nature and extent of likely impact

No impact is likely.

3.1 (h) The Great Barrier Reef Marine Park

Description

The GBR Marine Park is located approximately 110 km directly to the east of the Project site. Watercourses associated with the Project drain into the Coral Sea approximately 260 km south-east of the site.

Nature and extent of likely impact

Any runoff from the proposed development area will enter the Isaac River catchment, and then flow south-east into the Fitzroy River. The Fitzroy River ultimately flows into the Coral Sea at Rockhampton, approximately 260 km south-east of the Project site.

The *Significant impact guidelines 1.1: Matters of National Environmental Significance* (DoE 2013a) define significant impact criteria for the assessment of impacts to the GBRMP. Although the Fitzroy River Basin is the largest catchment draining into the GBR, the catchment does not contribute significant freshwater flows in comparison to other river systems located further north. The contribution of the Lake Vermont Northern Extension to sediment loads, nutrient loads and heavy metal concentrations entering the GBR at Rockhampton are likely to be negligible.

Investigations into the cumulative impacts of coal mining within the Fitzroy Basin on water quality were conducted by the Queensland Government in 2008. Outcomes of the investigation included a set of water conditions for the management of water discharges in order to achieve the WQOs of the EPP (Water).

Where controlled releases are conducted, they will be required to meet these WQOs. No uncontrolled releases are likely to occur. Further discussion of water management and potential surface water impacts are discussed in the MNES Assessment Report (Attachment B).

No impacts on the GBRMP are likely to occur as a result of the Northern Extension Project.

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

Description

As a 'large coal mine', defined in section 528 of the EPBC Act, the proposed Project is considered likely to trigger the matter of 'water resources'.

Nature and extent of likely impact

The MNES Assessment Report (Attachment B) provides a complete assessment of existing water resource values of the site, in addition to detailed assessment of the likelihood, nature and extent of impacts. Assessment of the Project's potential to impact water resources has been undertaken in accordance with the following guidelines:

- *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c); and
- *Information Guidelines for the Independent Expert Scientific Committee (IESC) advice on coal seam gas and large coal mining development proposals* (IESC 2014).

Specialist studies that form the basis of assessment of Project impacts on water resources include:

- Phillips Creek Diversion Functional Design Report (WRM 2016a) – Attachment B (Appendix B);
- Surface Water Impact Assessment (WRM 2016b) – Attachment B (Appendix C);
- Groundwater Impact Assessment (JBT 2016a) – Attachment B (Appendix D);
- Groundwater Summary Report (JBT 2016b) – Attachment B (Appendix E);
- Aquatic Ecology and Stream Morphology Assessment (AARC 2016a) – Attachment B (Appendix G).

As the Project comprises an extension to a large coal mine, it is anticipated that a significant impact on water resources will be triggered. Potential impacts on water have been comprehensively assessed in Attachment B and the relevant specialist studies listed above.

Surface Water

In accordance with the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c), the following impacts in relation to the Northern Extension Project are anticipated:

- Adverse impacts to the quality of surface water runoff entering receiving waters surrounding the Project are unlikely to occur. The SWMS for the Project has been designed to ensure all surface runoff from disturbed areas is captured by the mine affected water system;
- Adverse impacts to the environmental values of the Isaac River associated with uncontrolled releases are unlikely to occur. Modelling conducted for the SWMS indicates that no uncontrolled releases will occur from the mine affected water management system to receiving waters. Where controlled releases are conducted, release water will be required to be comply with EA conditions and regional WQOs;
- Loss of catchment area draining to local drainage paths and wetlands due to capture of runoff within onsite storages and the open-cut pits; and
- Potential minor impacts of the Project on flood levels and flood velocities of Phillips Creek.

<u>Loss of Catchment Area</u>

Surface water impacts and the potential for downstream contamination are managed through the Project's Site Water Management Strategy (SWMS). Development of the Project will result in modification of surface water drainages. The rehabilitated landform of the Project site will result in a modified topography, creating long-term impacts to local catchment areas, including a reduction of 5.9 km^2 to the catchment draining to Phillips Creek and a reduction of 1.3 km^2 in the area draining to Lake Vermont.

Development of the Northern Extension Project, in association with the existing Lake Vermont Mine, will result in changes to topography, diverting runoff that would have otherwise entered the receiving waters of Phillips Creek, Downs Creek, Lake Vermont, and other wetlands and unnamed tributaries on a long-term basis. In accordance with the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c), changes to the hydrological characteristics of these receiving waters as a result of changes to catchment areas are not anticipated to be of a sufficient scale or intensity to significantly impact the utility of these water resources.

At the end of mine life, the local catchment area of Lake Vermont is predicted to reduce by 1.3 km^2 (WRM 2016b). This will result in reduced of inputs to Lake Vermont between flood events. Local catchment runoff is small compared to evaporation, and is insufficient to fill Lake Vermont, which only fills during Phillips Creek floods significantly greater than a 1 in 2 AEP event. Consequently, the reduction of local catchment is likely to have limited impact on the overall volume stored in the Lake. Subsequent impacts on aquatic / ecological values of

Lake Vermont are unlikely or insignificant.

