



Title of Proposal - MRA2C Project, South Walker Creek Operations

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Mining

1.2 Provide a detailed description of the proposed action, including all proposed activities.

The South Walker Creek Mine (SWC Mine) is an open cut coal mining operation owned and managed by BHP Billiton Mitsui Coal (BMC). The mine is located in the northern Bowen Basin, approximately 26 km southeast of the township of Nebo in Queensland.

The mine includes a number of mining pits including the Mulgrave Pit. BHP Billiton Mitsui Coal (BMC) proposes to continue mining at its existing South Walker Creek Mine through a further development of the existing 'Mulgrave' open cut mining pit; in a south-westerly direction to access coal resources within the current mining lease (ML4750). The pit progression will intersect an ephemeral creek system (Walker Creek) requiring the diversion of the watercourse. Two new water storage dams will be constructed to replace an existing mine water dam that is in the path of the pit progression. One dam is located to the north of the coal pit and one to the south (which is located on ML70131). These dams will hold mine affected water that will be pumped directly from the mine into these dams.

The expansion of the Mulgrave Pit (the project) has two distinct phases:

1. Preparation phase
2. Continuance of mining in the Mulgrave Pit

Phase 1: Preparation Phase

This phase involves the following works, which are described below:

- fencing and stock removal
- clearing of vegetation and top soil removal for infrastructure items
- construction of a water course diversion and water management facilities, including two new dams.

Fencing and stock removal will occur in mine areas to enable safe operation of equipment.

Clearing of vegetation and topsoil salvage will occur only in areas required for installation of infrastructure or facilities, including the water course diversion. Vegetation clearance will involve spotter catching and capture/relocation programs. Where practical topsoil will be salvaged and stockpiled or immediately replaced elsewhere as part of rehabilitation works.

A diversion of Walker Creek is required to enable progression of mining activities in Mulgrave



Pit. The diversion channel will be located on the far western flank of the mine lease and as such the diversion will be permanent. Studies have been conducted on the watercourse diversion for Walker Creek, which has resulted in the preferred option of utilising an existing tributary of Walker Creek to divert water flows. The diversion is ~8 km long and has been designed to be a functioning and sustainable diversion that meets regulatory requirements. The creek diversion will connect to Carborough Creek, directly adjacent to a previously constructed diversion associated with MRA Stage 2A and make the new confluence with Walker Creek ~6.4 km downstream from its current confluence. An overland flow bund will be constructed along the south-western length of the diversion channel with associated batter drains to receive overland flow runoff. Levees will be required at sections along the north-eastern length of the diversion channel to retain functionality of the diversion.

Phase 2: Continuance of mining in the Mulgrave Pit

This phase involves the continuation of mining activities in the Mulgrave Pit in a south-west direction from the existing highwall. The rate of advancement of the pit will vary in accordance with resource characteristics and the best practice of maintaining a uniform high wall/pit face. It is anticipated that the mining activity will disturb an area of 1021 ha however, with infrastructure, spoil and overburden placement areas and creek diversion works, disturbance of the full surface are of 1,454 ha is being allowed for. Mining will continue in a westerly direction until the economical coal resource has been recovered.

The mining activity will only include activities authorised by the existing Environmental Authority and will follow the methodology outlined in the approved Plan of Operations. The South Walker Creek Plan of Operations (PoO) is a statutory plan approved annually by the Queensland Department of Environment & Heritage Protection (DEHP). The PoO – details mining disturbance and rehabilitation 12 months in advance of the activity occurring. The South Walker Creek PoO will detail the annual vegetation clearing requirements that are necessary for the advancement of the existing Mulgrave Pit. As such, it is noted that clearing of the entire project area will not occur at project commencement, and where clearing does occur flushing, trapping and spotter catching processes will be implemented to mitigate impacts to fauna where possible.

Topsoil stripping will also be performed prior to mining of overburden for the coal resource. The pit will be progressively backfilled and spoil dumps will be rehabilitated as per the current practice and in-line with the approved Plan of Operations.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
Mulgrave Pit Extension 1 approximate		-21.735721160048	148.39435461019
Mulgrave Pit Extension 2		-21.735431745684	148.3945889263



Area	Point	Latitude	Longitude
approximate			
Mulgrave Pit Extension 3		-21.74623055425	148.41175506661
approximate			
Mulgrave Pit Extension 4		-21.746665844816	148.4144853406
approximate			
Mulgrave Pit Extension 5		-21.743983963331	148.41495397281
approximate			
Mulgrave Pit Extension 6		-21.743911412019	148.41628005799
approximate			
Mulgrave Pit Extension 7		-21.746520744863	148.42657974061
approximate			
Mulgrave Pit Extension 8		-21.747463064744	148.4304816056
approximate			
Mulgrave Pit Extension 9		-21.74840457072	148.43360240817
approximate			
Mulgrave Pit Extension 10		-21.741592232348	148.43734806067
approximate			
Mulgrave Pit Extension 11		-21.744201607317	148.44343431249
approximate			
Mulgrave Pit Extension 12		-21.759855275529	148.46028802522
approximate			
Mulgrave Pit Extension 13		-21.764710630169	148.46372125276
approximate			
Mulgrave Pit Extension 14		-21.765507749903	148.46028802522
approximate			
Mulgrave Pit Extension 15		-21.763695891898	148.45779121343
approximate			
Mulgrave Pit Extension 16		-21.762826220344	148.4520954902
approximate			
Mulgrave Pit Extension 17		-21.766159785104	148.44780395577
approximate			
Mulgrave Pit Extension 18		-21.768551106873	148.44593112428
approximate			
Mulgrave Pit Extension 19		-21.774275774713	148.43102748752
approximate			
Mulgrave Pit Extension 20		-21.749564514101	148.38951719123
approximate			
Mulgrave Pit Extension 21		-21.748839854697	148.391233805
approximate			
Mulgrave Pit Extension 22		-21.741374584409	148.38819024952
approximate			
Mulgrave Pit Extension 23		-21.735721160048	148.39435461019
approximate			
southern dam	1	-21.774129106972	148.48096550193
approximate			



Area	Point	Latitude	Longitude
southern dam	2	-21.773403773729	148.48041876087
approximate southern dam	3	-21.770215443691	148.4854132436
approximate southern dam	4	-21.773621373114	148.48814351759
approximate southern dam	5	-21.776664567698	148.48307178514
approximate southern dam	6	-21.774129106972	148.48096550193
approximate southern dam			
northern dam	1	-21.715423301441	148.35666721613
approximate northern dam	2	-21.714480776376	148.35947602593
approximate northern dam	3	-21.719192536929	148.36080253807
approximate northern dam	4	-21.719518664885	148.35787657021
approximate northern dam	5	-21.715858276484	148.35682342861
approximate northern dam	6	-21.715423301441	148.35666721613
approximate northern dam			

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The MRA 2C project will occur at South Walker Creek Mine (SWC Mine) which is an open cut coal mining operation owned and managed by BHP Billiton Mitsui Coal (BMC). The mine is located in the northern Bowen Basin, approximately 26 km southeast of the township of Nebo in Queensland.

The land on which the project will occur is owned by BMC and has previously been used for cattle grazing. Areas of remnant and regrowth vegetation exist and an ephemeral watercourse, South Walker Creek, runs through it.

1.6 What is the size of the development footprint or work area?

1454 ha

1.7 Is the proposed action a street address or lot?



Lot

1.7.2 Describe the lot number and title. Lot 3 SP162563, Lot 7 SP155252, Lot 2 WHS16

1.8 Primary Jurisdiction.

Queensland

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 11/2017

End date 01/2037

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

The project will be regulated by:

- the existing Environmental Authority issued under the Environmental Protection Act 1994 (Qld)
- a Water Licence to Interfere by Diverting the Course of Flow issued under the Water Act 2000 (Qld)

The project will be performed as part of mining activity authorised by Environmental Authority (MIN100552107), the Plan of Operations and the Surface Area Rights granted over Mine Lease 4750, with a small area required for the southern dam on Mine Lease 70131.

The Environmental Protection Act 1994 (Qld) (EP Act) requires that the mine hold an Environmental Authority (EA) to conduct mining activities. The EA stipulates conditions relating to the mining activities that must be complied with to minimise environmental harm. The EA will be a key document controlling the activities associated with the project. Additionally, the EP Act requires that a Plan of Operations (PoO) be submitted and approved which outlines the proposed mining activities to occur during the period of the PoO and describes the measures that will be taken to minimise environmental harm and remain compliant with conditions in the EA.



For the diversion component of the action, the Water Act 2000 (Qld) requires that a Water Licence to Interfere with the Course of Flow be obtained from the Queensland Department of Natural Resources and Mines (DNRM). Approval requires that the design, construction, operation and monitoring of the diversion are consistent with Queensland Government and community expectations and will be regulated by DNRM. The licence conditions will require creating a waterway channel that resembles and functions like the natural system it replaces. The diversion has been hydraulically designed using both existing design guidelines adopted by the Queensland Government and the outcomes of the latest research undertaken by the Australian Coal Association Research Program (ACARP) in a report titled Criteria for functioning river landscape units in mining and post mining landscapes (ACARP, 2014).

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

BMC owns the land upon which the project will occur.

The local Traditional Owners, Barada Barna, represented by Woora Pty Ltd have undertaken cultural heritage survey across a majority of the project footprint and BMC will be engaging Woora to undertake salvage works in accordance with the Cultural Heritage Management Plan to ensure Indigenous values are managed in an appropriate way.

Given the relatively low scale of development associated with the project, and that it relates to the continuation of mining activities on a previously approved Mining Lease, broader consultation has not been performed and is not specifically required under Queensland legislation.[EK1] [TK2] The water licence amendment to divert a watercourse was advertised for public comment – no comments were received.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

Not applicable

The project will occur on lands that have previously been approved for mining activity and there is no requirement to undertake further environmental impact assessments under Commonwealth, State or Territory legislation beyond those detailed above. The proposed action is a continuation of existing mining activities on an existing mine lease area.

1.15 Is this action part of a staged development (or a component of a larger project)?

No



1.16 Is the proposed action related to other actions or proposals in the region?

No



Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The [interactive map tool](#) can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

- [Profiles of relevant species/communities](#) (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- [Significant Impact Guidelines 1.1 – Matters of National Environmental Significance](#);
- [Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies](#).

2.1 Is the proposed action likely to impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to impact on the members of any listed threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
Brigalow TEC	Potentially up to 31.9 ha of Brigalow TEC will



Species	Impact
Ornamental Snake	<p>be removed by the project. This equates to 0.18% of the mapped Brigalow TEC extent (based on RE associations) occurring within the Northern Bowen Basin (subregion). Clearing for the project will not fragment any remaining patches of Brigalow TEC. Connectivity between remaining Brigalow TEC patches will remain following the development of the project. The extent of occurrence for Brigalow TEC across the region will remain primarily unchanged following the development of the project</p> <p>Habitat within the study area is considered to support an important population due to the presence of important habitat (gilgai habitat in good condition). The determination of important habitat is supported by species records 2 – 5 km south-east of the study area. The project will impact on 33.1 ha of Ornamental Snake habitat. No undisturbed Ornamental Snake habitat will remain within the study area following the development of the project, resulting in the reduction of the local important population. Project clearing will not fragment Ornamental Snake habitat supporting an important population. The project will not specifically disrupt the breeding cycle of an important population. The species is known to persist in disturbed environments as long as key microhabitat features are present (gilgai, soil cracks). The project does not interfere with the recovery actions outlined in the Draft Recovery Plan for Queensland Brigalow Belt Reptiles.</p>

2.4.2 Do you consider this impact to be significant?

Yes

2.5 Is the proposed action likely to impact on the members of any listed migratory species, or their habitat?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside



Commonwealth marine areas)?

No

2.7 Is the proposed action likely to impact on any part of the environment in the Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Will there be any impact on a water resource related to coal / gas / mining?

Yes

2.9.1 Impact table

Water Resource	Impact
Walker Creek Local groundwater	Construction of a diversion of the creek around proposed mining activities. This change will be carefully managed and regulated to ensure water leaving the site is in similar quantities and quality to that occurring currently. The proposed activity will not cause a significant depletion or quality change of any surface or groundwater resources, nor will it have an impact on the way a critical water system operates.

2.9.2 Do you consider this impact to be significant?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?



No

2.13 Is the proposed action likely to impact on any part of the environment in the Commonwealth marine area?

No



Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

Grazing in the area has resulted in partial clearing of native vegetation to promote growth of pasture grasses however some extensive areas of remnant and regrowth native vegetation remains. Buffel grass is common throughout the grazing pastures, with some native grasses also present throughout the landscape. The common invasive species include pigs, cats, buffel grass and parthenium. Previous biodiversity studies have attributed much of the degraded vegetation condition to the cattle grazing activities that have occurred on the land.

