



Vickery Extension Project

State Significant Development Assessment SSD 7480

May 2020



Published by the NSW Department of Planning, Industry and Environment

dpie.nsw.gov.au

Title: State Significant Development Assessment (SSD 7480)

Subtitle: Vickery Extension Project

Cover image: Braymont Road – Approximate location of Mine Infrastructure Area (Department's site visit, 2019)

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Executive Summary

This Assessment Report (AR) has been prepared by the Department of Planning, Industry and Environment (the Department) for consideration by the Independent Planning Commission (the Commission), in its determination of the Vickery Extension Project (the Project).

This report follows a comprehensive assessment process over an 18-month period that incorporated the following key stages summarised in **Table E- 1** below.

Table E- 1 | Assessment Process

Assessment Stage	Timing
Exhibition of Environmental Impact Statement (EIS)	September - October 2018
Department's Preliminary Issues Report (PIR)	November 2018
Commission Public Hearing	February 2019
Commission Issues Report	April 2019
Submissions Report	August 2019
Amendment Report	September 2019
Referral of the Department's Assessment Report (this report) to the Commission for a further public hearing and determination	March 2020

The Department prepared a Preliminary Issues Report (PIR) providing a summary of the key issues raised in submissions and advice during the exhibition of the EIS. The PIR provides further contextual background to the Project and should be read in conjunction with this report.

Background

Vickery Coal Pty Ltd, a subsidiary of Whitehaven Coal Pty Ltd (Whitehaven) owns the Vickery Coal Mine, located approximately 25 kilometres (km) north of Gunnedah. The project is located within the Gunnedah and Narrabri local government areas (LGAs).

In September 2014, the delegate of the Minister for Planning approved the Vickery Coal Project (the Approved Project) as a State Significant Development (SSD-5000) under the *Environmental Planning and Assessment Act 1979* (EP&A Act). The development consent for the Approved Project was physically commenced in 2019, however Whitehaven is yet to commence construction of key infrastructure necessary for the operation of the mine.

The Approved Project includes the extraction of 135 million tonnes (Mt) of coal over a 30-year period, at a rate of up to 4.5 million tonnes of run-of-mine (ROM) coal a year (Mtpa) with coal hauled by trucks on public roads to Whitehaven's existing coal handling and preparation plant (CHPP) near Gunnedah, for processing and transport by rail to the Port of Newcastle. The CHPP operates under a separate development consent (DA 79_2002) and is approved to operate until October 2022.

The Gunnedah CHPP has historically processed coal from other mines in the region, including its Tarrawonga, Rocglen and Sunnyside mines. However, the Rocglen and Sunnyside open cut mines recently ceased operations and are currently undergoing rehabilitation.

The Project

Whitehaven is now proposing to extend the Approved Project and develop a new CHPP and train load out facility at Vickery Coal Mine (see **Figure E-1**). It also proposes to develop a rail spur across the Namoi River floodplain to connect the load out facility to the main Werris Creek to Mungindi Railway line. The Project also includes a water supply borefield and associated infrastructure. The new CHPP would also receive and process coal from the Tarrawonga mine which would enable the cessation of road transport of coal to the Gunnedah CHPP.

The key incremental changes of the Project compared with the Approved Project include:

- an increase in total coal extraction by 33 Mt, from 135 to 168 Mt;
- an increase in the peak annual extraction rate from 4.5 up to 10 Mtpa of coal; and
- an additional disturbance area of 776 hectares (ha), compared with 2,242 ha for the Approved Project, with the open cut extension area accounting for around 20% of the additional disturbance.

The Project is fully described in the EIS lodged with the development application and further amended as described in an Amendment Report lodged by Whitehaven in September 2019.

The Project was amended in September 2019 to remove coal extraction from Mining Lease (ML) 1718 where the lease only permitted ancillary uses, such as overburden emplacement. This reduced the total resource proposed to be extracted from 179 Mt to 168 Mt. Whitehaven has also committed to construct the proposed rail viaduct west of the Namoi River using pylons rather than using embankments, except for a short section where the rail spur line joins the public rail network.