Hydrologic and Hydraulic Impacts

The potential hydrologic and hydraulic impacts of the Project have been assessed against the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c). The permanent diversion of Phillips Creek has the potential to alter the natural hydrological and hydraulic characteristics of surface water resources associated with the Project. While the diversion has been designed to be consistent with the existing and adjoining reaches, modelling indicates it may cause a redistribution of flow from the southern to the northern floodplains.

Factors influencing changes in hydrology and hydraulics include the proposed levee (to protect the mine from inundation), influencing the direction of flow, and the slight widening of the diverted channel, increasing conveyance. Flood levels have been modelled, indicating a decrease on the southern floodplain and an increase on the northern floodplain. No flood waters propagate upstream of the Project.

Surface Water Quality

Land disturbance associated with mining has the potential to adversely affect the quality of surface runoff by increasing sediment loads and transporting contaminants from spoil and coal seams. If these management principles are implemented effectively, environmental risks from disturbed area runoff are expected to be low, when assessed in accordance with the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c). Regional WQOs are expected to be achieved and no significant degradation of local water quality is anticipated to occur.

Offsite Release

The results of the water balance modelling indicate that under the current model assumptions and configuration, there is a low risk of the SWMS accumulating water over the 32 year mine life. The results show that the system recovers well after each wet season. The model results show no uncontrolled release from the mine-affected water management system to receiving waters.

Groundwater

Groundwater Quality

Minimal impact on groundwater quality is anticipated, as the Project will generate a cone of depression generating flow towards the pit. Aquifers surrounding the Project are unlikely to be contaminated.

Groundwater Drawdown

Modelling of potential groundwater drawdown indicates that current and future mining at the existing Lake Vermont Coal Mine are predominantly responsible for groundwater drawdown to the south, south-east and south-west of the Northern Extension mining area; there is only limited potential for the Project to cause additional drawdown.

The Project is considered to have a low impact on groundwater levels in existing registered bores. Bores to the south and west are within the potential impact zone of the existing Lake Vermont and/or Saraji Mines. A total of three existing groundwater bores within the area are predicted to be impacted by the proposed mining activities. The majority of surrounding properties do not have groundwater bores, or have bores that are not equipped or regularly used. Alternative water sources are readily available; water is collected in dams, pumped from the Isaac River or sourced from offtakes from the Saraji pipeline. The marginal quality of groundwater (assessed against the ANZECC (2000) Stock Water Guideline) and the relatively low yield recorded indicate that groundwater is not widely used in the region.

Creeks within the Project area are ephemeral and data indicate that the water table across the region is typically at or below the base of the Tertiary unit. Consequently, it is considered that the Project will have only a low risk of impacting on baseflow contribution to surface waters, and a low risk of impact to groundwater dependent ecosystems (GDEs). Groundwater drawdown is anticipated to have minimal impacts on GDEs due to the limited extent of mining impacts arising from the Northern Extension, and the depth (from the surface) of regional groundwater.

The Lake Vermont wetland is an ephemeral topographic depression recharged only after sufficient creek flow and is therefore dry for much of the year. Connectivity with groundwater is not considered to be a source of inflow to the waterbody and groundwater drawdown is therefore predicted to have little impact.

Groundwater level at the Phillips Creek wetland is likely to occur at a depth of more than 11 mbgl. The wetland is therefore likely to be maintained by surface water runoff, rather than groundwater baseflow (JBT 2016).

Nearby operations that have the potential to contribute to cumulative groundwater drawdown impacts with the Northern Extension Project include the current Lake Vermont Mine and the Saraji Coal Mine, located approximately 6 km to the west.

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?**	X	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?**	X	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?**	X	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?**	X	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?**	X	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

Flora

A total of 232 flora species and eight vegetation communities were identified on the Project site during the Flora and Fauna Field Survey. No flora species of conservation significance were identified. Three declared Class 2 weeds under the LP Act were recorded in small numbers during the survey: Harrisia Cactus (*Harrisia martini*), Prickly Pear (*Opuntia stricta*) and Parthenium (*Parthenium hysterophorus*).

The majority of the Project area has been subject to clearing for grazing. The survey found that remaining vegetation is largely limited to the riparian area of Phillips Creek, two large dams, and the area surrounding Lake Vermont in the east of the site.

Six of these vegetation communities are classified as remnant vegetation, as defined by the Queensland *Vegetation Management Act 1999* (VM Act). Vegetation communities are briefly described below, along with their corresponding Regional Ecosystem (RE):

- Community 1 – Poplar Box Open Woodland on Alluvial Plains (RE 11.3.2);
- Community 2 – Poplar Box Open Woodland on Sand Plains (RE 11.5.3);
- Community 3 – River Red Gum Riparian Woodland (RE 11.3.25);
- Community 4 – Poplar Gum Open Woodland (RE 11.3.35);
- Community 5 – Mixed Bloodwood Open Woodland (RE 11.3.7);
- Community 6 – Freshwater Wetlands (RE 11.3.27);
- Community 7 – Regrowth Vegetation; and
- Community 8 – Derived Grasslands (non-remnant).

Figure 3 – Vegetation Communities provides a map of vegetation communities over the Lake Vermont Northern Extension. The Flora and Fauna Study provides further detail of vegetation communities and characteristics of the Project site, and is provided in Attachment B – Appendix F.