Biodiversity studies indicate that the area may provide habitat suitable for some protected species, most of which are common throughout the Brigalow Belt bioregion, however no studies have identified areas that contain unusually high levels of biodiversity abundance or diversity. Those studies commonly identify the grazing practices and fire regimes as reasons for common or less than common levels of biodiversity.

The condition of riparian zones varies between good quality, intact remnant ecosystem to highly modified and poor quality vegetation communities, or no vegetation at all having been replaced by erosion gullies and scars. Nonetheless the riparian zones are reported to provide adequate corridors for fauna movement.

A summary fo the ecological survey is provided as an attachment. Due to the attachment size restriction the details ecological survey report was unable to be submitted with this application but can be supplied on request. See 2.14.

3.2 Describe the hydrology relevant to the project area (including water flows).

See Attachment C - Summary Water Impact Assessment Report.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

The soil profile of the project site is similar to other areas throughout the Bowen basin. Surface layers are of unconsolidated sand and clay overlying mudstone and sandstone. Beneath these lie a series of coal and sandstone. The strata of the coal measures dips to the west at approximately 6 degrees, towards the axis of the syncline that aligns with the topographically elevated Carborough Range.



3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

not applicable

3.5 Describe the status of native vegetation relevant to the project area.

See Attachment A. Further details available on request due to file restriction size.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

See attachment C. Further information is available in the detailed Surface Water Impact Assessment report that could not be attached due to file size and will be available on request

3.7 Describe the current condition of the environment relevant to the project area.

The environment and landscape of the project area and immediate surrounds are considered to be consistent with other landscape units in the Bowen Basin.

Land use is almost entirely broad scale cattle grazing with the remainder being the SWC mine, Coppabella Mine 20km south, or the Hail Creek Mine approximately 40km to the north. The Carborough Range to the west of the SWC mine lease is predominantly undisturbed but there are no known recreation reserves or areas nearby with the exception of Dipperu National Park 60km south east, Lake Elphinstone that is approximately 40km north west and the Homevale National Park 50km north east, the latter two of which are located in a different catchment.

The grazing activity in the area has resulted in partial clearing of native vegetation to promote growth of pasture grasses however some extensive areas of remnant and regrowth native vegetation remains. No cropping has occurred on the land. The invasive Buffel grass is common throughout the grazing pastures, with some native grasses also currently present throughout the landscape. The common invasive species include pigs, cats, buffel grass and parthenium. Previous biodiversity studies have attributed much of the degraded vegetation condition to the cattle grazing activities that have occurred on the land.

Biodiversity studies indicate that the area may provide habitat suitable for some protected species, most of which are common throughout the Brigalow Belt bioregion, however no studies have identified areas that contain unusually high levels of biodiversity abundance or diversity. Those studies commonly identify the grazing practices and fire regimes as reasons for common or less than common levels of biodiversity.

The condition of riparian zones varies between good quality, intact remnant ecosystem to highly modified and poor quality vegetation communities, or no vegetation at all having been replaced by erosion gullies and scars. Nonetheless the riparian zones are reported to provide adequate



corridors for fauna movement.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

not applicable

3.9 Describe any Indigenous heritage values relevant to the project area.

The local Traditional Owners, Barada Barna, have been engaged to undertake a cultural heritage survey across the project footprint and BMC will work with Traditional Owners to ensure Indigenous values are managed in an appropriate way.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The action is proposed to occur within the boundary of ML4750 on land that is currently owned by BHPB. A small area within the northern portion of ML70131 will be used for a dam.

3.11 Describe any existing or any proposed uses relevant to the project area.

Coal mining and leased grazing.



Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

As indicated in Section 2 of this referral, there are two Matters of National Environmental Significance (MNES) relevant to the proposed action with significant impacts. These are:

- Brigalow TEC
- Ornamental Snake

Mitigation measures for threatened species and ecological ecosystems

The impacts on Brigalow and Ornamental Snake will be avoided and minimised where possible. For the Ornamental Snake in particular this will include clearance surveys in suitable habitat ahead of any vegetation clearing. Avoidance of impacts on Brigalow are difficult as the vegetation community overlays the coal resource.

BMC is committed to providing a no net loss offset for any residual significant impacts in line with the EPBC Offset Policy.

BMC has already undertaken a significant amount of work to understand the existence and condition of MNES potentially impacted by the project, including targeted flora and fauna surveys, surface and groundwater studies and watercourse diversion design.

The following mitigation measures are proposed to ensure that impact to all MNES are avoided or minimised.

Construction Environmental Control Plan

To minimise potential impacts, construction will be managed under a Construction Environmental Control Plan (CECP) which will include the following measures:

- construction personnel will be made aware of the presence of significant fauna



-
- construction activities will not commence until a Biodiversity Offset strategy has been approved. An offset strategy is being developed in accordance with the EPBC Act Environmental Offsets Policy and will be submitted to DoEE as soon as finalised.
 - fence and mark corridor boundaries, no-go areas etc; establishing buffer zones to potentially reduce the risk of unacceptable impacts on sensitive environmental areas
 - regular flushing of disturbance area by site personnel to promote self-relocation of highly mobile fauna for a period of time prior to the disturbance occurring and immediately prior to clearing activities
 - a pre-clearing survey, trapping and relocation program for the Ornamental snake will be undertaken to minimise harm to any individuals present. Any individuals found will be relocated to adjoining suitable habitat as part of pre-clearance surveys
 - spotter catching by a suitably qualified fauna ecologist will be employed during clearing activities
 - management of habitat through erosion and weed control measures.

Mitigation measures for water resources

The impact of the project upon the hydrology and water quality of water resources is not expected to be significant. However, BMC is committed to remaining in compliance with the Environmental Authority and Water Licence conditions that will minimise harm to the receiving environment. As part of remaining in compliance with the Environmental Authority, BMC will undertake or maintain the following water management and monitoring requirements.

Water Management Plan

South Walker Creek Mine (SWC mine) has developed and implements a Water Management Plan, that:

- provides overarching information about the water resource and the receiving environment
- identifies the management tools and strategies that have been developed to minimise impact
- set trigger levels to identify if activities are potentially impacting the water resource
- identifies the monitoring and reporting requirements.

Receiving Environment Monitoring Program

SWC mine has developed and implements a Receiving Environment Monitoring Program (REMP) that makes an assessment of the condition of the receiving environment and any mine derived impacts. This includes:



-
- predicted impacts to the regional and site water balance
 - changes to hydrology
 - water quality
 - toxicant movement
 - risks to ecological assets and receptors.

Key components of the REMP include:

- identification of the surface and aquatic systems to be monitored and their environmental values
- water quality parameters
- environmental and ecological characteristics and values and the rationale
- the frequency of the monitoring and rationale for the frequency
- baseline data for each monitoring site for comparison of monitoring results over the life of the project.

Groundwater Monitoring Program

SWC mine has developed and implements a Groundwater Monitoring Program, that:

- predicts drawdown
- measures interconnectivity and toxicant movement
- monitors risks to assets and receptors.

Sediment and Erosion Management Plan

SWC mine has developed and implements a Sediment and Erosion Management Plan (SEMP) to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

For listed threatened species and communities significantly impacted a no net loss will be achieved through mitigation and offset measures.



Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

Listed threatened species and communities - Yes

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No



5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

not applicable



Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

BMC has an excellent record of responsible environmental management and a strong commitment to continual improvement of environmental performance.

BMC has been the sole manager of South Walker Creek Mine since 2010 and no significant non-conformance of its Environmental Authority has occurred in that time, nor has the mine performed any unauthorised activities.

Between 1996 and 2010 the mine was managed by BM Alliance Coal Operations Pty Ltd, during which time only one non-compliant environmental incident is known to have occurred, being that of a tailings pipeline failure which was remedied in accordance with Government and community expectations.

BHP Billiton also has an overriding commitment to environmental responsibility. We strive to achieve the efficient use of resources, including reducing and preventing pollution, and enhancing biodiversity protection by assessing ecological values and land use in our activities. Our stewardship approach is designed to ensure that the lifecycle health, safety, environment and community impacts associated with resources, materials, processes and products related to our businesses are minimised and managed.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

BMC has not been subject to any environmental related proceedings in any of the following Courts - High Court, Federal Court, Supreme Court, District Court, and Planning and Environment Court.

To the best of our knowledge and enquiries, nor has BMC been involved in any proceedings within the various Queensland Magistrate's Courts



6.3 Will the action be taken in accordance with the corporation's environmental policy and planning framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

South Walker Creek Mine currently operates under an Environmental Management System that provides the framework for environmental management and details the management plans to be created and implemented and also stipulates the legal aspects to be considered in all actions.

The project will be conducted in accordance with the South Walker Creek Environmental Management System, the BHP Billiton Charter, and internal governance processes and standards (e.g. Code of Conduct, BHP Billiton Environment Standard).

BHP Billiton's approach to environmental management is incorporated in the Charter, which states that we have 'an overriding commitment to health, safety, environmental responsibility and sustainable development'.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes

6.4.1 EPBC Act No and/or Name of Proposal.

Wards Well Exploration Program (EPBC 2011/5820)

Poitrel Mine (EPBC referral 2004/1770)

Kemmis II Open Pit (EPBC 2013/7025)

MRA2A Pit progression (EPBC 2014/7272)

BMC Dragline Move (EPBC 2016/7788)



Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Adaptive Strategies (2017) MRA2C Summary threatened species & ecological communities report	Highly reliable	none
Adaptive Strategies (2017) MRA2C Summary water impact report	Highly reliable	none
Alluvium (2016). MRA2C Surface Water Impact assessment. Report by Alluvium Consulting Australia for BHPB Coal.	Highly reliable	none
Australian Government Department of Environment (2013) Significant impact guidelines 1.1: EPBC Act Matters of National environmental Significance.	Highly reliable	none
Australian Government Department of Environment (2013) Significant impact guidelines 1.3: EPBC Act Coal seam gas and large coal mining developments – impacts on water resources.	Highly reliable	none
CDM Smith (2016) Mulgrave Access Resource Project - MRA2C Groundwater Impact Assessment. Report by CDM Smith for BHPB Coal.	Highly reliable	none
Eco Logical Australia (2017) Mulgrave Stage 2C Ecological Impact Study. Prepared for BHP Billiton.	Highly reliable	none



Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

Many alternatives to the proposed action have been assessed as part of life of mine planning, including:

Not performing the action

Opening of a new pit on the western side of Walker Creek (removing the need for the watercourse diversion as part of the preparatory activities)

Sustaining operations through mining other areas of the existing mine lease, or alternatively seeking greenfield mining opportunities.

These alternatives are discussed briefly as follows.

Not performing the action at all: The coal that exists in the project area is considered to be highly valuable to BMC, because of its qualities and relatively low strip ratios. Access to all economical coals within the Mine Lease area have continually been forecast to support the ongoing development of South Walker Creek Mine. Not undertaking the proposed action would leave a substantial volume of commercially viable coal resource unattained adjacent to an efficiently operating and well performing mining operation. Additionally it would shorten the life of the mine considerably (resulting in broader financial and employment impacts).

No Diversion: Advancement of coal mining in Mulgrave Pit is currently restricted due to the location of Walker Creek, beneath which a significant resource of commercial quality coal exists. Not performing the diversion would require substantial set-back of mining activities and thereby sterilise a substantial proportion of the commercially viable coal. Additionally, the potential option of building a bridge to access the western side of Walker Creek and clearing for overburden due to initial box cut will involve additional environmental impacts. This option is also considered to have economic costs too high to justify mining the remaining portion that would be available.

Sustaining operations through mining other areas of the existing mine lease, or alternatively seeking greenfield mining opportunities: The option to continue existing mining activities within Mulgrave Pit, within the existing Mine Lease area, presents the most significant opportunity to capitalise on the commercially available coal resource. To do otherwise would restrict the ability to produce coal from an established and operating mine and hence introduce inefficiencies and need for further alternatives in the utilisation of Australian resources. Other areas of resource within the SWC mine are already proposed for use for similar reasons.



None of the alternatives are considered feasible.

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No



Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Manager Environment A&I East

9.2.2 First Name

Mark

9.2.3 Last Name

Garrahy

9.2.4 E-mail

mark.garrahy@bhpbilliton.com

9.2.5 Postal Address

Level 14, 480 Queen St
Brisbane QLD 4000
Australia

9.2.6 ABN/ACN

ABN * 34 009 713 875 BHP BILLITON MITSUI COAL PTY LTD

~~77125531017 BHP BILLITON METCOAL HOLDINGS PTY LTD~~

9.2.7 Organisation Telephone

+61733292180



9.2.8 Organisation E-mail

mark.garrah@bhpbilliton.com

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:.....N/A..... Date:N/A.....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 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

Person proposing the action - Declaration

I, MARK GARRAHY, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. 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:06-06-2017.....