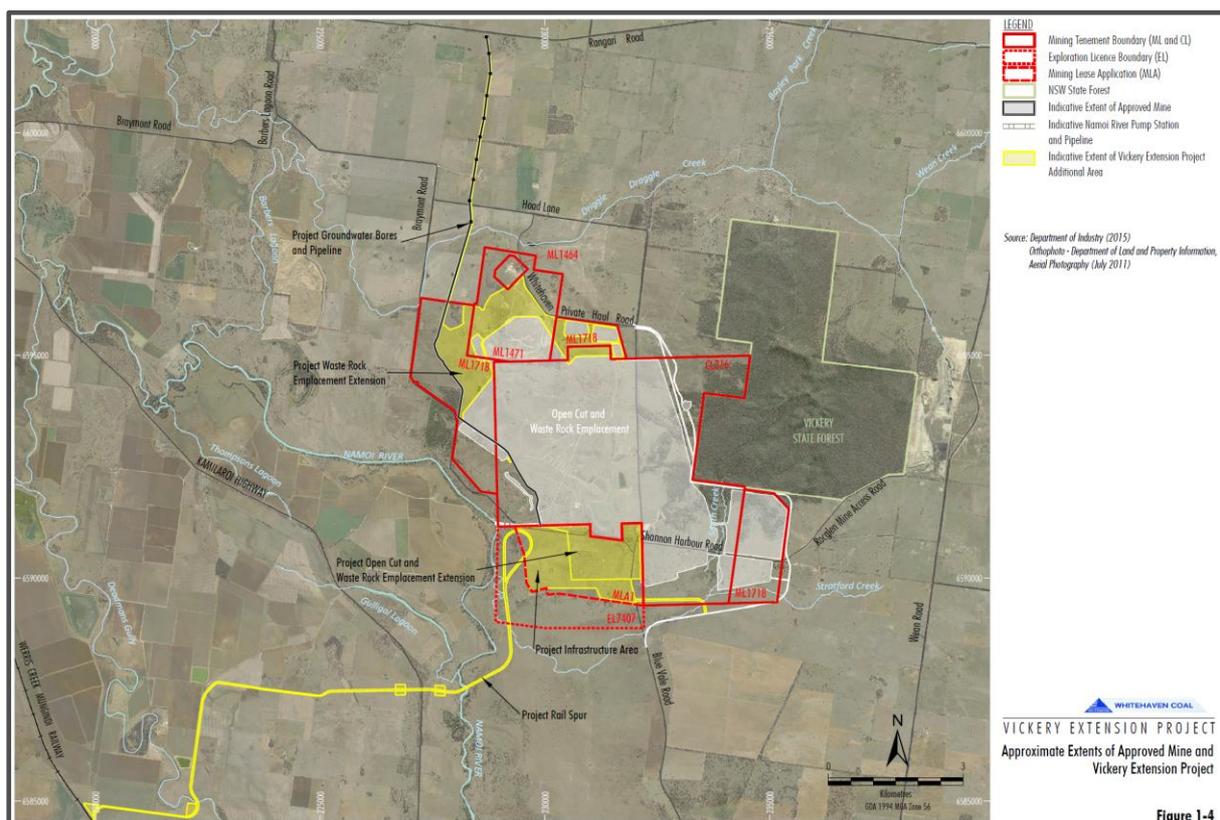


Figure E-1 | Project Layout compared with Approved Project.

Statutory Context

The proposal is a 'State Significant Development' (SSD) under Part 4 of the EP&A Act, as it is development for the purpose of coal mining and mining-related works. The Commission is the consent authority for the proposal as there were more than 50 unique public objections to the development application.

Whitehaven proposes to surrender the development consent for the Approved Project if the Vickery Extension Project is approved, so that the mine would be regulated under a single consolidated and contemporary development consent.

In September 2018, the former Minister for Planning requested the Commission conduct an initial public hearing into the Project, as soon as practicable after the public exhibition of the EIS for the Project. The Minister asked that the Commission consider the EIS, submissions on the Project, and any relevant expert advice and other information.