Fauna

A total of 163 fauna species were identified during the field survey, including six amphibians, 124 birds, 20 mammals and 12 reptiles. Existing fauna habitat on the Project site is largely fragmented and heavily disturbed by grazing. The majority of the Project site has been cleared and vegetated with exotic pasture species.

Four listed threatened fauna species were recorded on the site, one of which is listed under the EPBC Act:

- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable under the Queensland *Nature Conservation Act 1992* (NC Act) and EPBC Act;
- Cotton Pygmy Goose (*Nettapus coromandelianus*) – Near Threatened under the NC Act;
- Freckled Duck (*Stictonetta naevosa*) – Near Threatened under the NC Act; and
- Black-necked Stork (*Ephippiorhynchus asiaticus*) – Near Threatened under the NC Act.

The Flora and Fauna Study provides further detail of fauna species identified on the Project site, and is provided in Attachment B – Appendix F.

3.3 (b) Hydrology, including water flows

Water characteristics are previously described in Section 3.1. Complete assessments are provided in the following reports:

- Phillips Creek Diversion Functional Design Report (WRM 2016a) – Attachment B (Appendix B);
- Surface Water Impact Assessment (WRM 2016b) – Attachment B (Appendix C);
- Groundwater Impact Assessment (JBT 2016a) – Attachment B (Appendix D);
- Groundwater Summary Report (JBT 2016b) – Attachment B (Appendix E);
- Aquatic Ecology and Stream Morphology Assessment (AARC 2016a) – Attachment B (Appendix G).

Surface Water

The Project area is situated within the Fitzroy Basin Catchment. Phillips Creek is the main drainage channel traversing the Northern Extension area in a north-easterly direction. It is an ephemeral watercourse, only flowing as a result of rainfall events. Phillips Creek is a third order stream comprised of a channel (up to 12 m) with embankments (up to 9 m in height). The stream bed predominantly consists of sand and is relatively flat. Phillips Creek drains into the Isaac River, the primary tributary of the Fitzroy River. The Fitzroy River ultimately drains into the Coral Sea at Rockhampton, approximately 260 km south-east of the Project site.

The watercourses and wetlands occurring on or surrounding the Project site are typical of slightly to moderately disturbed ecosystems. Physico-chemical and biological properties of aquatic ecosystems were generally found to be consistent with the WQOs for moderately disturbed aquatic ecosystems in the Isaac River Sub-basin, as defined in the EPP (Water). All features were found to be moderately disturbed as a result of upstream mining activities, surrounding agricultural land use (i.e. cattle grazing) and associated creek crossings.

The Northern Extension area contains two pastoral dams and two palustrine wetlands – Lake Vermont, crossing the eastern border of the Northern Extension, and a small wetland located immediately adjacent to Phillips Creek. Both wetlands are recharged by surface runoff / flooding and do not hold permanent water.

A detailed hydrologic and hydraulic assessment of Phillips Creek and the Northern Extension Project has been conducted as part of the application for approval under the Queensland EP Act. The assessment identifies the extent of impacts on surface water, including flows, upstream and downstream of the Project.

A URBS runoff-routing model was developed to estimate design flow discharges in Phillips Creek for 1 in 2, 50, 100 and 1,000 year Annual Exceedance Probability (AEP) design flood events. Under existing conditions, all flow generally remains contained within the Phillips Creek channel during a 1 in 2 AEP flood. There are areas of localised inundation on the northern floodplain and around Lake Vermont due to local catchment runoff.

Groundwater
Geological and hydrogeological units within the Project area include:

- Quaternary alluvial aquifers;
- Tertiary basalt aquifer;
- Tertiary sedimentary units;
- Triassic sedimentary units; and,
- Permian sedimentary units.

Available water level data from registered groundwater bores within and adjacent to the Northern Extension indicate that:

- The Quaternary alluvium associated with Phillips Creek has been noted to be dry when drilled. This indicates that groundwater occurs sporadically within this unit (following rainfall recharge or creek flow), with water seeping down to recharge lower units. Groundwater levels in the Isaac River alluvium vary from 0.5 m below ground level (mbgl) to almost 15 mbgl;
- The Tertiary sediments tend to be dry when drilled, with the water level in lower units typically within several metres of the base of Tertiary. Groundwater is encountered within sporadic occurrences of basal sand, where the water level tends to be several metres above base of Tertiary; and
- Groundwater levels in the Permian coal measures vary from approximately 25 – 50 mbgl (JBT 2016a).

3.3 (c) Soil and Vegetation characteristics

Vegetation characteristics are described in detail in Section 3.1 and Attachment B – Appendix F.

Surface geology of the Project site (refer to Figure 4 – Surface Geology) is characterised by locally red-brown mottled, poorly consolidated sand, silt, clay, minor gravel; high-level alluvial deposits, generally dissected, and related to present stream valleys.

The Project area is dominated by cracking clays with hard-setting to weakly self-mulching surface. Self-mulching clays and non-cracking to weakly cracking clays also occur, with the latter mapped as minor soils (McClurg 2012). Vertosols, Chromosols and Dermosols commonly occur in the area.

A detailed Soil and Land Suitability (AARC 2014) was prepared as part of the application for approval under the EP Act. Mapping of soil types and assessment land suitability for cropping and grazing is included. Existing vegetation on the Northern Extension area is predominantly improved pastures dominated by Buffel Grass.