I, _____, the person proposing the action, consent to the designation of _____ as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:.....N/A..... Date:N/A.....

9.3 Is the Proposed Designated Proponent an Organisation or Individual?



9.8.4 E-mail

mark.garrah@bhpbilliton.com

9.8.5 Postal Address

Level 14 480 Queen Street
Brisbane QLD 4000
Australia

9.8.6 ABN/ACN

ABN ~~77125531017~~ 34 009 713 875 BHP BILLITON MITSUI COAL PTY LTD
~~77125531017 BHP BILLITON METCOAL HOLDINGS PTY LTD~~

9.8.7 Organisation Telephone

+61733292180

9.8.8 Organisation E-mail

mark.garrah@bhpbilliton.com

Referring Party - Declaration

I, MARK GARRAH, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature: [Signature] Date: 06.06.2017



Individual

9.4 Individual

9.4.1 Job Title

Manager Environment A&I East

9.4.2 First Name

Mark

9.4.3 Last Name

Garrahy

9.4.4 E-mail

mark.garrahy@bhpbilliton.com

Proposed designated proponent - Declaration

I, MARK GARRAHY, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: [Signature] Date: 06-06-2017

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Manager Environment A&I East

9.8.2 First Name

Mark

9.8.3 Last Name

Garrahy



Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. attachment_a_mra2c_summary_threatened_species_ecological_communities_report_.pdf
2. attachment_c_mra2c_summary_water_impact_report_.pdf
3. figure_1_proposed_location.png
4. our_charter_english_a4_sept16.jpg.jpg
5. referral_attachment_-_project_location.pdf
6. referral_attachment_-_watercourse_diversion.pdf
7. study_area_v2.shp

**South Walker Creek Mulgrave Resource Access Project
Stage 2C**

**Threatened species and ecological communities
– assessment of impacts (EPBC Act)**

DOCUMENT TRACKING

PREPARED BY:	Tom Kaveney (Adaptive Strategies)
VERSION:	Final
DATE:	22 May 2017

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INTRODUCTION

The South Walker Creek Mine (SWC Mine) is an open cut coal mining operation owned and managed by BHP Billiton Mitsui Coal (BMC). The mine is located in the northern Bowen Basin, approximately 26 km southeast of the township of Nebo in Queensland.

The mine includes a number of mining pits including the Mulgrave Pit. The Mulgrave Resource Access (MRA) project is a multi stage progression of open cut mining of the Mulgrave Pit. Previous stages have been assessed and approved separately (ref: EPBC 2014/7272). The current project relates to MRA Stage 2C (MRA2C) that involves a progression of the Mulgrave Pit in a south –westerly direction to access coal resources within the current mining lease (ML4750). The pit progression will intersect an ephemeral creek system (Walker Creek) requiring the diversion of the watercourse.

Under the EPBC Act, an action that involves a large coal mining development requires approval from the Australian Government Environment Minister if the action has, will have, or is likely to have a significant impact on a water resource. This report provides a summary of studies undertaken to determine the levels of impacts on water resources.

PURPOSE

Adaptive Strategies Pty Ltd has been engaged by BMC to review and advise on whether the MRA2C project will have a significant impact on threatened species or ecological communities under the requirements and definitions of the *Environment Protection and Biodiversity Conservation Act 1999*.

The advice considers the Australian Government's *Significant impact guidelines 1.1: Matters of National Environmental Significance*; and in particular whether the proposed progression of mining is likely to have a significant impact on a threatened species or ecological community as a matter of national environmental significance.

INFORMATION SOURCES

The assessment and information in this report has been derived from key source documents. The latest study specific to MRA2C is a technical assessment of ecology issues that has been undertaken and reported in *Eco Logical Australia (2016) Mulgrave Stage 2C Ecological Impact Study*.

Over many years BMC has commissioned a considerable amount of work to more accurately define the presence/absence of threatened species and ecological communities within and adjacent to the SWC Mine, including the area proposed for disturbance, these have included:

- Flora and Fauna Baseline Surveys and Impact Assessment for the SAA04 Project Area. Ecoserve and LAMR, 2006
- Target Flora and Fauna Species Surveys – BMA South Walker Creek Mine. Ecoserve and LAMR, 2007
- Biodiversity Management Plan, BMC South Walker Creek Mine. Austecology, 2010
- South Walker Creek and Poitrel Mines – Environmental Values and Water Quality Objectives. BMT WBM, 2011
- Walker Creek Diversion – Biodiversity Assessment Report – Stage 1. Cardno, 2012
- Walker Creek Diversion – Biodiversity Assessment Report – Stage 3. Cardno, 2012 and addendum
- Threatened Terrestrial Fauna Species Assessment Report for Mulgrave Pit Expansion Project. Footprints, 2013

These earlier studies of terrestrial biodiversity have been used as references in the more recent work to provide historical context and ecological baselines over time.

RELEVANT LEGISLATION, POLICIES AND PLANS

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, wetlands, water resources and heritage places — defined in the EPBC Act as matters of national environmental significance.

These matters of national environmental significance (MNES) are:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource in relation to coal seam gas (CSG) and large coal mining (the water trigger).

Significant Impact Guidelines 1.1: Matters of National Environmental Significance.

The Australian Government published the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* to assist proponents understand when significant impacts may result.

The guidelines describe a 'significant impact' as an impact that is "important, notable, or of consequence, having regard to its context or intensity."

Whether or not an action is likely to have a significant impact depends upon the sensitivity, value and quality of the environment that is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

The guidelines provide questions or criteria to consider in determining whether an action is likely to have a significant impact on a matter of national environmental significance and for project proponents to use in undertaking a 'self-assessment' to decide whether or not a proposed action is likely to have a significant impact on any matters of national environmental significance. Significant impact criteria are provided for each matter of NES.

ASSESSMENT AGAINST CRITERIA

Based on field validation surveys in 2016 and 2017, the following MNES values were confirmed within the project disturbance footprint of MRA2C:

- Brigalow TEC
- Black Ironbox
- Potential habitat for Koala, Ornamental Snake, Greater Glider and Squatter Pigeon.

The following assessments on significant impact are provided against the EPBC Significant Impact Guidelines 1.1.

BLACK IRONBOX

Within the project site there is 16.8 ha of suitable riparian habitat supporting Black Ironbox that will be impacted by the project. This habitat has been assessed as not critical for the survival of the species and the occurrence of Black Ironbox within the study area is not considered to be part of an important population.

The extent of impacts is anticipated to be limited to the direct removal of the species and habitat within the project disturbance footprint. Indirect impacts downstream or from ground water alterations are not expected. The average depth to groundwater sources is approximately 10 m below the surface (CDM Smith, 2016). The depth is consistent across the entire study area, including the Walker Creek riparian zone. The fact that Black Ironbox is limited to the riparian zone suggests it is not highly dependent on the groundwater but rather reliant on the riparian saturation zone that is replenished by seasonal flooding. As such there is a low risk that downstream populations will be negatively affected by any potential groundwater drawdowns associated with the construction of the Mulgrave Pit.

As it is highly likely that Black Ironbox requires water from the riparian saturation zone, the maintenance of the current hydrological flows along Walker Creek is of importance. The constructed diversion channel will divert the current catchment area associated with Walker Creek. Connectivity of subsurface flows will remain through deliberate design of the diversion channel. As such, water flow and volume to downstream areas will be equivalent to current conditions, which will reduce the likelihood of indirect impacts to downstream populations.

In addition, it is proposed to use Black Ironbox in the revegetation of the constructed diversion channel to assist in mitigating impacts associated with the removal of mature individuals within the project disturbance footprint. Species planting along the diversion channel will substantially mitigate any impacts. Overall an increase in Black Ironbox individuals is expected.

As outlined in the table below, project impacts are not considered to be significant on this MNES value.

Black Ironbox (*Eucalyptus raveretiana*) – Assessment against Significant Impact Criteria

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek). Revegetation of the creek diversion utilising the species would mitigate the long-term decrease of Black Ironbox within the impact area.
Reduce the area of occupancy of an important population	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek). Impacts are expected on 16.8 ha. Nearby important populations downstream on Bee Creek will not be impacted by this project. Revegetation of the creek diversion utilising the species would mitigate the reduction of area of occupancy of Black Ironbox within the impact area.
Fragment an existing important	No	Project clearing will not fragment habitat supporting an

Significant Impact Criteria	Assessment	Response to Criteria
population into two or more populations		important population.
Adversely affect habitat critical to the survival of the species	No	Habitat within the study area is not considered critical to the survival of the species due to there being good quality habitat still occurring downstream of the study area. Loss equates to only 0.04 % of potential Black Ironbox habitat modelled within the region.
Disrupt the breeding cycle of an important population	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek). This population would have a greater reproductive output (pollen) in comparison to population within the study area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	<p>Habitat within the study area is not considered critical to the survival of the species due good quality habitat occurring downstream of the study area and in numerous other large watercourse systems in the nearby region.</p> <p>The loss equates to only 0.04% of potential Black Ironbox habitat modelled within the region. It is unlikely that this will result in a decline of the species.</p> <p>Rubber Vine is a threat to the species and has the potential to cause extensive degradation. No Rubber Vine infestations were located along Walker Creek. Current mining operations have not introduced this species and it is unlikely that this will occur as a result of the expansion project. Exotic grasses were prevalent along Walker Creek and likely a result of previous grazing land use rather than current mining activities. Management of diversion rehabilitation will include weed and exotic grass control that are identified as threatening processes.</p>
Introduce disease that may cause the species to decline	No	No diseases listed as a threat to the species
Interfere substantially with the recovery of the species	No	<p>Based on the percentage of potential modelled habitat impacted, the project is not considered to substantially interfere with the recovery of the species.</p> <p>Rehabilitation of creek diversion will include Black Ironbox to mitigate impacts.</p>

ORNAMENTAL SNAKE

Approximately 33.1 ha of Ornamental Snake habitat will be impacted by the project. As outlined in the table below, project impacts are likely to be significant for this MNES value.

Ornamental Snake (*Denisonia maculata*) – Assessment against Significant Impact Criteria

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	Yes	Habitat within the study area is considered to support an important population due to the presence of important habitat (gilgai habitat in good condition). The determination of important habitat is supported by species records 2 – 5 km south-east of the study area. The project will impact on 33.1 ha of Ornamental Snake habitat. No undisturbed Ornamental Snake habitat will remain within the study area following the development of the project.
Reduce the area of occupancy of an important population	Yes	Habitat within the study area is considered to support an important population due to the presence of high quality habitat. The project will impact on 33.1 ha of Ornamental Snake habitat.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment Ornamental Snake habitat supporting an important population.
Adversely affect habitat critical to the survival of the species	Yes	The project will impact on 33.1 ha of Ornamental Snake habitat.
Disrupt the breeding cycle of an important population	No	The project will not specifically 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 the species is likely to decline	No	The species is also known to persist in disturbed environments as long as key microhabitat features are present (gilgai, soil cracks)
Introduce disease that may cause the species to decline	No	There are no known diseases that threatened the species
Interfere substantially with the recovery of the species	No	The project does not interfere with the recovery actions outlined in the Draft Recovery Plan for Queensland Brigalow Belt Reptiles.

KOALA

A large area, 273.2 ha, of Eucalypt woodland supporting known Koala food trees is present within the project area. No survey records for Koalas are known from the project area despite considerable survey effort on site and in the vicinity. However, two informal observations of Koalas has occurred in the SWC Mine area in the past 2 years, indicating that Koalas are present in the locality periodically.

As per the EPBC Act referral guidelines for the vulnerable Koala, Koala habitat value is categorised by five primary habitat attributes – vegetation composition, occurrence, recovery value, key existing threats and connectivity. An analysis of these five primary Koala habitat attributes along with the latest regional data, previous ecological assessment results for the study area and the recent results of the targeted habitat assessments the habitat has been determined not to be critical to the survival of the species or supporting an important population.

The detailed habitat analysis is provided in the Mulgrave Stage 2C Ecological Impact Study (Eco Logical Australia 2016). A summary of findings is provided below.

Vegetation composition

Based on targeted habitat assessments across the study area, Koala food trees were confirmed within the floodplain of Walker and Carborough Creek. The entirety of the fringing riparian forest habitat was found to contain known Koala food species; however only portions (approximately 45%) of the floodplain Eucalypt forest habitat was found to contain Koala food trees dominating the canopy layer (>50% coverage). Koala food trees identified within these habitat types include:

- Poplar Box
- Narrow-leaved Ironbox
- Queensland Blue Gum
- River Red Gum

Suitable vegetation composition, structure and condition to support Koalas was therefore only identified within two habitat areas within the study area – the fringing riparian forest and portions of the floodplain Eucalypt forest habitat.