It was anticipated that a further public hearing would be held prior to determination of the Project as part of a multi-stage public hearing process. However, in December 2019, the Productivity Commission of NSW completed its independent review of the Commission. One of its recommendations was to revert to a single stage public hearing process and that the Commission's focus should be on the determination of SSD projects.

Consequently, in February 2020, the Minister for Planning and Public Spaces issued a new request to the Commission to hold a further public hearing into the Vickery Extension Project, focusing on the Department's assessment report, submissions received during the hearing and any other relevant information. Further, the Minister requested that the Commission finalise its determination of the project within *12 weeks* of receiving the Department's assessment report (this report).

Whitehaven also needs to obtain an approval from the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to the potential impacts on threatened species and water resources. The assessment process under the EP&A Act has been accredited under a bilateral agreement with the Commonwealth Government. Under this agreement, the assessment of both State and Commonwealth matters has been integrated into a single assessment process.

Exhibition and Public Hearing

The Department exhibited the EIS from 13 September to 25 October 2018 and received 560 public submissions, with 62% submissions supporting and 36% submissions objecting to the Project.

As a comparison, 23 public submissions were received for the Approved Project, showing the change in the level of public interest towards coal mining more broadly and the changes to the strategic context of coal mining in the Gunnedah Basin.

The Department also received advice from 14 government authorities. None of the NSW government authorities objected to the project during the exhibition of the EIS although most raised issues and/or made recommendations. However, Narrabri Shire Council (NSC) formally objected to the Project in late February 2020, due to concerns about social impacts, and the lack of a voluntary planning agreement (VPA) with Whitehaven.

Gunnedah Shire Council (GSC) has accepted Whitehaven's VPA offer of \$7.4 million which is based on a pro-rata increase to the existing VPA for the Approved Project which was negotiated during the assessment of the project in 2014. The Department notes that the Project is located mainly within GSC and the majority of the workforce and the heavy vehicle traffic associated with the mine is within the Gunnedah LGA.

During the public exhibition of the EIS, the Department held a community information session in Boggabri to inform the community about the planning assessment process and listen to the concerns

of local residents. The Department has also convened several meetings with local landholders and a number of special interest groups and experts engaged by these stakeholders.

The Commission held its initial public hearing into the carrying out of the project over 2 days in Boggabri and Gunnedah from 4-5 February 2019. The Commission received 506 submissions with 101 people/ organisations registered to speak during the public hearing.

In April 2019, the Commission completed its Issues Report which considered the information provided in the Department's PIR, submissions received during the exhibition of the EIS, and presentations and submissions received during the public hearing. The Commission identified in its report 14 focus areas where further information/ clarification was required for the merit assessment of the Project as summarised in **Table E- 2** below.

Table E- 2 | Summary of Commission's Issues Report

	Focus Area	Key Issues
1	Project Justification and Layout	<ul style="list-style-type: none"> • Interaction between existing approvals and the Project • Need for and potential relocation of the CHPP and rail load out • Production thresholds and additional coal resources
2	Groundwater	<ul style="list-style-type: none"> • Sensitivity analysis of the groundwater modelling/ final void • Borefield assessment and further clarity on groundwater drawdown impacts • Impacts and risk analysis on groundwater dependent ecosystems • Water quality from runoff and seepage from rehabilitated areas • Further clarification on cumulative post-mining groundwater drawdown
3	Surface Water and Flooding	<ul style="list-style-type: none"> • Sediment dam discharges and surface water quality monitoring • Additional flood modelling and analysis of probable maximum flood
4	Water Balance	<ul style="list-style-type: none"> • Sufficiency of water entitlements • Final void water balance
5	Noise and Blasting	<ul style="list-style-type: none"> • Consideration of worst-case years over the mine life • Construction hours • Validation of train noise on the rail spur line • Consideration of noise/ blast performance at other mines • Blast criteria for the historic Kurrumbede Homestead • Consider potential to relocate the CHPP and rail spur line access • Acoustic cladding of the CHPP
6	Air Quality	<ul style="list-style-type: none"> • Consideration of worst-case years over the mine life • Reasons for dust impact reductions compared to the Approved Project
7	Biodiversity	<ul style="list-style-type: none"> • Impacts on Koala populations • Rehabilitation to self-sustaining woodland communities • Process for retirement of offsets and supporting information for credit calculations for mine rehabilitation
8	Rehabilitation, Final Void and Final Landform	<ul style="list-style-type: none"> • Management of soils in rehabilitated areas • Final landform design including justification for final void • Final land use objectives – agriculture vs biodiversity conservation • Final void water quality and potential beneficial use post mining
9	Heritage	<ul style="list-style-type: none"> • Adequacy of consultation with Aboriginal community and surveys • Management of impacts on the historic Kurrumbede homestead