A summary of the characteristics of each soil management unit identified within the Project site is provided below.

<u>Basaltic Alluvium</u>	
Knockane (Kk)	Dark Brown / Black Dermosols and Vertosols. Moderately to very deep, alkaline, grey or brown cracking clay with hardsetting surface. The soil profile is highly calcareous with soft carbonates found throughout the profile. These soils are slowly permeable and moderately well drained. These soils are hardsetting and have a weak patchy self-mulch.
Mayfair (Sodic Variant) (MfSv)	Brown / grey Sodosols. Deep to very deep, alkaline, grey or brown sodic texture soil with thick, clay loamy topsoil. Consists of alluvium derived from basaltic landscapes. This SMU is similar to the Kirkcaldy soil, but is distinguished by the presence of a texture contrast

between the A and B horizons. These soils are light brown / yellow throughout their profiles and have vertic properties including slickensides and lenticular structure. Surfaces are typically hardsetting but appear to be relatively permeable with good drainage associated with landscape position.

Kirkcaldy (Kc) — Brown / yellow Dermosols / Vertosols. Light brown Non-texture contrast soils. Moderately deep to very deep, grey to brown cracking clay with hardsetting surface. These soils possess vertic properties including surface cracking, lenticular structure and slickensides. Permeability and drainage is high due to their relatively permeable profiles and high landscape position. These soils are highly alkaline and often possess bands of calcium and magnesium carbonates in subsoil layers.

Knockane Wet Phase (KkWp) — Grey Vertosols. Gradational and texture contrast black / brown clays with pale brown subsoil sometimes with mottles at depth. Moderately to very deep brown, alkaline, mottled brown cracking clay with hardsetting surface. These soils are found on lower lying areas on alluvial plains and drainage depressions.

Norwich (Nw) — Grey / Brown Vertosols. Deep to very deep, alkaline grey or brown cracking clay with moderately to strongly self-mulching surface. These soils are older alluvial soils with high clay contents. The 2:1 clays produce soils that have vertic properties including lenticular structure, slickensides, and a moderately to strong self-mulching surface. High levels of calcium are present throughout the profile and are sometimes expressed as soft segregations throughout subsoil horizons.

Sedimentary Alluvium

Foxleigh (Fx) — Grey Chromosols / Sodosols. Texture contrast coarse sandy soils over grey, medium to medium heavy clay subsoils, with prominent orange mottles. These soils are rigid and are non-reactive due to the presence of kaolinite clay in the subsoil. Profiles are imperfectly to moderately well-drained with strongly to extreme sodic subsoils and moderate to strong, coarse, columnar structure.

Foxleigh (Yellow Variant) (FxYv) — Yellow Chromosols / Sodosols. Texture contrast coarse sandy soils over whole coloured yellow, medium to medium heavy clay subsoils. These soils possess superior permeability and drainage to the mottled Foxleigh SMU.

Recent Alluvium

Booroondarra (Bn) — Red, Brown Dermosols. Loamy surfaced, sporadically bleached, red non-sodic texture contrast or gradational soils on level or gently undulating alluvial plains and occasional terraces adjacent to larger stream channels. The distinguishing feature of the Booroondarra is the red subsoil colour. It indicates the alluvium has been in-situ for some time and profile development is relatively mature.

Langly (Lg) — Black Vertosols. Very deep, black cracking clay with strongly self-mulching surface. These soils have high clay contents with low silt content. High CEC / clay ratios as well as lenticular structure in the subsoil suggest the clay fraction is reactive, has shrink / swell properties and contains significant proportions of montmorillonite.

3.3 (d) Outstanding natural features

The Project site is located within the Brigalow Belt Bioregion. Despite fragmentation and colonisation of introduced species as a result of human activities, the Brigalow Belt Bioregion continues to support a diversity of flora and fauna, including a number of threatened species (Threatened Species Network 2008).

No outstanding natural features are likely to be impacted by the proposal.

3.3 (e) Remnant native vegetation

Remnant vegetation across the Project site covers a total area of 391.8 ha (approximately 10%). Six remnant vegetation communities are present on the Northern Extension site. These communities are described briefly

below. Further detail is provided in the MNES Assessment Report (Attachment B) and the Flora and Fauna Study (Attachment B – Appendix F).

Community 1 / RE 11.3.2
Community 1 is an open woodland dominated by Poplar Box (*Eucalyptus populnea*). This community exists as small sections of remnant vegetation on alluvial deposits around Lake Vermont in the east of the Project site. Community 1 covers a total area of 9.7 ha over the Project site. RE 11.3.2 has been extensively cleared or modified by grazing activities.

Community 2 / RE 11.5.3
Community 2 is a low open woodland of Poplar Box (*E. populnea*) and Ghost Gum (*Corymbia dallachiana*) that occurs on Cainozoic sand plains. This vegetation community is found in one small patch in the west of the Project site, north of Phillips Creek. Community 2 covers a total area of 0.9 ha across the Project site. RE 11.5.3 has been extensively cleared or modified by grazing, and is subject to grazing pressure and Buffel Grass invasion (EHP 2013).