Occurrence

While food trees are present across the study area, koala occurrence is very low. Survey data for the South Walker Creek Mine spanning 11 years from 2005 – 2016, has not recorded any Koala within the study area. Two informal sightings have been documented from areas adjacent to the project site.

Targeted searches for Koalas across suitable habitat within and adjacent to the study area in 2013 and 2014 found no evidence of Koala utilisation. This involved targeted searches (including spotlighting nocturnal searches) along fringing riparian forest and Eucalypt floodplain habitat along Carborough and Walker Creek. Only one form of indirect evidence has been recorded, which was during surveys in 2006 where potential scratch marks were identified on a Eucalypt tree located along Walker Creek.

Whilst inland Koala populations naturally occur in low densities (0.01 Koala / ha), given the extent of suitable habitat both within and surrounding the study area the evidence of species utilisation should be higher for a typical inland population. As such all evidence collected to date suggests that Koalas are present; however use of suitable habitat is infrequent and that Koalas are likely to utilise the study area on a transient basis only.

Recovery value

As per the EPBC Act referral guidelines for the vulnerable Koala, the interim recovery objectives for inland environments is protecting and conserving refuge habitat. Refuge habitat is areas that provide a water source for the species during drought conditions. During the 2002 – 2006 drought across Central Queensland region, Koala sightings were concentrated in large vegetation tracts associated with the ranges as well as the riparian vegetation along Funnel Creek (ALA, 2016). During non-drought years sightings extend to the smaller tributaries of major watercourses and the surrounding fragmented landscape. Within the South Walker Creek Mine, all evidence of utilisation has occurred outside of the drought period.

The Walker and Carborough Creek are fourth and fifth order streams but due to their ephemeral nature are a limited source for available water, particularly during drought conditions. The refuge value of this habitat is considered to be low. Downstream environments such as Funnel Creek provide more substantial watercourse and surrounding riparian vegetation that provide better refuge values than upstream areas.

Key existing threats

The study area has historically been utilised for grazing purposes. Key threats to the species such as dog attacks and vehicle strikes are low. Operational mining activities do not currently extend into the study area although wild dog eradication has occurred in nearby areas. Vehicle traffic associated with mining activities are infrequent and occur as

part of routine maintenance and inspection checks across the lease. Clearing or construction of infrastructure within the study area has not occurred to the extent that it would create a barrier to Koala movement.

Overall, key existing threats to Koala within the study area are considered to be low.

Connectivity

The study area forms the eastern edge of a large vegetation tract that extends west of the South Walker mining lease. Connectivity to the west and south of the study area is therefore high. The large vegetation tract provides a landscape linkage between the Carborough Ranges and Dipperu National Park.

The operational mining area fragments the study area from areas to the north and east, creating a significant barrier to fauna movement. However, Walker Creek does provide a corridor that links to other eastern areas of habitat.

Therefore based on the low occurrence and the lack of recovery value, habitat within the study area is not considered critical to the survival of the species.

Project impacts are not considered to be significant on the Koala.

Koala (*Phascolarctos cinereus*) – Assessment against Significant Impact Criteria

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	<p>The study area is not considered to support an important population of Koalas. Based on current information and concentrations of species records, important populations are likely to occur in the Conor Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park.</p> <p>The study area does occur to the east of the Conor Ranges and connectivity with surrounding habitat will remain following the construction of the project, allowing for Koalas to still disperse across the area.</p> <p>The existing hydrology of Walker Creek will also be maintained within the diversion channel, which will retain habitat values within the study area. Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.</p>
Reduce the area of occupancy of an important population	No	<p>The study area is not considered to support an important population of Koalas. Based on current information and concentrations of species records, important populations are likely to occur in the Conor Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park.</p> <p>The existing hydrology of Walker Creek will also be maintained within the diversion channel, which will retain habitat values within the study area. Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.</p>
Fragment an existing important population into two or more populations	No	Connectivity with surrounding habitat such as Carborough Ranges and Dipperu National Park will remain following the construction of the project.
Adversely affect habitat critical to the survival of the species	No	Habitat within the study area is not considered critical to the survival of the species due to the recorded low level of occurrence and the lack of recovery value.
Disrupt the breeding cycle of an	No	The project will not disrupt the breeding cycle of an important population. Connectivity with surrounding

Significant Impact Criteria	Assessment	Response to Criteria
important population		habitat will remain following the construction of the project, allowing for breeding males to still disperse across the area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	<p>The project area provides potential suitable foraging resources for the species; however utilisation appears to be very low and infrequent. Evidence shows the density of Koalas utilising the study area to be lower than the expected density for inland populations (i.e. 0.01 / ha). The loss of habitat is therefore unlikely to cause the species to decline.</p> <p>Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts. Connectivity across the landscape will also remain, allowing Koalas to continue to disperse to surrounding areas of core habitat.</p>
Introduce disease that may cause the species to decline	No	<p>It is unlikely that the project will facilitate the introduction or spread of diseases specific to the species such as Chlamydia, or diseases that can significantly degrade critical habitat such as root rot (<i>Phytophthora cinnamomi</i>).</p> <p>Whilst dieback was noted to occur in the study area, this was highly localised and not to the extent that occurs as a result of root rot. No other signs of root rot such as yellow and wilting of the leaves was observed across the vegetation communities within the study area.</p>
Interfere substantially with the recovery of the species	No	<p>The project will not increase Koala fatalities due to dog attacks, vehicle strike or introduced pathogens. Mining activities are limited to operational land and will not encroach into remaining habitat areas.</p> <p>The retention of vegetation within undisturbed portions of the study area will retain connectivity across the landscape, allowing any Koalas present to continue to disperse to surrounding areas of suitable habitat.</p> <p>Maintaining existing hydrology of Walker Creek within the diversion channel will also retain refuge habitat values within the study area.</p> <p>Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.</p>

SQUATTER PIGEON

The project area contains approximately 350 ha of potential Squatter Pigeon habitat. This habitat has been assessed as not critical for the survival of the species and is not considered to support an important population. As outlined in the table below, project impacts are not considered to be significant on Squatter Pigeon.

Squatter Pigeon (*Geophaps scripta scripta*) – Assessment against Significant Impact Criteria

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Reduce the area of occupancy of an important population	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment Squatter Pigeon habitat supporting an important population.
Adversely affect habitat critical to the survival of the species	No	Habitat within the study area is not considered critical to the survival of the species due to the abundance of habitat (including breeding) that occurs in the region. Potential breeding habitat for the species will be cleared as a result of the project. The diversion will result in the relocation of a suitable water source for the species further south. Current extent of breeding habitat ground-truthed within the study area is 351.1 ha. Following the construction of the project, including the diversion, critical water resources may be available to the surrounding suitable foraging habitat for the species.
Disrupt the breeding cycle of an important population	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The project will result in the potential loss of 351.1 ha of Squatter Pigeon habitat. This equates to only 0.28% of potential Squatter Pigeon habitat modelled within the region (1:500,000). It is unlikely that this will result in a decline of the species.
Introduce disease that may cause the species to decline	No	No diseases are listed as a threat to the species.
Interfere substantially with the recovery of the species	No	Based on the percentage of potential modelled habitat impacted, the project is not considered to substantially interfere with the recovery of the species. Rehabilitation of creek diversion to ensure the catchment size and volume of water flow through the diversion is similar to that of Walker Creek will assist in mitigating impacts on breeding habitat.

GREATER GLIDER

The project area contains approximately 125 ha of Greater Glider habitat. This habitat is not considered to support an important population or considered critical to the survival of the species.

The persistence of the species in a fragmented and disturbed landscape like that of the Northern Brigalow Belt is heavily dependent on forest connectivity, sizeable habitat tracts and the presence of hollow-bearing trees. Hollow-bearing trees are a particularly critical component as they are a limited resource due to the association with old growth forest. The project will result in the removal of habitat containing breeding resources but will not impact on the large habitat tracts in the surrounding area including the Carborough and Conor Ranges.

As outlined in the table below, project impacts are likely to cause a local population decline.

Greater Glider (*Petauroides volans*) – Assessment against Significant Impact Criteria

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	Not considered to be an important population as available data suggests that the local population is not at a density that is likely to form a source population and play a critical role in maintaining genetic diversity.
Reduce the area of occupancy of an important population	No	Not considered to be an important population as available data suggests that the local population is not at a density that is likely to form a source population and play a critical role in maintaining genetic diversity.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment Greater Glider habitat supporting an important population. This habitat is likely to occur west on the Carborough Ranges. Connectivity within this area will not be impacted upon by the project.
Adversely affect habitat critical to the survival of the species	No	The project will result in the potential impact of 125.2 ha of Greater Glider habitat. This consists of riparian habitat containing a low density of hollow-bearing trees. This habitat is not considered critical in the overall long-term maintenance of the species.
Disrupt the breeding cycle of an important population	No	Not considered to be an important population as available data suggests that the local population is not at a density that is likely to form a source population and play a critical role in maintaining genetic diversity.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Local decline	The project will result in the potential impact of 125.2 ha of Greater Glider habitat. This consists of riparian habitat containing a low density of hollow-bearing trees. This habitat is not considered critical in the overall long-term maintenance of the species.
Introduce disease that may cause the species to decline	No	There are no known diseases that threaten the species.
Interfere substantially with the recovery of the species	No	The project does not interfere with the recovery actions outlined in the species conservation advice.

CONCLUSION

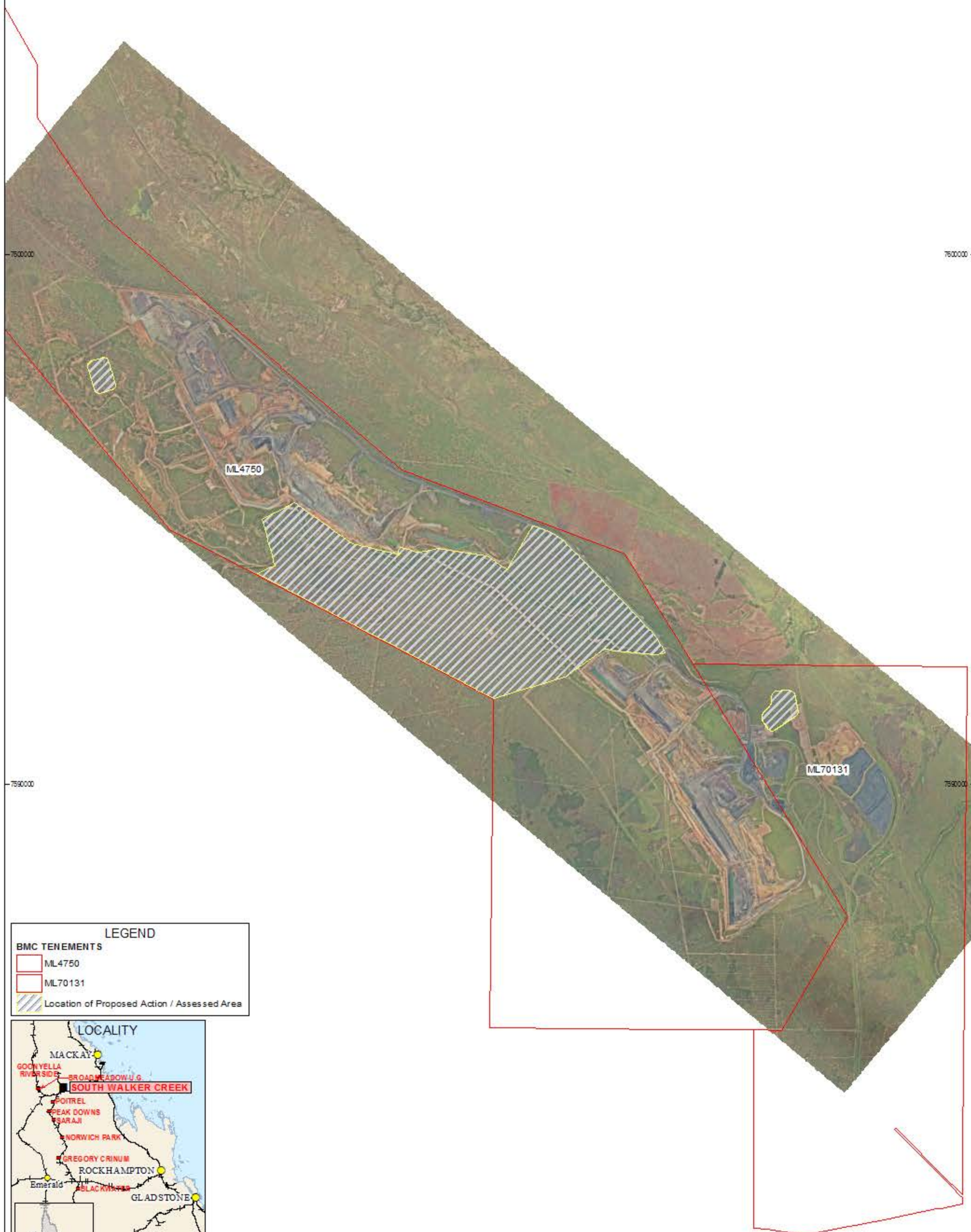
Listed threatened species and ecological communities may be impacted by the project. Based on field validation surveys, the following MNES values were confirmed within the project disturbance footprint of MRA2C:

- Brigalow TEC
- Black Ironbox
- Habitat for Koala, Ornamental Snake, Greater Glider and Squatter Pigeon.