Focus Area	Key Issues
10 Social and Economic	<ul style="list-style-type: none"> Impacts of a mining-based economy on the non-mining community Clarification on assumptions used in the cost benefit analysis Comparative economic analysis of relocating the CHPP and rail loop Social impacts and focused strategies for impacted communities
11 Visual Amenity	<ul style="list-style-type: none"> Visual impact mitigation options and additional photomontages Consultation with Siding Spring Observatory and light modelling
13 Traffic and Transport	<ul style="list-style-type: none"> Clarification of timing of removing product coal from roads Further information on impacts of rail transport of coal
14 The Public Interest	<ul style="list-style-type: none"> Consideration of the objects of the EP&A Act Greenhouse Gas (GHG) emissions with regard to applicable government policies Demand for product coal and use by signatories of the Paris Agreement

Assessment

The Department has undertaken a comprehensive assessment of the merits of the Project and considered all potential issues in accordance with the requirements of the EP&A Act and applicable government policies and guidelines. The Department has focused its assessment on the issues from the Commission's Issues Report which also reflects concerns raised in public submissions to the Commission and the Department during the exhibition period.

The Department engaged independent experts to review the following key aspects of the project:

- groundwater
- flooding
- surface water; and
- economics.

The Department also relied on government agency advice and the *Commonwealth Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development* (IESC) in undertaking its assessment.

Water Resources

The assessment of the Project's impacts on water resources incorporates the cumulative impacts of the Approved Project. The key changes to the Approved Project affecting impacts on water resources is the increase in disturbance area, increase in the size of the open cut pit, management of runoff from the new infrastructure components including the CHPP and rail load out facility, and the rail spur line crossing the Namoi River floodplain.

Key concerns raised in submissions, and as detailed in the Commission's Issues Report, includes the potential for the Project to impact groundwater and surface water resources, particularly adjoining agricultural operations and groundwater dependent ecosystems associated with the Namoi River, the retention of a final void in the mine plan, and the impacts of the Project's rail spur line on the Namoi River floodplain and how this infrastructure could change flood behaviour and impact on landholdings across the floodplain.

In response to these concerns, Whitehaven undertook further groundwater and flood modelling, including further groundwater sensitivity analysis. The Department and the independent groundwater and flooding experts consider that the additional analysis and modelling is fit for purpose and ensures the full range of potential impacts of the Project can be assessed.

In regard to groundwater impacts, consistent with the Approved Project, the groundwater modelling predicts that the Project would comply with the minimal impact criteria of the *NSW Aquifer Interference Policy (AIP)*. The maximum drawdown at the closest privately-owned bore in the alluvial aquifer, the key aquifer used for agricultural production in the area, is predicted to be less than 0.2 m, well below the minimal impact drawdown of 2 m recommended by the AIP.

The Project proposes to retain one additional final void in the final landform compared to two additional final voids for the Approved Project. The final void would develop a pit lake in the medium to long term after mining is completed that would act as a localised groundwater sink.

Following advice from the independent groundwater expert, Whitehaven undertook further groundwater modelling which demonstrated that there would be a flow of saline groundwater towards the alluvium if the void was to be backfilled. Whitehaven also estimates backfilling the final void would cost an additional \$600 Million and result in further amenity impacts on the local community due to re-handling of significant volumes of overburden material.