Community 3 / RE 11.3.25
Community 3 is a riparian woodland community dominated by River Red Gum (*E. camaldulensis*). The community occurs in a continuous thin strip along the banks of Phillips Creek. It is the largest remnant vegetation community on the Project site. Community 3 covers an area of 184.5 ha over the Project site. The total area of this community located in protected areas is classed as low. It is impacted by total grazing pressure and subject to invasion by Rubber Vine (*Cryptostegia grandiflora*) and Buffel Grass (EHP 2013).

Community 4 / RE 11.3.35
Community 4 occurs in the east of the Project site. It is the second largest remnant vegetation community on the Project site. It consists of a canopy dominated by Poplar Gum (*Eucalyptus platyphylla*) with associated Clarkson's Bloodwood (*Corymbia clarksoniana*) and a patchy Paperbark (*Melaleuca* spp.) understorey. Community 4 covers a total area of 132.2 ha across the Project site. The extent of this community protected in reserves is low. In some areas it is invaded by Chinee Apple (*Ziziphus mauritiana*) and Rubber Vine (*C. grandiflora*) (EHP 2013).

Community 5 / RE 11.3.7
Community 5 is a tall woodland with a canopy of Clarkson's Bloodwood (*C. clarksoniana*), Moreton Bay Ash (*Corymbia tessellaris*) and Ghost Gum (*C. dallachiana*) located on alluvial plains. This community exists in a single patch in the north-east of the Project site. It is contiguous with Community 4. RE 11.3.7 covers an area of 43.9 ha over the Project site. The extent of RE 11.3.7 in reserves is low. It is subject to total grazing pressure and the introduction of Buffel Grass has displaced native species from the ground layer (EHP 2013).

Community 6 / RE 11.3.27 (Freshwater Wetlands)
This community occurs around small wetland areas / standing water bodies on the Project site. The largest area of Community 6 is located at Lake Vermont. One very small patch of this community is located south of Phillips Creek in the west of the Project site. Community 6 covers an area of 20.6 ha on the Project site.

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

The topography of the Project site is described as undulating Downs country interspersed with flat broad floodplains of the Isaac River and upstream catchment.

3.3 (g) Current state of the environment

Ecological assessments describe the land as being of relatively poor condition with respect to conservation values of the land. Impacts of past clearing and ongoing cattle grazing were prevalent.

A number of exotic species have been identified on the site. Buffel Grass (*Cenchrus ciliaris*) is an exotic pasture grass that dominates the ground layer on the Project site, particularly in cleared areas. A further 28 exotic flora species were present on the Project site, including Harrisia Cactus (*Harrisia martinii*), Prickly Pear (*Opuntia stricta*) and Parthenium (*Parthenium hysterophorus*), which are Class 2 pests under the *Land Protection (Pest and Stock Route Management) Act 2002*. Parthenium and Prickly Pear are also classed as Weeds of National Significance.

Five introduced fauna species were identified on the Project site. Cane Toads (*Rhinella marina*) were observed in and around wetland areas. Feral Pigs (*Sus scrofa*) were sighted, which are known to favour riparian habitats. Feral Cats (*Felis catus*), Dingoes (*Canis familiaris dingo*) and European Rabbits (*Oryctolagus cuniculus*) were also recorded. Pest fauna typically cause erosion and land degradation, prey on stock and native wildlife, feed on native plants, cause competition with native species, or spread diseases.

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

There are no Commonwealth Heritage Places identified within a 100 km buffer of the Project site. No impact is likely.

3.3 (i) Indigenous heritage values

A CHMP has been implemented within the Lake Vermont MLs and the surrounding MDLs and EPCs. It has been successful in providing the necessary guidance regarding dealings with the traditional owners. There have been no cultural heritage issues identified to date.

Bowen Basin Coal will conserve and manage areas of Indigenous cultural heritage on the Lake Vermont North Project, in accordance with the CHMP.

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

Dipperu National Park is located approximately 53 km north-east of the Project site and Peak Range National Park is approximately 50 km to the south-west. No conservation parks are located in the vicinity of the Project. No impact on these values is likely.

3.3 (k) Tenure of the action area (eg freehold, leasehold)

Tenure underlying Northern Extension area is freehold land, as shown in Figure 2 – Land Tenure. The current mining tenure underlying the Northern Extension area is ML 70528.

3.3 (l) Existing land/marine uses of area

The current land use of the Northern Extension Area is cattle grazing. Land uses of the broader region include cattle grazing, cropping, coal mining and coal seam gas development.

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

Not applicable

4 Environmental outcomes

Proposed Outcomes

This section outlines proposed environmental outcomes for the Project. These outcomes have been developed in accordance with the DoE's *Draft Outcomes-based Conditions Policy* (DoE 2015b) and *Draft Outcomes-based Conditions Guidance* (DoE 2015c), as well as baseline information available in the specialist studies conducted for the Project. Outcomes have been developed only in relation to water resources, as no other MNES are anticipated to be impacted.