Consideration of assessments undertaken against the criteria in the Significant Impact Guidelines 1.1 indicates that a significant impact may result on the Brigalow TEC and Ornamental snake. Impacts on other threatened species are not expected to be significant.

REFERENCES

- Austecology (2010) Biodiversity Management Plan, BMC South Walker Creek Mine.
- Australian Government Department of Environment (2013) Significant impact guidelines 1.1: EPBC Act Matters of National environmental Significance.
- BMT WBM (2011) South Walker Creek and Poitrel Mines – Environmental Values and Water Quality Objectives.
- Cardno (2012) Walker Creek Diversion – Biodiversity Assessment Report – Stage 1.
- Cardno (2012) Walker Creek Diversion – Biodiversity Assessment Report – Stage 3. and addendum
- DEHP (2015) Environmental Authority – South Walker Creek Mine Permit No. EPML00712313.
- Eco Logical Australia (2016) *Mulgrave Stage 2C Ecological Impact Study*. Prepared for BHP Billiton.
- Ecoserve and LAMR (2006) Flora and Fauna Baseline Surveys and Impact Assessment for the SAA04 Project Area.
- Ecoserve and LAMR (2007) Target Flora and Fauna Species Surveys – BMA South Walker Creek Mine.
- Footprints (2013) Threatened Terrestrial Fauna Species Assessment Report for Mulgrave Pit Expansion Project.



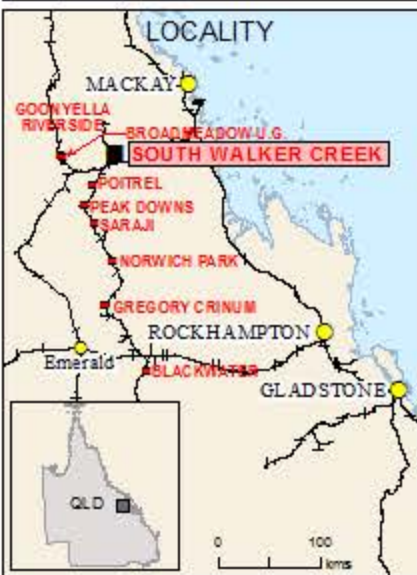
LEGEND

BMC TENEMENTS

ML4750

ML70131

Location of Proposed Action / Assessed Area





Our Charter

**We are BHP Billiton,
a leading global resources company.**

Our Purpose

Our purpose is to create long-term shareholder value through the discovery, acquisition, development and marketing of natural resources.

Our Strategy

Our strategy is to own and operate large, long-life, low-cost, expandable, upstream assets diversified by commodity, geography and market.

Our Values

Sustainability

Putting health and safety first, being environmentally responsible and supporting our communities.

Integrity

Doing what is right and doing what we say we will do.

Respect

Embracing openness, trust, teamwork, diversity and relationships that are mutually beneficial.

Performance

Achieving superior business results by stretching our capabilities.

Simplicity

Focusing our efforts on the things that matter most.

Accountability

Defining and accepting responsibility and delivering on our commitments.

We are successful when:

Our people start each day with a sense of purpose and end the day with a sense of accomplishment.

Our teams are inclusive and diverse.

Our communities, customers and suppliers value their relationships with us.

Our asset portfolio is world-class and sustainably developed.

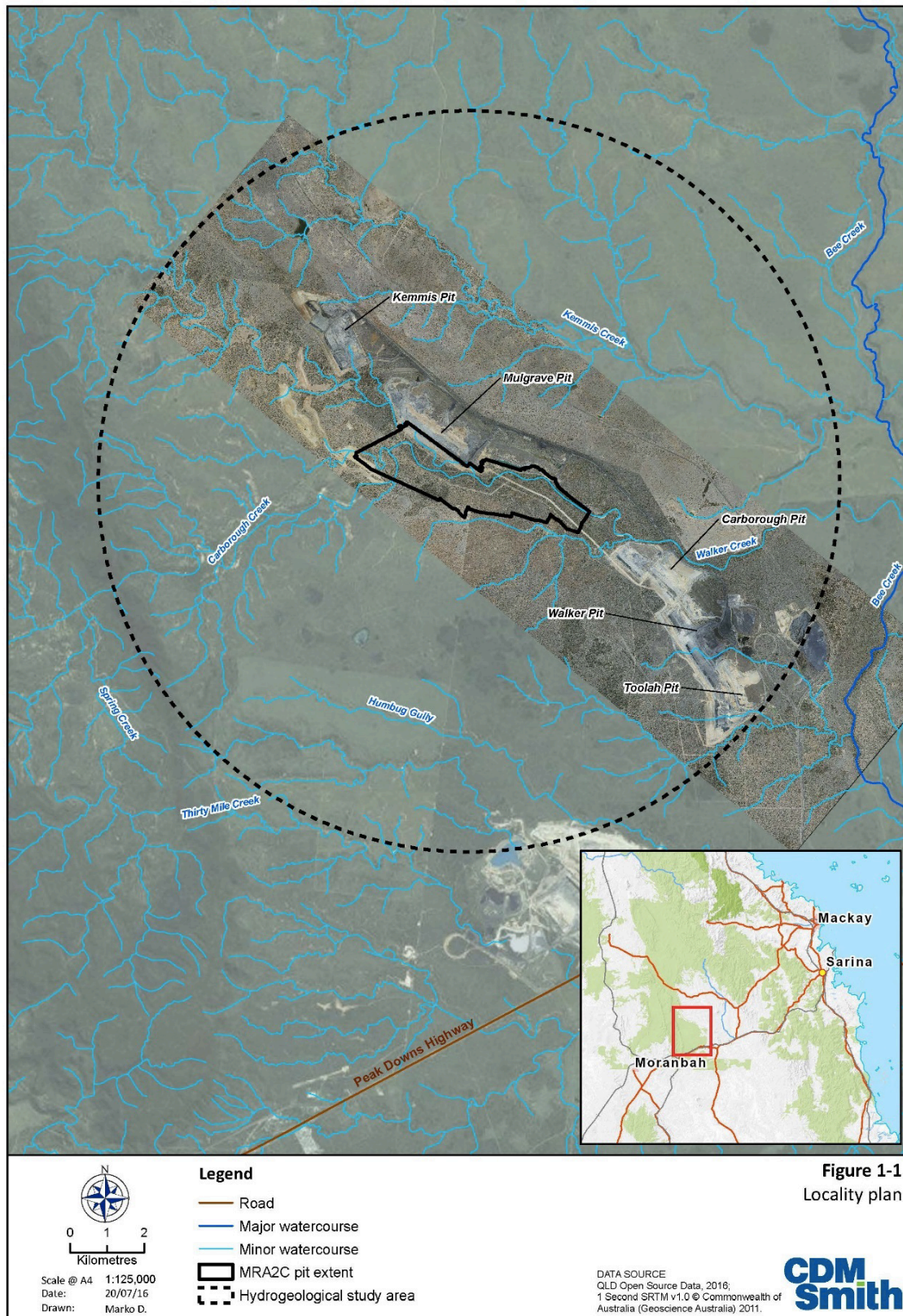
Our operational discipline and financial strength enables our future growth.

Our shareholders receive a superior return on their investment.

Andrew Mackenzie
Chief Executive Officer

September 2016

Project Location



South Walker Creek Mulgrave Resource Access Project

Stage 2C

Water Resource – assessment of impacts (EPBC Act)

DOCUMENT TRACKING

PREPARED BY:	Tom Kaveney (Adaptive Strategies)
VERSION:	Final
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INTRODUCTION

The South Walker Creek Mine (SWC Mine) is an open cut coal mining operation owned and managed by BHP Billiton Mitsui Coal (BMC). The mine is located in the northern Bowen Basin, approximately 26 km southeast of the township of Nebo in Queensland.

The mine includes a number of mining pits including the Mulgrave Pit. The Mulgrave Resource Access (MRA) project is a multi stage progression of open cut mining of the Mulgrave Pit. Previous stages have been assessed and approved separately (ref: EPBC 2014/7272), The current project relates to MRA Stage 2C (MRA2C) that involves a progression of the Mulgrave Pit in a south –westerly direction to access coal resources within the current mining lease (ML4750). The pit progression will intersect an ephemeral creek system (Walker Creek) requiring the diversion of the watercourse. The project will also require the replacement of a mine water dam, this will be achieved through the establishment of two new dams one to the north and one to the south of the pit.

Under the EPBC Act, an action that involves a large coal mining development requires approval from the Australian Government Environment Minister if the action has, will have, or is likely to have a significant impact on a water resource. This report provides a summary of studies undertaken to determine the levels of impacts on water resources.

PURPOSE

Adaptive Strategies Pty Ltd has been engaged by BMC to review and advise on whether the MRA2C project will have a significant impact on water resources under the requirements and definitions of the *Environment Protection and Biodiversity Conservation Act 1999*.

The advice considers the Australian Government's *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments— impacts on water resources*; and in particular whether the proposed progression of mining is likely to have a significant impact on a water resource as a matter of national environmental significance.

INFORMATION SOURCES

The assessment and information in this report has been derived from a number of key source documents. Each of these documents contains both a technical assessment of water and ecology issues and compiles information from earlier studies, surveys and impact assessments. The reports are:

- Alluvium (2016). MRA2C Surface Water Impact assessment. Report by Alluvium Consulting Australia for BHPB Coal.
- CDM Smith (2016) Mulgrave Access Resource Project - MRA2C Groundwater Impact Assessment. Report by CDM Smith for BHPB Coal.
- Eco Logical Australia (2016) Mulgrave Stage 2C Ecological Impact Study. Prepared for BHP Billiton.
- DEHP August (2015). Environmental Authority (EA) – *South Walker Creek Mine Permit No. EPML00712313*

RELEVANT LEGISLATION, POLICIES AND PLANS

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, wetlands, water resources and heritage places — defined in the EPBC Act as matters of national environmental significance.

These matters of national environmental significance (MNES) are:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource in relation to coal seam gas (CSG) and large coal mining (the water trigger).

The amendment to the EPBC Act to include a water resource in relation to CSG and large coal mining as a MNES came into effect on 22 June 2013. This means that, under the EPBC Act, an action that involves a CSG development or a large coal mining development now requires approval from the Australian Government Environment Minister (the Minister) if the action has, will have, or is likely to have a significant impact on a water resource.

The 'Water Trigger'

The intent of the introduction of water resources as a matter of National Environmental Significance (NES) was to address community concern about potential impacts to critical water resources. This intent was quite clearly stated in the Minister's second reading speech, as reproduced below:

"The challenge we have had up until now is that people quite reasonably expect the minister for the environment and water to take into account, by law, the impacts of coal seam gas and large coal mining on water resources. They want to know that I am considering: if there is an irreversible depletion and contamination of our surface and groundwater resources; the impacts on the way critical water systems operate; and the related effects on our ecosystems."

The Minister went on to say that:

"The amendment does not seek to invoke the Commonwealth in all water decisions. The trigger will not capture small projects such as farm dams. The amendments will create a new matter of national environmental significance for coal seam gas and large coal mining developments which are likely to have a significant impact on a water resource. It will provide the strong legal basis for protection that the community wants. This is not a broad trigger."

(The Hon Tony Burke, Minister for Sustainability, Environment, Water, Population and Communities, 13 March 2013)

The second reading speech made clear that water resources as a matter of NES is restricted to CSG and coal developments and this is reflected in the Significant impact guidelines 1.3.

Significant Impact Guidelines 1.1: Matters of National Environmental Significance.

The Australian Government published the *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* to assist proponents understand when significant impacts may result.

The guidelines describe a 'significant impact' as an impact that is:

important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.

The guidelines provide questions to consider in determining whether an action is likely to have a significant impact on a matter of national environmental significance and for project proponents to use in undertaking a 'self-assessment' to decide whether or not a proposed action is likely to have a significant impact on any matters of national environmental significance. Significant impact criteria are provided for each matter of NES.