While there are clear benefits in retaining a final void to minimise long term impacts on surrounding aquifers, there is potential through mine planning (throughout the life of the mine) to optimise the configuration of the final void. The Department has recommended conditions setting rehabilitation objectives for the final landform and requiring Whitehaven to undertake 5 yearly reviews of its rehabilitation strategy against these objectives, to inform ongoing mine planning.

In regard to flooding impacts, the flood modelling predicts that the Project would comply with the flood impact criteria of the recently gazetted *Floodplain Management Plan for the Upper Namoi Valley Floodplain 2019 (FMP)*. As outlined above, Whitehaven has committed to construct the rail viaduct on piers to the west of the Namoi River to ensure that there would be minimal obstruction to flood flows up to the 1 in 100-year average recurrence interval (ARI) design flood.

The Department, the independent flood expert, and DPIE Water's flood experts consider that the rail spur line can be designed and constructed such that the 1 in 100-year design flood can be conveyed without exceeding the impact criteria in the FMP.

For surface water impacts, the Project includes a water management system that is designed to separate clean water, dirty water (capturing sediment laden runoff from disturbed areas) and coal contact or mine water. Whitehaven's assessment confirms that excess water can be managed on-site during extended wet periods without discharging mine water from the site and that with the proposed northern borefield, there would be sufficient water supply available for the mine.

While submissions raised concerns, given the extended drought period, about availability of water supply during very dry periods, the Department notes that the Approved Project requires Whitehaven to adjust its operations to match its water supply. The Department recommends this condition is retained for the Project.

A key concern raised in submissions and raised by the independent surface water expert is the management of discharges from sediment dams to receiving waters. Discharges from sediment dams from the site would be regulated by the EPA through an Environment Protection Licence (EPL) and in accordance with the provisions of the *Protection of the Environment Operations Act 1979 (POEO Act)*, requiring that there must be no pollution of waters, except as permitted through an EPL. The Department has recommended that a comprehensive water quality monitoring program incorporating a trigger-action-response plan be implemented for the Project, consistent with recommendations from the EPA, the IESC and the independent surface water expert.

With the implementation of the required water management and monitoring measures and ensuring that the Project is operated in accordance with strict discharge limits and water management performance measures, the Department considers that the Project can be managed such that it would comply with relevant guidelines and policies and would not result in any significant impacts on water resources (or on the agricultural enterprises that rely on these resources).

The Department has recommended a range of conditions to manage the water resource impacts, including requiring Whitehaven to:

- ensure it has sufficient water supply for all stages of the development and adjust operations to match supply;
- provide compensatory water supply to privately-owned landowners if directly impacted as a result of mining operations, with the burden of proof resting with Whitehaven to demonstrate that loss is not due to the development;
- ensure surface water discharges comply with discharge limits set in any EPL or the requirements of the POEO Act;
- ensure the design and construction of the rail spur line and Kamilaroi Highway overpass is consistent with the objectives of the *Floodplain Management Plan for the Upper Namoi Valley Floodplain 2019*;
- comply with a range of water management performance measures including ensuring negligible impacts to alluvial aquifers beyond those predicted in the EIS; and
- prepare and implement a Water Management Plan for the Project incorporating a site water and salt balance, erosion and sediment control plan, surface water management plan and groundwater management plan in consultation with DPIE Water and the EPA.

Amenity Impacts

The noise, blasting, air quality and visual assessments incorporate the potential cumulative impacts of the Project (which incorporates the Approved Project) together with other mining operations in the region, and are based on maximum production rates. The key changes to the Project that potentially increase amenity impacts on receivers compared to the Approved Project include:

- the operation of the CHPP, rail load out facility and rail movements along the spur line across the Namoi River floodplain;
- increased intensity of mining operations but over a shorter timeframe; and
- locating the Mine Infrastructure Area (MIA) closer to the residences to the south-west.

Overall, the assessment of amenity impacts shows that for the Project's mining area there are relatively small changes to noise, air and visual impacts of the Project when compared to the Approved Mine.

The Approved Project predicted that operational noise would exceed relevant noise criteria at 3 residences all located on one landholding (Mirrabinda) such that acquisition rights were afforded to this property. The air quality assessment for the Approved Project predicted that three privately-owned properties, including Mirrabinda, would be impacted, with two other properties subsequently acquired by Whitehaven.