The following outcomes in relation to water resources are proposed:

- Ensure the Phillips Creek diversion achieves dynamic equilibrium with adjoining reaches as per the outcomes detailed in the Phillips Creek Diversion Functional Design Report (Attachment B – Appendix B), namely:
    - Incorporate natural features present in local watercourses;
    - Maintain existing hydrologic characteristics of surface water and groundwater systems;
    - Achieve hydrologic characteristics comparable to those in the existing watercourse;
    - Achieve a self-sustaining watercourse diversion that is unlikely to result in material or serious environmental harm, either upstream or downstream; and
    - Maintain stability and functionality under anticipated substrate conditions;
- Restore the connectivity of the vegetation corridor along Phillips Creek;
- Result in no long-term adverse changes to downstream water quality; and
- Result in no significant groundwater impacts.

Baseline Data

Baseline data currently available for surface water and groundwater resources in relation to the Lake Vermont Northern Extension Project is considered sufficient for defining the proposed outcomes. Extensive modelling and assessment was conducted by suitably qualified experts to characterise the Project's potential impacts on water resources. These assessments and their relevant information are detailed in Table 4 below.

Table 4 Baseline Data

Report Title	Relevant Data and Information
Phillips Creek Diversion Functional Design Report (WRM 2016a)	Preliminary design of the Phillips Creek diversion was undertaken, including details of the hydrologic and hydraulic characteristics to enable a stable and functional diversion to be achieved.
Surface Water Impact Assessment (WRM 2016b)	This report included development of a site water balance model to determine the most appropriate design of a SWMS for the Project. The water balance model was based on the previous model developed for the Lake Vermont Mine, updated to include details of the Northern Extension Project. A GoldSim Model was developed for the Project to assess the dynamics of the water balance under various rainfall and catchment conditions throughout the progression of the Project. Configuration of the model simulated the operation of major components of the SWMS. The report also includes a salinity balance model and assessment of final void behaviour.
Groundwater Impact Assessment (JBT 2016a) Groundwater Summary Report (JBT 2016b)	The Groundwater Impact Assessment modelled the Project's potential to impact groundwater resources. This included development of a two-dimensional seepage modelling platform (Seep/W) to predict the rate and extent of changes to the phreatic surface due to ongoing mining operations at Lake Vermont Mine and the extension of mining into the Project area. Two models were developed, one oriented north-south and one oriented west-east, to identify potential drawdown for two scenarios: • End of mining (Project Year 32); and • 100 years post-mining.

Report Title	Relevant Data and Information
Aquatic Ecology and Stream Morphology Assessment (AARC 2016)	This assessment characterised the aquatic ecology and stream morphology characteristics of the Project site, including Phillips Creek and the Lake Vermont Wetland. Baseline data for riparian vegetation health, stream sediment quality, macroinvertebrate indicators and water quality was collected as part of the assessment.

Likelihood of Achieving Proposed Outcomes

It is considered highly likely that the proposed outcomes will be achieved following cessation of mining. Measures to achieve the proposed outcomes are briefly outlined in Section 5 below, and discussed in further detail in the MNES Assessment Report (Attachment B).

The Phillips Creek diversion has been designed such that it achieves dynamic equilibrium with the adjoining reaches. It replicates the length, slope and cross-sectional shape of the Phillips Creek channel, incorporating meanders of similar radii, amplitude and magnitude to existing meanders. The implementation of a revegetation plan (to be developed) will ensure bank stability is achieved using suitable vegetation. In addition, the hydrologic conditions of the diversion are largely unchanged to that of the existing channel.

The SWMS for the Project has been developed to using appropriate modelling to ensure mine affected water and stormwater are managed separately and appropriately. With the effective implementation of the Project's SWMS management principles, environmental risks resulting from disturbed area runoff are expected to be low. In small rainfall events, runoff from disturbed areas will be intercepted and contained by sediment dams, but in larger events, these dams will overflow. Water quality in these dams will be monitored regularly to ensure that the assumption that this water is not mine-affected is valid. Water may be pumped into the mine water management system if required to manage this risk.

The Groundwater Impact Assessment determined that, while there is potential for drawdown, modelling and assessment indicates that impacts are anticipated to be minimal. Overall impacts on Tertiary sediment water levels are anticipated to be low due to their generally unsaturated nature. The Project will have only a low risk of impacting on baseflow contribution to surface waters, and a low risk of impact to groundwater dependent ecosystems.

5 Measures to avoid or reduce impacts

A range of mitigation measures and management strategies will be adopted for the Project. Table 5 outlines these mitigation measures. Further details of mitigation measures are provided in Attachment B and respective specialist studies.

Table 5 Mitigation Measures and Management Strategies to be Adopted for the Project