Significant impact guidelines 1.3: Coal seam gas and large coal mining developments— impacts on water resources

The Australian Government has also issued guidelines specifically relating to consideration of a water resource in relation to CSG and large coal mining as a MNES. The *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments— impacts on water resources* (December 2013) seek to assist in the decision about whether an action involving a CSG development or a large coal mining development has, or is likely to have, a significant impact on a water resource. The guidelines should be read in conjunction with the EPBC Act and Significant impact guidelines 1.1.

The guidelines provide a 'self-assessment' process for the proposers of projects, including detailed criteria, to assist in deciding whether or not referral may be required. This advice has regard to those detailed criteria and forms the 'self-assessment' for the MRA2C project.

RELEVANT CRITERIA

For large coal mining operations the criteria relevant to impacts on water resources are focussed on changes in hydrological characteristics, water quality, cumulative impacts. The criteria refer specifically to the utility of the water resource, therefore, it is imperative that any assessment of impacts is undertaken with a focus on third party uses of the water resource, including human and natural environmental users.

Specifically the criteria are:

5.2 General criteria

An action is likely to have a significant impact on a water resource if there is a real or not remote chance or possibility that it will directly or indirectly result in a change to:

- the hydrology of a water resource,
- the water quality of a water resource,

that is of sufficient scale or intensity as to reduce the current or future utility of the water resource for third party users, including environmental and other public benefit outcomes, or to create a material risk of such reduction in utility occurring. For further information on the utility of a water resource for third party uses.

5.2.1. Value of a water resource

It is important to consider the value of the water resource in determining whether the impacts of a proposed action on a water resource are likely to be significant. The key factor that will be relevant in determining the value of a water resource will be its utility for all third party uses, including environmental and other public benefit outcomes (see Example 8). Such outcomes include:

- provisioning services (e.g. use by other industries and use as drinking water)
- regulating services (such as the climate regulation or the stabilisation of coastal systems)
- cultural services (including recreation and tourism, science and education)
- supporting services (e.g. maintenance of ecosystem function).

The ecosystem function of a water resource includes the ecosystem components, processes and benefits or services that characterise the water resource, including support for the biological diversity or species composition of the water resource.

If there is evidence, based on data, modelling and engagement with potentially affected stakeholders, that the action would not materially affect (either by increasing or decreasing) the availability and quality of water for all third party users, including environmental and other public benefit outcomes and including at a future time or in another place, then that would reduce the likelihood of the action having a significant impact.

Criteria 5.3. Guidance on changes to hydrological characteristics

A significant impact on the hydrological characteristics of a water resource may occur where there are, as a result of the action:

- a) changes in the water quantity, including the timing of variations in water quantity
- b) changes in the integrity of hydrological or hydrogeological connections, including substantial structural damage (e.g. large scale subsidence)
- c) changes in the area or extent of a water resource

Where these changes are of sufficient scale or intensity as to significantly reduce the current or future utility of the water resource for third party users, including environmental and other public benefit outcomes.

Criteria 5.4. Guidance on changes to water quality

A significant impact on a water resource may occur where, as a result of the action:

- a) there is a risk that the ability to achieve relevant local or regional water quality objectives would be materially compromised, and as a result the action:
- I. creates risks to human or animal health or to the condition of the natural environment as a result of the change in water quality
 - II. substantially reduces the amount of water available for human consumptive uses or for other uses, including environmental uses, which are dependent on water of the appropriate quality
 - III. causes persistent organic chemicals, heavy metals, salt or other potentially harmful substances to accumulate in the environment seriously affects the habitat or lifecycle of a native species dependent on a water resource, or
 - IV. causes the establishment of an invasive species (or the spread of an existing invasive species) that is harmful to the ecosystem function of the water resource, or
 - V. there is a significant worsening of local water quality (where current local water quality is superior to local or regional water quality objectives), or
 - VI. high quality water is released into an ecosystem which is adapted to a lower quality of water.

Criteria 5.5.1. Cumulative impacts

With regards cumulative impacts the guidelines provide the following advice:

The definitions of CSG development and large coal mining development refer to the action having a significant impact 'when considered with other developments, whether past, present or reasonably foreseeable developments'. This means that a significant impact on water resources may be caused by one CSG development or large coal mining development, or the cumulative impact of other developments in the area.

At the referral stage, cumulative impacts should be assessed qualitatively on the basis of potential risks, and only existing and reasonably foreseeable future uses should be considered.

ASSESSMENT AGAINST CRITERIA

SURFACE WATER

The MRA2C project will occur within the surface water catchment of Walker Creek, just downstream of the confluence with the smaller tributary, Carborough Creek.

Walker Creek is an ephemeral watercourse with a catchment of approximately 17,500ha that originates roughly 25 kilometres north of the current mining activity and drains in a general southerly direction. The vast majority of the Walker Creek catchment is used for grazing and no other mines are located within it.

Walker Creek enters the mine lease north of the project and is currently not impacted by mining activities until it reaches SWC Mine where its original course has been diverted to avoid sections of the Mulgrave pit, specifically MRA2A which was an earlier stage of the mine plan (EPBC 2014/7272).

Downstream from the recently constructed MRA2A diversion, Walker Creek flows in a south-easterly direction adjacent the Mulgrave Pit highwall through the mining lease area identified for the MRA2C stage of mining. Walker Creek then joins Bee Creek approximately 5.5km downstream of the eastern mining lease boundary. Bee Creek continues for approximately 60km before joining the Connors River that, together with the Isaac River, form a major drainage basin for the Fitzroy River Basin (refer Figure1).

Water quality in Walker Creek upstream of mining activity is considered to be good with the exception of the high suspended solid concentrations often in excess of 1000mg/L. It is this high suspended load that is believed responsible for the uniformly flat sandy bed, which offers little to no habitat value.

The *South Walker Creek and Poitrel Mines – Salt Assimilation Studies: Environmental Values and Water Quality Objectives* report (BMT WBM, 2011) determined that based on the degree of modification to its catchment, lack of aquatic habitat and/or permanent/semi-permanent water holes, and overall stream condition, Walker Creek is considered to be in slightly-to-moderately disturbed condition.

No listed fish species or other aquatic fauna have been identified within the creek system and field surveys indicate that there are no aquatic macro-invertebrate, fish or reptile (turtles) MNES species likely to be present. While Walker Creek provides temporary aquatic fauna movement habitat during flow events, it does not provide sufficient habitat diversity or type suited to MNES fauna species, predominately due to the lack of permanent waterholes which are a result of seasonal rains and from the increased sediment loads carried by the system.

Surface water flows into Walker Creek from the project area occur during moderate and high rainfall events. Low rainfall events are generally absorbed by surface soils (Alluvium 2016). Drainage into Walker Creek occurs from the western and southern side of the creek, flows from the northern side are already interrupted by the existing mine operations.

An assessment of impacts to surface water has been undertaken and reported in *MRA2C Surface Water Impact Assessment* (Alluvium 2016). A summary of findings against the Significant Impact Guidelines 1.3 is provided below.

Change in integrity of hydrological connections

The main change in hydrological surface water connections will be from the diversion of Walker Creek from its original course to avoid pit progression as shown in Figure 2.

The Walker Creek diversion has been hydraulically designed using both existing design guidelines adopted by the Queensland Government and the outcomes of research undertaken by the Australian Coal Association Research Program (ACARP) in a report titled *Criteria for functioning river landscape units in mining and post mining landscapes* (ACARP, 2014). These guidelines are the recommended standard to minimise potential adverse impacts and allow diversions to function as part of the natural landscape in the longer term.

The diversion design includes consideration of the existing hydrologic, hydraulic and sediment transport data so that channel stability is created and rates of erosion mimic the natural conditions. The entire diversion is located on existing mining lease area and the diversion will re-join the natural creek line prior to the creek crossing the mine lease boundary. Hydraulic and hydrodynamic modelling shows that stream power, shear stress and velocity are below threshold levels throughout the length of the diversion channel and no change to water quantity downstream of the diversion will occur. Changes to stream location, function and flow beyond the mine lease will not result.

The diversion has been designed to provide continuity in physical stream system processes such that the reach of Walker Creek upstream and downstream of the proposed diversion should be minimally impacted.