This compares to the Project where a significant impact (> 5dBA above the noise criteria) is predicted at one residence on the Mirrabinda property, with a further three residences (on 2 other landholdings) predicted to receive negligible impacts (1-2 dBA above the noise criteria). These properties are located to the west and south-west of the mine in closer proximity to the MIA, rail loop and rail spur line. The air quality modelling completed for the Project predicted that the relevant ambient air quality criteria would now be met at all residences.

Submitters, the Commission and the EPA raised concerns that the air and noise modelling predicted similar or reduced impacts at receivers compared to the Approved Project, particularly as there is an increase in peak production rate and a new MIA inclusive of the CHPP, rail load out and rail loop moving closer to receivers to the west of the Namoi River.

To address these concerns, Whitehaven provided further information justifying the modelling assumptions, including improvements in the mine design and reduced sound power levels for the mining fleet. The Department and EPA consider that the assumptions used for the noise and air quality modelling are appropriate and the scenarios modelled are representative of worst-case operating conditions over the mine life.

In regard visual and lighting impacts, the key project landform and most visible aspect of the Project mining area would be the Western Emplacement Area (WEA), visible from some nearby residences and along sections of public roads up to 5 km away. For comparison, the WEA of the Project while longer, would be about 5 m lower than the Approved Project. The rail spur line would also be visible at some rural residences.

The Approved Project conditions require Whitehaven to implement visual impact mitigation measures for impacted receivers. The Department recommends that this requirement be retained for the Project along with requirements to minimise the upward spill of lighting. Whitehaven also undertook further lighting assessment in consultation with the Siding Spring Observatory (SSO) and demonstrated that the upward light spill from the Project would not exceed threshold requirements of the *NSW Dark Sky Planning Guideline*.

Overall, the Department considers that the amenity impacts of the Project are similar or less than the Approved Project, and with the implementation of a suite of mitigation and monitoring measures, can be carried out in a manner that minimises its impacts on the amenity of potentially impacted receivers.

The Department has recommended a range of conditions to manage amenity impacts, including requiring Whitehaven to:

- comply with strict construction, operational and rail/road noise criteria;
- comply with strict blasting and air quality criteria;
- undertake an acoustic review during the detailed design of the rail spur line to incorporate all reasonable and feasible noise mitigation measures and undertake commissioning trials to demonstrate rail noise is minimised;
- ensure commissioning of noise suppressed equipment on mining trucks when production exceeds 3.5 Mtpa and conduct a testing program to ensure noise attenuation remains effective;
- undertake all reasonable measures to minimise visual and off-site lighting impacts of the development;
- implement visual impact mitigation measures such as landscaping treatments or vegetation screens to reduce the visibility of the mining operations and infrastructure from affected residences that have significant direct views; and
- prepare and implement Noise, Blast and Air Quality Management Plans for the Project.

Biodiversity

The biodiversity assessment of the Project has been assessed primarily on an incremental basis focusing on the increased disturbance footprint to that of the Approved Project. However, the assessment includes consideration of cumulative impacts associated with the Approved Project and other developments in the area.

The Project site has been subject to disturbance by agricultural and mining activities. Because of these historical land uses, the majority of the Project's disturbance area is dominated by native and exotic grasslands and patches of re-growth and remnant woodland. The project rail spur traverses agricultural land, although there are some patches of native woodland near the rail loop, Namoi River crossing and Kamilaroi Highway crossing.

The Project would disturb an additional 580 ha of native vegetation compared to clearing of 1,748 ha for the Approved Project, of which 78 ha comprises native woodland and 502 ha of native grassland. None of the vegetation communities impacted by the project conform to a State or Commonwealth listed Endangered Ecological Community (EEC). Isolated patches of the Box Gum Woodland EEC and Weeping Myall Woodland EEC were identified in the locality (within the footprint of the Approved Project) but no additional areas would be impacted by the Project.