Mitigation Measure	Effectiveness of Measure	Timeframe
Limit clearing footprint to only those areas required for mining and associated infrastructure. Clearing will be conducted in a staged manner to enable fauna to move out of the disturbance area to adjacent habitat.	This will minimise the area of land cleared or disturbed and eliminate unnecessary impacts to native flora and fauna.	Construction phase and operation phase as new areas are cleared.
Progressively rehabilitate disturbed areas as they become available throughout the life of the Project.	Progressive rehabilitation will minimise the area of land subject to disturbance at any one time.	Ongoing throughout the life of the Project.
Enforce vehicle speeds on the Project site to minimise the risk of collisions with fauna.	This is a preventative measure effective in minimising unnecessary and avoidable fauna impacts.	Ongoing throughout the life of the Project, including construction, operation and decommissioning.
Monitor and actively control pest and weed species on the Project site.	Effective control of weeds and pests through monitoring of abundance, location and active control.	Ongoing monitoring and control through life of mine.
Erosion and sediment release will be minimised by constructing appropriate water management infrastructure.	Water management infrastructure will direct the flow of water on the Project site into various containment structures, based on the quality and characteristics of the water. This will reduce erosion and ensure only water of acceptable quality flows into the receiving environment.	Ongoing throughout the life of the Project.
Environmental offsets are proposed to offset impacts to Matters of State & National Environmental Significance, including riparian vegetation occurring along Phillips Creek, a wetland on the southern bank of Phillips Creek, and the Squatter Pigeon (southern).	Impacts to Matters of State Environmental Significance in the Northern Extension area will be mitigated by ensuring the protection of ecologically equivalent vegetation elsewhere in the bioregion. This will be achieved in accordance with the Queensland *Environmental Offsets Act 2014* and subordinate legislation and policies.	Development of an Offsets Delivery Plan / Financial Settlement Offset following approval of Project and Environmental Offsets Strategy (Attachment B – Appendix H).
Rehabilitation of the creek diversion channel in order to create a more stable landform, reduce erosion, and restore connectivity.	Planting native species will ensure that the habitat values of the creek and riparian area are maintained for fauna.	Commence following construction of the diversion of Phillips Creek.
Revegetation of the diversion will utilise native species consistent with RE 11.3.25.	This will assist in restoring the connectivity of the vegetation corridor along Phillips Creek.	Following completion of the Phillips Creek diversion.
Regular monitoring of the diversion will be conducted in accordance with the Australian Coal Association Research Program Guidelines (2001).	Monitoring will enable evaluation of the performance of the diversion, identification of any issues as they arise, and ensuring the diversion achieves dynamic equilibrium with the adjoining reaches.	Baseline data collected prior to construction of the diversion. Additional monitoring following construction.
Implement a water management strategy, including sediment controls for the Northern Extension area.	The water management strategy will be effective in separating water of different qualities for management. Sediment controls at the Northern Extension areas will reduce the sediment load of runoff from disturbed areas.	Implement from commencement of construction and maintain for the life of the Project.
Develop and implement a Receiving Environment Monitoring Program	The REMP will be effective in early identification of potential sources of downstream contaminant	Implement from commencement of

Mitigation Measure	Effectiveness of Measure	Timeframe
(REMP) for the Northern Extension area.	originating from the Northern Extension. The REMP will include monitoring of the Lake Vermont wetland.	construction and maintain for the life of the Project.
A water storage monitoring program will be implemented for all storages.	Monitoring will ensure water is of an appropriate quality to release / use for dust suppression and ensure the effectiveness of the SWMS in separating water of differing qualities.	Ongoing throughout the life of the Project.
Regular groundwater level monitoring will be conducted at existing monitoring bores on the Project, as per recommendations in JBT (2016).	Monitoring will allow assessment of the potential for groundwater impacts to arise, e.g. extent of groundwater drawdown.	Monitoring will occur prior during construction and operation of the Project.
Continue to implement a staff training and awareness program, incorporating a segment for the identification of key environmental values and appropriate procedures for environmental protection and incident response.	Staff training will ensure all personnel on the Project site are aware of the particular environmental values of the site, the issues that may arise during the course of operations and can implement appropriate procedures.	During the operational phase of the Project.

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
X	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

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)
X	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)

The Lake Vermont Mine is considered to be a large coal mine, as per the definition provided in section 528 of the EPBC Act. The Project will form an extension of the existing mine into new mining areas immediately to the north.

The Northern Extension Project includes the diversion of a section of Phillips Creek, which has potential to significantly alter the hydrology of the existing watercourse, in accordance with the criteria presented in the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013c).

Development of the Northern Extension Project, in association with the existing Lake Vermont Mine, will result in changes to topography, diverting runoff that would have otherwise entered the receiving waters of Phillips Creek, Downs Creek, Lake Vermont, and other wetlands and unnamed tributaries on a long-term basis. In accordance with the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013b), changes to the hydrological characteristics of these receiving waters as a result of changes to catchment areas are not anticipated to be of a sufficient scale or intensity to significantly impact the utility of these water resources.

No other MNES is considered likely to be significantly impacted by the Lake Vermont Northern Extension.

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** Bowen Basin Coal Pty Ltd is committed to minimising environmental impacts during all phases of the Project life. Staff training and awareness ensures that all personnel and contractors implement best practice strategies for environmental protection and give due consideration to the environmental values of the Project site.	X	
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**		X
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**	n/a	
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)**		X

8 Information sources and attachments

8.1 References

AustralAsian Resource Consultants Pty Ltd (AARC) 2016a, *Lake Vermont Northern Extension: Aquatic Ecology and Stream Morphology Assessment*, report prepared for Lake Vermont Resources Pty Ltd, April 2016

AustralAsian Resource Consultants Pty Ltd (AARC) 2016b, *Lake Vermont Northern Extension: Flora and Fauna Report*, report prepared for Bowen Basin Coal Pty Ltd, April 2016

AustralAsian Resource Consultants Pty Ltd (AARC) 2014, *Lake Vermont Northern Extension: Soil and Land Suitability Assessment*, report prepared for Bowen Basin Coal Pty Ltd, October 2013