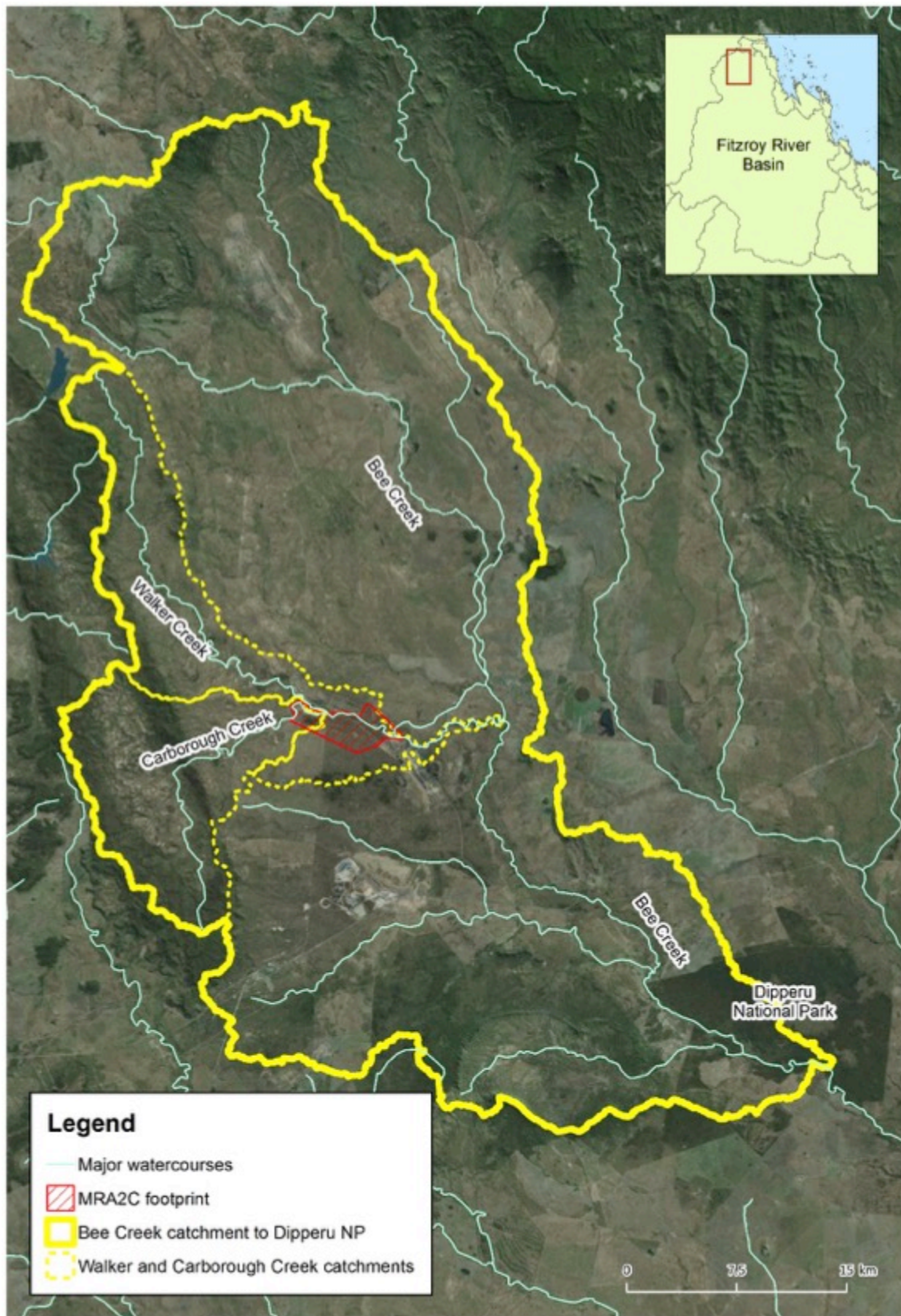


Figure 1: Waterways in the vicinity of the project

Changes in catchment flows and water quantity

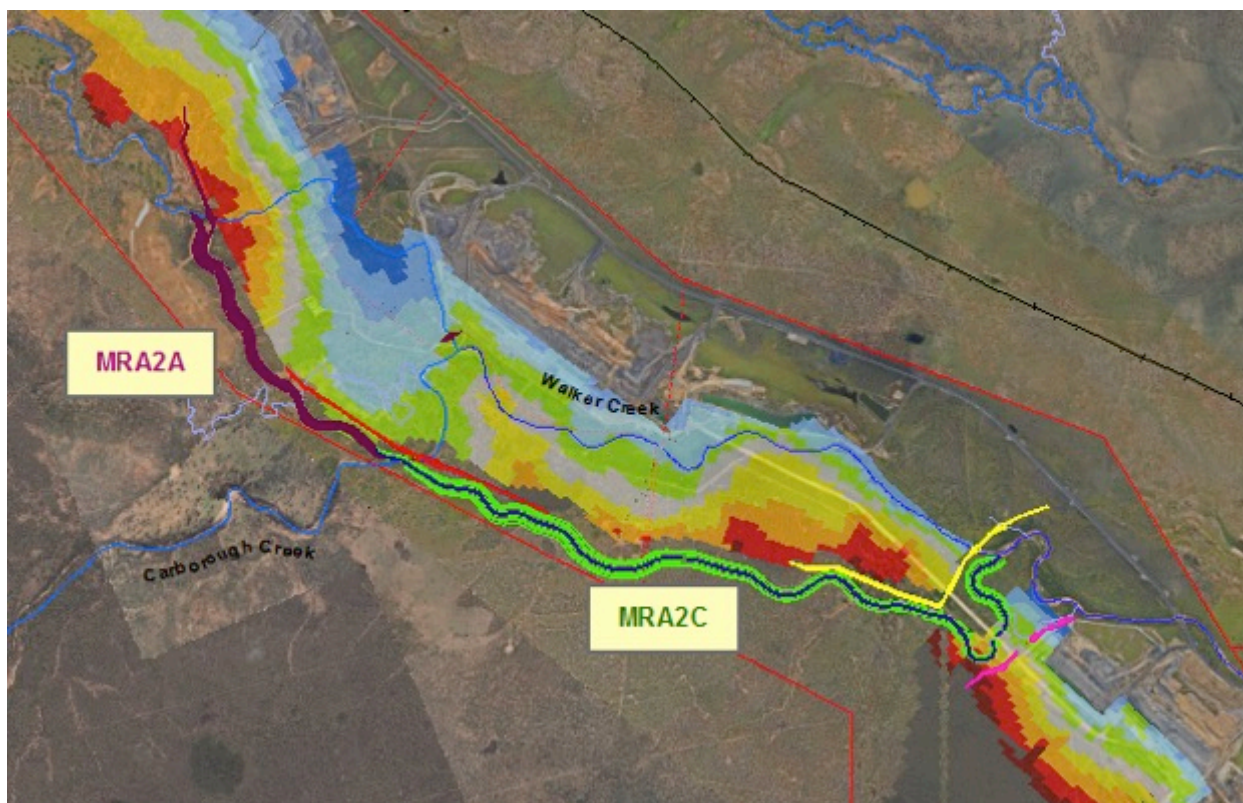
Flows through the diversion become confined between high ground and constructed levees before returning to the original channel and floodplain. All impacts will be limited to the SWC Mine lease. There are no expected impacts to users upstream or downstream.

The increase in mine pit catchments has the potential to result in a decrease in creek flows. The maximum impact on flows in Walker Creek as a direct result of the increasing catchment areas is a decrease of 0.08% of the Bee Creek catchment at Dipperu National Park. This is considered to be a conservative (upper limit) estimate, as it does not include any flows returned to the natural system from storages under licence conditions.

This percentage reduction in water quantity, catchment area and flows is well within any margin of error in calculations and is not considered to represent any significant impact on the hydrology of Walker Creek and is therefore considered to have no significant impacts to users.

The highwall drain catchments will generate runoff that will initially drain to the remnant Walker Creek channel from where it must be pumped out due to impoundment by the downstream diversion plug. This is considered 'clean' water and can be pumped directly to Walker Creek under existing EA conditions. As the mine develops post 2019 the highwall drain catchments reduce as the pit progresses. The remnant Walker Creek channel will be cut and a number of subcatchments will be created, which can be joined by drainage or managed separately. By the time the development is completed the highwall drain catchments will be minimal and the remaining catchments topography can be graded and/or built up to prevent ponding behind levees.

Figure 2: Walker Creek diversions for MRA2A and MRA2C



Changes in flood flows and extents

Some change to flood flows and extents is expected, these changes are minor and will be localised to the diversion and the immediate reaches of Walker Creek upstream and downstream from the diversion on the SWC Mine lease. There are no identified significant impacts to other users.

Changes in water quality

The primary focus for water quality is related to the need for SWC to periodically return water (both "stormwater" and "mine water" collected from the catchments of the mining pits) back into the natural system.

The controlled release of mine water from site is only permissible in accordance with strict conditions outlined in the Environmental Authority (EA) – *South Walker Creek Mine Permit No. EPML00712313* (DEHP 2015). These release conditions have been carefully and scientifically determined, and are in accordance with Qld Government requirements,

so as to protect downstream environmental values. The release conditions are based upon natural flow rates in Bee Creek.

The pit progression will result in the decommissioning of an existing mine water dam. Two new water storage dams will be constructed to replace the existing dam. One dam is located to the north of the coal pit and one to the south. These dams will hold mine affected water that will be pumped directly from the mine into these dams. Water storage and release conditions will be as per the SWC Mine EA, the dams will be managed as per standard procedures for other mine water damns.

The two damns are relatively shallow with raised bund walls. There will be no interaction between the dams and groundwater resources.

Under the EA conditions, monitoring is required of the quality of receiving waters at specific locations and different frequencies. All monitoring is undertaken under the umbrella of the site Receiving Environment Monitoring Program (REMP), which under EA condition W20 *"must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being released. For the purposes of the REMP, the receiving environment is the waters of Bee Creek and connected or surrounding waterways with 15km downstream of the release."*

In the latest annual report for REMP (2015) there was no evidence of an impact on macro invertebrate or fish communities, it is considered unlikely that any changes in water quality associated with the discharge of mine-affected water resulted in environmental harm. Based on these results, the current discharge limits appear suitable to protect downstream environmental values. Additionally, the maximum change in catchment area to Walker Creek as a result of the MRA2C development is 1.65km², which is 0.08% of the Bee Creek catchment. Potential changes to water quality over current conditions are considered to be very limited due to the limited increase in the scale of the project. As the MRA2C project develops the land previously mined will be progressively rehabilitated resulting in a limited overall increase in disturbed ground or pit extent. Consequently, the potential for significant changes to water quality over the current mining configuration is considered to be very low.

Stormwater is managed via the EA, and includes all runoff from lease areas other than mine water. Stormwater may potentially contain elevated levels of suspended solids and dissolved elements compared to background conditions. To manage this, surface water is collected on site from areas disturbed by mining that generate stormwater runoff and associated sediment generation and transport. These areas are treated in accordance with current EA conditions and the Erosion and Sediment Control Plan (ESCP). It is not expected that the EA conditions will need to be revised as they already adequately cover the treatment and discharge of stormwater runoff. The ESCP will require updating over the project lifespan to reflect the changing site configuration.

Impact on human use

There are no known human uses of Walker Creek within the stretch of waterway to be directly impacted by mining and the creek diversion. The entirety of direct impact will occur on mining lease as will the reconstructed diversion. The land is owned by BHPB and all existing stock activity will be removed.

Indirect impacts to human uses downstream of the project are not expected. There will be no discernable change in the quantity and quality of water leaving the mining lease than occurs currently. Additionally, there are no known permanent water extraction points for surface water in Walker Creek due to its ephemeral nature.

Impact on environmental use

Direct impacts to waterway related values are limited to the progression of the mining pits. This will result in a direct loss of vegetation and habitats unrelated to any change in surface water. Direct ecological impacts have been addressed separately to this report.

Indirect impacts on riparian vegetation and other downstream values, such as Dipperu National Park are not expected due to the minimal changes in water quantity and quality that will ultimately be released or discharge from the mining area. This includes the diverted flows along Walker Creek.

GROUND WATER

To support mine planning, impact assessments and both Commonwealth and Queensland regulatory approvals a detailed groundwater study (CDM Smith 2016) has been undertaken. This Study involved two key pieces of work:

1. Groundwater effect assessment to identify groundwater-affecting mining activities and associated effects on groundwater, i.e. alteration of groundwater conditions; and
2. Numerical groundwater modelling to quantify the magnitude and spatial extent of potential effects, focusing on the alteration of groundwater conditions at the location of receptors.

From this study and other related groundwater work undertaken at SWC Mine the following assessment is provided against the Significant Impact Guidelines 1.3.

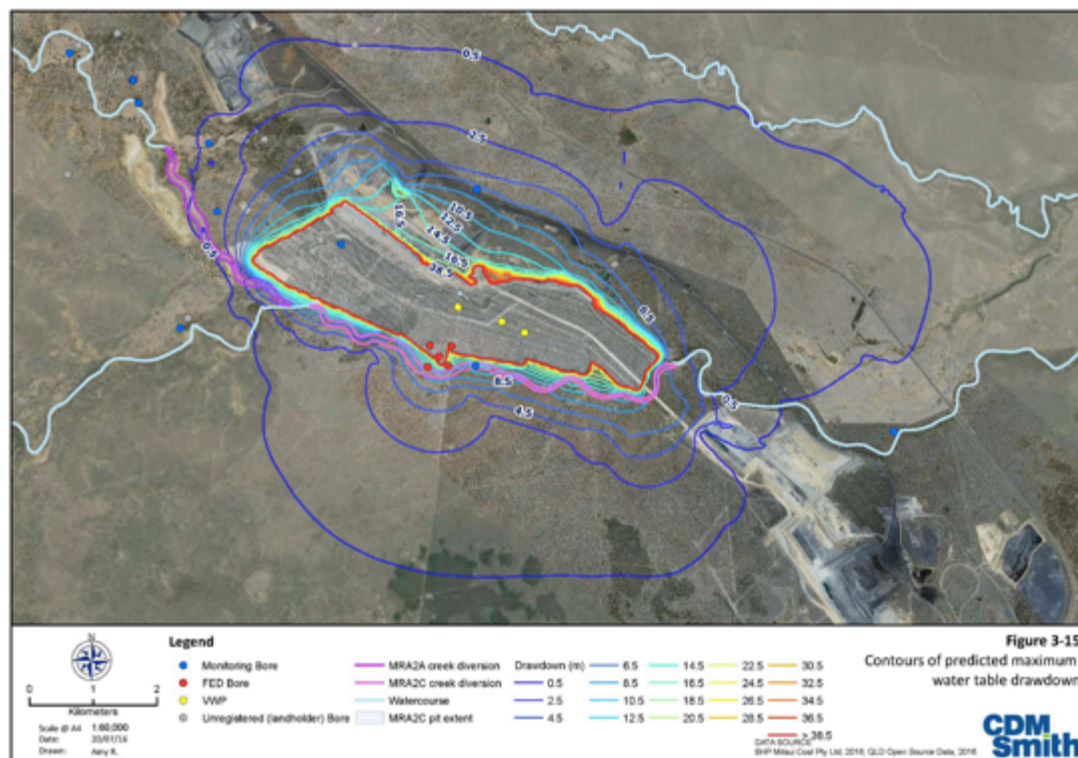
Change in integrity of hydrological connections, water quantity, area or extent

Open cut mining involves the removal of the overburden material and extraction of coal seams, creating a void that is progressively backfilled by waste rock during the course of mining. This causes permanent changes to the physical properties of groundwater aquifers at the location of the mine pit, with the void forming a new low point in the landscape.

The depth of the coal seams in the MRA2C mining area indicates that the floor of the pits will extend several metres beneath the water table. As the overburden rock mass and coal seams are removed, groundwater is likely to seep into the pits from the surrounding formation. Removal of seepage water from the pits to enable dry mining conditions will result in the depressurisation of the surrounding groundwater, forming a cone of depression that radiates away from the pits.

Analytical modelling predicts that the impacts to groundwater levels are likely to be concentrated around the Mulgrave Pit. Due to the low permeability rockmass, the area of influence on groundwater (i.e. cone of depression) is limited to a small confined area and extends out to a radius of 2.5 to 3km (refer Figure 3). The drawdown created is predicted to be minimal, for instance the estimated drawdown at two nearby bores will lead to a 0.9% to 2% reduction in the height of standing water.

Within the Mulgrave Pit the groundwater inflow rates range from 0.4 to 6.5 ML/day, these rates correspond to rates already experienced in the Mulgrave Pit and surrounding mining pits of SWC Mine. The predicted median groundwater inflow rate into the mine is 1.36 mega litres per day.



Surface Water – Groundwater interaction

Walker Creek is ephemeral, with moderate to high surface water flows during the wet season. The depth to groundwater measured in monitoring bores located within the vicinity of the creek range from 2.8 to 14 m below ground level, with the shallowest level recorded after periods of above average rainfall (from 2011 to 2013) and reflect the influence of ephemeral surface flows. The depth to water measurements indicate that the Creek is disconnected from groundwater and (when flowing) it acts as a losing stream, locally supplying recharge to the water table during the wet season. Accordingly, any change in groundwater will not affect the flows within Walker Creek.