Surveys of the project disturbance area have identified isolated patches of native woodland that would support fauna habitat, with 11 threatened fauna species recorded in the project disturbance area, including 6 birds, 3 bats, the squirrel glider and Koala. None of these species are predicted to be significantly impacted and no threatened flora species would be directly impacted by the Project.

Whitehaven has committed to offsetting the residual biodiversity impacts through a combination of land-based offsets, payment into the NSW Government's Biodiversity Conservation Trust, and mine site rehabilitation. Retirement of ecosystem and species credits would be consistent with the requirements of the *NSW Biodiversity Offsets Policy for Major Projects*.

The proposed land-based offsets and focus on ecological rehabilitation of the mine site builds upon the existing strategy for the Approved Project and other mines in the region. The Approved Project includes 2,063 ha of land-based offsets and mine rehabilitation of 1,360 ha to woodland communities. The Project offset strategy includes an additional 993 ha of land-based offsets and 1,005 ha of ecological rehabilitation at the mine.

Overall, the Department and BCD consider that the Project has been designed to avoid, mitigate and manage biodiversity impacts where practicable, and that the required ecosystem and species credits could be obtained and that the retirement of these credits would sufficiently compensate for residual biodiversity impacts in accordance with applicable government policies.

The Department has recommended a range of conditions to manage the biodiversity impacts, including requiring Whitehaven to:

- implement its existing biodiversity strategy for the Approved Project, including required conservation bonds and security mechanisms;
- retire ecosystem and species credits for the additional clearing required for the Project within 2 years of the date of commencement of development and provide a 6-monthly report to the Department on progress towards retiring credits;
- prepare and implement a Biodiversity Management Plan for the Project; and
- prepare and implement a Koala Plan of Management for the Project.

Rehabilitation and Final landform

The Project's land use impacts, such as impacts on agricultural land, have been assessed on a cumulative basis incorporating the Approved Project, but consideration has been given to the additional impacts over and above those associated with the Approved Project for comparative purposes.

The Approved Project would rehabilitate disturbed areas back to 1,360 ha of woodland and 780 ha of grazing land with stable landforms, compatible with the surrounding landscape. Three voids, including the existing Blue Vale void, were to be retained in the approved final landform.

In comparison, the rehabilitation strategy for the Project proposes to retain a single void in the landscape in addition to the Blue Vale void, and would rehabilitate disturbed areas back to 2,385 ha of woodland to improve habitat connectivity between the Vickery State Forest and the Namoi River. Approximately 256 ha (i.e. around 10%) of the Project mining area would be rehabilitated to agricultural land suitable for grazing, comprising 78 ha of Class 3 land and 178 ha of Class 4 land.

Due to the focus on ecological rehabilitation, submitters raised concerns about the loss of agricultural land. The majority of the agricultural land impacted by the Project is lower quality grazing land on the slopes above the alluvium, including existing rehabilitated mining land. The Department also notes that the mine area is not located on Biophysical Strategic Agricultural Land. The Department and BCD consider the benefits of providing a habitat corridor between the Namoi River and the Vickery State Forest (and beyond) outweigh the loss of the agricultural land capability.

Concerns were also raised about legacy issues associated with rehabilitation of mines. The Department notes there is a comprehensive regulatory regime for mine site rehabilitation under the *Mining Act 1992*, and the Mining Lease would incorporate enforceable rehabilitation objectives and a requirement for Whitehaven to have a rehabilitation bond for the full cost of rehabilitating the site in accordance with the Mining Lease and the development consent.

The Department and the Resources Regulator consider that the proposed final landform and rehabilitation strategy provides an appropriate basis for rehabilitation of the site and would achieve a final land use that supports and enhances the conservation land uses in the area.

The Department has recommended a range of conditions to manage the rehabilitation of the Project, including requiring Whitehaven to:

- rehabilitate the site in accordance with strict rehabilitation objectives;
- undertake progressive rehabilitation;
- prepare a rehabilitation strategy for the Project in consultation with councils and NSW government agencies, including 5 yearly review of the final landform and final void as mining progresses; and
- prepare and implement a Rehabilitation Management Plan for the Project in accordance with conditions set in any Mining Lease.