Bowen Basin Coal Pty Ltd (BBC) 2004, *Vermont Coal Project Environmental Impact Statement*, prepared by Minserve Group Pty Ltd, July 2004

Department of the Environment (DoE) 2013a, *Significant impact guidelines 1.1: Matters of National Environmental Significance*, Commonwealth of Australia

Department of the Environment (DoE) 2013b, *Species Profile and Threats Database*, Commonwealth of Australia

Department of the Environment (DoE) 2013c, *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources*, Commonwealth of Australia

Department of the Environment (DoE) 2015a, *Species Profile and Threats Database*, Commonwealth of Australia

Department of the Environment (DoE) 2015b, *Draft Outcomes-based Conditions Policy: Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia

Department of the Environment (DoE) 2015c, *Draft Outcomes-based Conditions Guidance: Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia

Department of Natural Resources and Mines (DNRM) 2014, *Guideline – Works that interfere with water in a watercourse: watercourse diversions*, Department of Natural Resources and Mines, Queensland Government.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPAC) 2003, *Nationally threatened species and ecological communities – Brigalow Regrowth and the EPBC Act*, Commonwealth of Australia

Environment Australia 2001, *Brigalow (Acacia harpophylla dominant and co-dominant) information sheet*, Commonwealth of Australia

Garnett. S., Szabo, J. and Dutson, G. 2010, *The Action Plan for Australian Birds 2010,* CSIRO Publishing, Canberra

Independent Expert Scientific Committee (IESC) 2014, *Information Guidelines for Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals*, Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development

JBT Consulting Pty Ltd (JBT) 2016a, *Lake Vermont Northern Extension: Groundwater Impact Assessment*, report prepared for Bowen Basin Coal Pty Ltd, April 2016

JBT Consulting Pty Ltd (JBT) 2016b, *Groundwater Summary – Lake Vermont Northern Extension*, report prepared for Jellinbah Group Pty Ltd, February 2016

McClurg, J 2012, *Soils, pre-mining land suitability and stripping recommendations for Lake Vermont Coal mining lease, central Queensland*, North Queensland Soil Assessment, Lake Vermont Coal Mine

Threatened Species Network 2008, *Brigalow Belt bioregion – a biodiversity jewel*, http://www.qmdc.org.au/publications/download/49/

WRM Water & Environment 2016a (WRM), *Phillips Creek Diversion Functional Design Report*, report prepared for Lake Vermont Resources Pty Ltd, 15th April 2016

WRM Water & Environment 2016b (WRM), *Lake Vermont Mine Northern Extension Surface Water Impact Assessment*, report prepared for Lake Vermont Resources Pty Ltd, 15th April 2016

8.2 Reliability and date of information

Information used to complete this referral has been obtained primarily from Commonwealth and State Government sources, thereby relying on the QA/QC processes adopted by these departments to ensure data reliability and a low level of uncertainty.

All field studies referenced in this referral were undertaken by qualified and experienced ecologists.
Information has also been sourced from previous studies associated with the Lake Vermont Mine and other published scientific literature.

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	– Figure 1 – Regional Location Map – Figure 2 – Land Tenure
	GIS file delineating the boundary of the referral area (section 1)	✓	– Attachment A
	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 3 – Vegetation Communities – Figure 4 – Surface Geology
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	✓	Attachment C – Environmental Authority EPML00659513
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	✓	Attachment B – MNES Assessment Report All other completed assessments are provided as appendices to Attachment B: – Appendix B – Phillips Creek Diversion Functional Design Report – Appendix C – Surface Water Impact Assessment – Appendix D – Groundwater Impact Assessment – Appendix E – Groundwater Summary Report – Appendix F – Flora and Fauna Report

		– Appendix G – Aquatic Ecology and Stream Morphology Assessment – Appendix H – Environmental Offsets Strategy – Appendix I – Protected Matters Search
copies of any flora and fauna investigations and surveys (section 3)	✓	All flora and fauna investigations are provided as appendices to Attachment B – MNES Assessment Report: – Appendix F – Flora and Fauna Report – Appendix G – Aquatic Ecology and Stream Morphology Assessment
technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	As above.
report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

Project title: Lake Vermont Northern Extension Project

9.1 Person proposing to take action

1. Name and Title:	Tim O'Brien – Company Secretary
2. Organisation (if applicable):	Bowen Basin Coal Pty Ltd
3. EPBC Referral Number (if known):	n/a
4: ACN / ABN (if applicable):	ACN: 065 321 440 ABN: 22 065 321 440
5. Postal address	GPO Box 374 Brisbane Qld 4001
6. Telephone:	(07) 3877 6700
7. Email:	tobrien@jellinbah.com.au
8. Name of proposed proponent (if not the same person at item 1 above and if applicable):	
9. ACN/ABN of proposed proponent (if not the same person named at item 1 above):	

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

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:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

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 [signature] Date 6/5/16.

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

Name	Gareth Bramston
Title	Principal Scientist
Organisation	AustralAsian Resource Consultants Pty Ltd
ACN / ABN (if applicable)	ACN: 077 456 074 ABN: 96 077 456 074
Postal address	Suite 5, 1 Swann Rd Taringa, Qld 4068
Telephone	(07) 3217 8772
Email	gbramston@aarc.net.au
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 [signature] Date 6/05/2016

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)?

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/)