Changes in water quality

Potential changes in groundwater quality resulting from the alterations of the flow regime are considered unlikely, as groundwater flowing from the broader area is expected to have a similar quality. Local groundwater flow directions will be maintained towards the mine during and after mining, such that changes to groundwater quality, if any, are unlikely. Groundwater will not be exposed to new materials or surface locations; the mining it will act like a sink and water accumulating will be pumped out and treated as onsite mine water. Contamination of the aquifer will be avoided.

The flow of groundwater towards the MRA2C pit from the adjacent area greatly reduces the risk of the mining activity contaminating the groundwater source. Existing controls on potential sources of contamination, such as fuel spills, will be maintained in all operational areas of the mine.

Impact on human use

Drawdown is predicted at four bores, of which two of the bores are located within the footprint of proposed mining area and will be decommissioned. Information on these two remaining bores indicate that drawdown will lead to 2% and 0.9% reduction in the height of standing water respectively, these two bores are on land owned by BHPB and arrangements to replace any water usage has already been made.

No impacts on human users are expected.

Impact on environmental use

Groundwater-dependent ecosystems are defined as ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain the communities of plants and animals, ecological processes they support, and ecosystem services they provide.

Three broad types of groundwater dependent ecosystems occur:

1. Aquifer and cave ecosystems - are underground ecosystems supported by groundwater that provide habitat stygofauna and other living organisms.
2. Ecosystems dependent on the surface expression of groundwater - include wetlands, lakes, seeps, springs, and river baseflow systems. In these cases, groundwater discharge provides water to support aquatic biodiversity.
3. Ecosystems dependent on subsurface presence of groundwater - include terrestrial vegetation that depends on groundwater on a seasonal, episodic or permanent basis. These types of ecosystems can exist wherever the water table capillary fringe is within the root zone of the plants, either permanently or episodically.

The first two types do not occur in the vicinity of the project.

Potentially the third type may occur within the vicinity of the project although this is considered unlikely. Vegetation in the study area occurs in five major habitat types identified by Eco Logical Australia (2016) as follows:

- Fringing riparian forest occurs on the stream banks of Walker and Carborough Creek, providing habitat for *Eucalyptus raveretiana*
- Floodplain Eucalypt forest occurs on the active floodplains adjacent to Walker and Carborough Creek
- Dry Eucalypt Forest occurs in the majority of the study area and occurs outside of the extent of the currently active floodplain (e.g. on older alluvial terraces);
- Brigalow Woodland occurs in discrete patches (e.g. towards the southern extent of the proposed expansion area) associated with clay plans; and
- Wetlands occur in discrete patches and include a palustrine wetland fringed by *Eucalyptus camaldulensis* that occurs to the immediate south west of the proposed expansion area.

Of these vegetation habitats, the most likely areas of groundwater interaction are those that occur along riparian corridors and adjacent floodplains. This is consistent with groundwater level data that shows the water table being marginally shallower in these zones; however, it is well below the streambed. While some intermittent use of groundwater by terrestrial vegetation could potentially occur at these locations the species are not groundwater

dependent, their presence in the riparian zone is a clear indication that their occurrence is due to the availability of surface water (not groundwater).

Mapping of average depth to water and groundwater contours indicates that the regional groundwater source occurs approximately 10 m below the surface (CDM Smith, 2016). The depth is consistent across the entire study area, including the Walker Creek riparian zone. For instance, the fact that Black Ironbox is limited to the riparian zone suggests it is not highly dependent on the regional groundwater but rather reliant on the riparian saturation zone that is replenished by seasonal flooding (Eco Logical Australia 2016).

In summary, the presence of GDEs in the study area is unlikely, but some intermittent groundwater use by terrestrial vegetation in riparian zones is possible.

CUMULATIVE IMPACT

The wider land uses and activities that could affect the quantity and quality of water within the Bee Creek catchment above Dipperu National Park are:

- Grazing - the predominant landuse, which contributes to land disturbance and the generation of sediment via reduced vegetation cover, particularly in riparian zones.
- Mining at Hail Creek - located in the upper catchment of Bee Creek.
- Mining at Coppabella mine – located on Harrybrandt Creek, which discharges to Bee Creek immediately upstream from Dipperu National Park.
- Mining at South Walker Creek Mine.

The location of the mines is shown in Figure 5.

Given the existing catchment wide disturbance from grazing and the existing mines of Hail Creek, Copabella and South Walker Creek, the MRA2C project will have a very minor additional potential cumulative impact.

As has been stated previously, the limited additional increase in disturbed surface catchment and the ongoing management of water discharges under existing EA conditions will result in no significant impacts to users.

Ground water disturbances are localized and primarily occur within the mining lease, limited to around a 3km radius from the pit. There is some potential for the drawdown effects to overlap in the north of the MRA2C project area with the previously approved MRA2A project (refer Figure 4) but these are minor. The predicted drawdown due to the MRA2A project is greater than that of the MRA2C project and accordingly the MRA2A dewatering will dominate over the MRA2C dewatering effects, with limited cumulative effects.

In areas away from the projects, towards the edge of the predicted area of influence where drawdown due to the two projects is comparable, the cumulative effect may lead to a small net increase in drawdown, however, the overlapping drawdown contours are localised, generally contained within the mine lease; therefore, the cumulative effect of the two mining pits are not expected to lead to additional impacts to the environment of other uses.

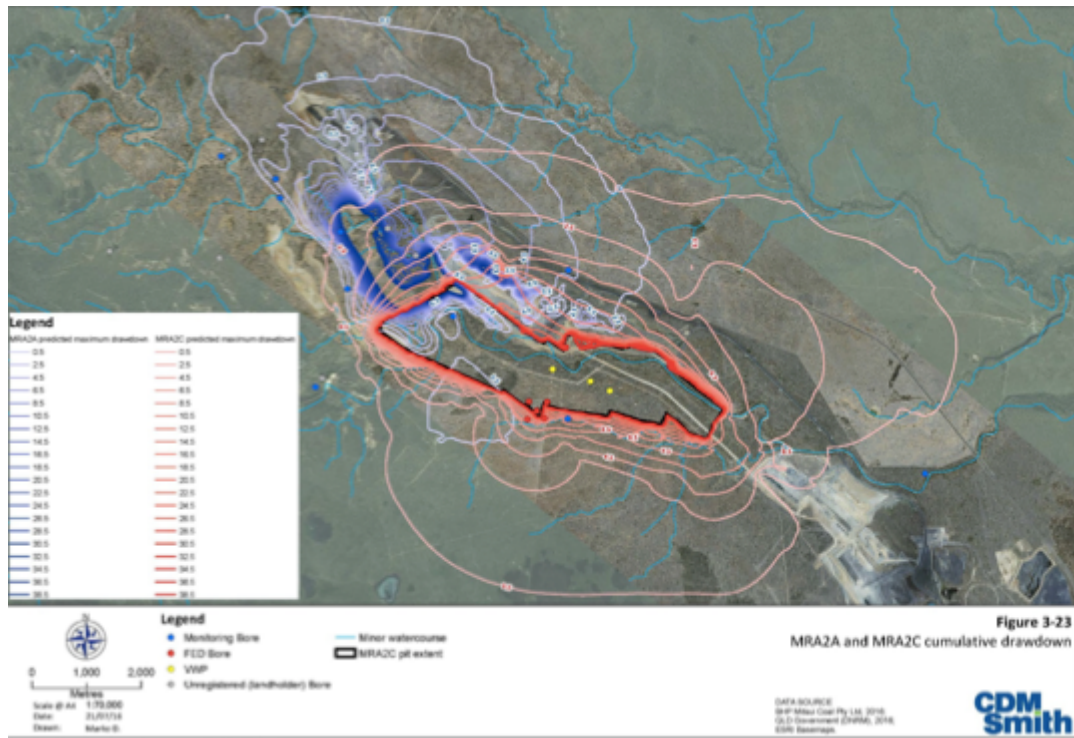


Figure 4: MRA2A and MRA2C cumulative drawdown effects (Source: CDM Smith 2016)

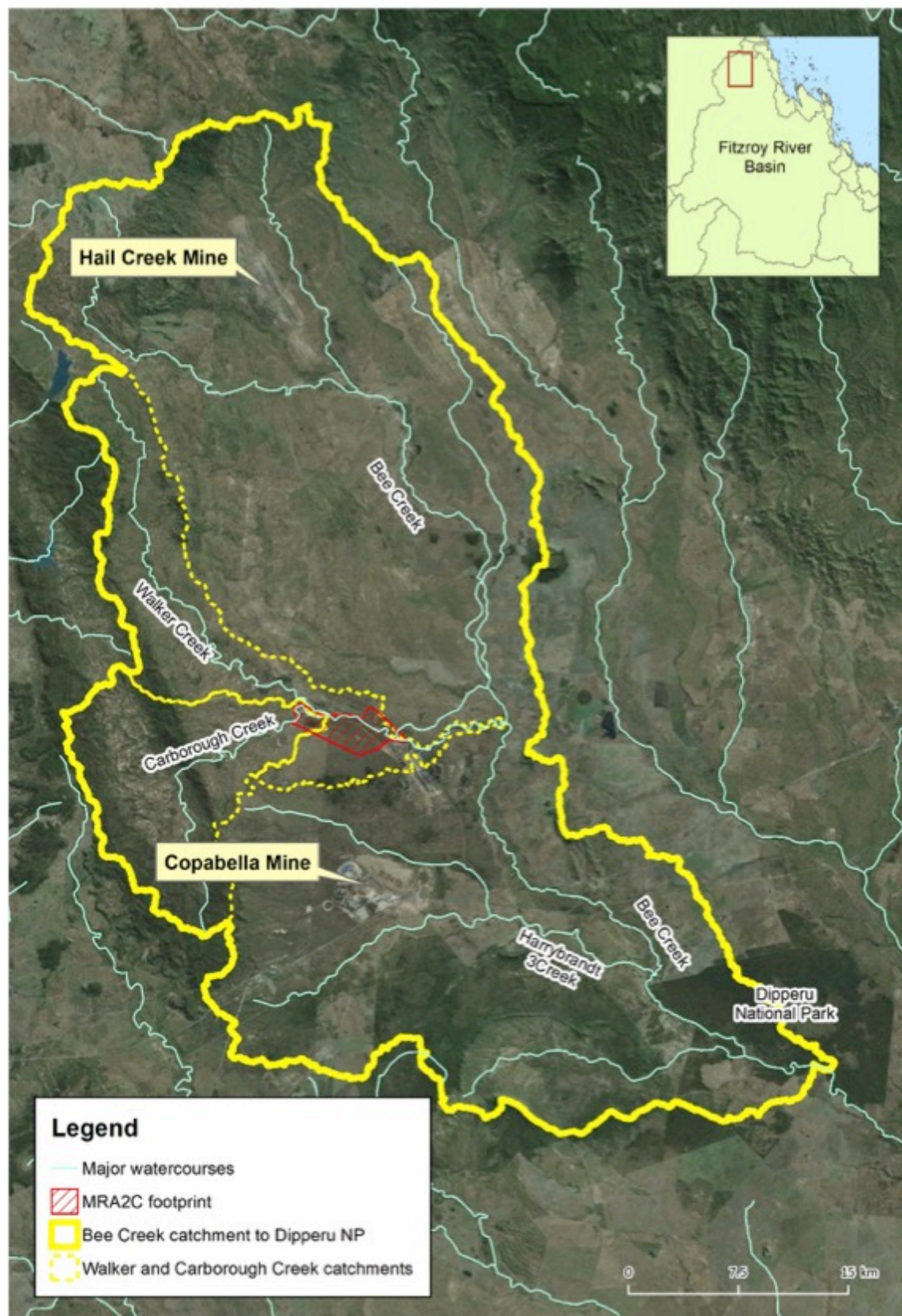


Figure 5: Regional land uses and activities (Source: Alluvium 2016)

CONCLUSION

The proposed activity will not cause a significant depletion or quality change of any surface or groundwater resources, nor will it have an impact on the way a critical water system operates.

One ephemeral local watercourse, Walker Creek, will be impacted by the project directly through the construction of a diversion around proposed mining activities. This change will be carefully managed and regulated to ensure water leaving the site is in similar quantities and quality to that occurring currently.

SWC Mine's water management system including release of mine affected water operates effectively under current EA conditions – given that the catchment areas of the pits changes little over the proposed mining period (2019 to 2034) it can be expected that the mine can continue to operate effectively without the need for changed EA conditions or alterations to water flows and quality.

There is also a high level of confidence that the project activity will not substantially change the quality or quantity of groundwater in the vicinity of the project. Drawdown effects are localised and the risk of water quality changes or contamination are low and correspond to those in place currently for the SWC Mine. There are no current known uses of groundwater within the area affected, alternative water source arrangements have been made for stock on affected land owned by BHPB.

Under the definitions detailed in *"Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources"*, the development of MRA2C will not result in any significant impacts to water resources or users.

REFERENCES

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Watercourse diversion