Heritage

The heritage assessment of the Project has been assessed primarily on an incremental basis focusing on the increased disturbance footprint to that of the Approved Project. However, the assessment includes consideration of cumulative impacts associated with the Approved Project and other developments in the area.

In addition to the 31 sites located within the disturbance footprint of the Approved Project, the Aboriginal Cultural Heritage Assessment identified a further 24 isolated artefacts and artefact scatter sites within the Project disturbance footprint. One artefact scatter site was assessed in Whitehaven's cultural heritage impact assessment as having low-moderate archaeological significance with the remaining sites assessed as having low archaeological significance.

Two sites near the Project were assessed as having moderate significance including an artefact scatter site near the project borefield and an axe grinding groove site along the Namoi River. Neither of these sites would be directly impacted by the Project, however management measures are proposed to ensure that the grinding groove site would not be indirectly impacted from blasting.

No sites listed on State or local historic heritage registers would be impacted by the project. The historic heritage assessment identified one item of historic heritage significance (potential local significance) within the Project extension area, and three sites within the immediate vicinity of the Project.

The Kurrumbede Homestead (associated with Australian poet Dorothea MacKellar) has the potential to be indirectly impacted by ground vibration caused by blasting. The Kurrumbede Homestead was considered in the assessment to be potentially of state significance. Concerns were also raised about potential impacts on the visual amenity of the curtilage around the homestead, associated with the rail spur and the mine affecting the views from the property. Whitehaven's EIS noted that the mining infrastructure and landforms would be concealed by existing vegetation around the Kurrumbede Homestead, however mining operations would be visible from some parts of the property.

To address these issues, Whitehaven proposes to engage a structural engineer to assess the condition and stability of the homestead complex, and recommend works and appropriate blast criteria to protect the integrity of the homestead, maintain the existing tree screening and landscaping around the homestead, and rehabilitate the mining landforms to merge with the surrounding landscape in the medium to long term.

The Department and NSW Heritage Council supports these measures, including the preparation of a Heritage Management Plan for the Project, in consultation with Heritage NSW, GSC and the Dorothea Mackellar Memorial Society.

The Department has recommended a range of conditions to manage the heritage impacts, including requiring Whitehaven to:

- ensure the development does not cause any direct or indirect impacts to heritage items outside the approved disturbance area;
- prepare and implement an Aboriginal Cultural Heritage Management Plan in consultation with the BCD and Registered Aboriginal Parties for the Project;

- commission a structural engineer to inspect the condition of the Kurrumbede Homestead Complex to inform blast design and criteria, and recommend any works to protect the structural integrity of the homestead; and
- prepare and implement a Historic Heritage Management Plan, in consultation with Heritage NSW, GSC, the Dorothea Mackellar Memorial Society, which includes consideration of ongoing use for cultural events and controlled public access.

Social and Economic

The social and economic impacts and benefits of the Project have been assessed on a cumulative basis incorporating the Approved Project, but consideration has been given to the additional impacts over and above those associated with the Approved Project for comparative purposes.

The Project would generate a range of social benefits for the local and regional community through additional jobs and economic growth in the regional economy. It would also generate benefits for the State through royalties and tax revenues. Whitehaven's economic assessment predicted that the Project, incorporating the Approved Project, would generate significant benefits for NSW and the region, including:

- up to 450 full time equivalent (FTE) operational jobs (average 344 FTE jobs) and up to 500 construction jobs;
- approximately 181 FTE indirect jobs in the region;
- increased disposable income of \$316 million (Net Present Value (NPV)) associated with the direct and indirect jobs;
- value added benefits of approximately \$322 million NPV in other industries in NSW; and
- a net economic benefit of \$1.16 billion NPV from generation of additional tax revenue and royalties.

However, there are potential adverse social impacts in the local community, particularly to rural residential receivers closer to the mine where there would be an increase in amenity impacts. The Department acknowledges that even where noise and dust limits are considered acceptable under NSW Government policy and guidelines, they may not be acceptable to the residents and community living near the mine. Nonetheless, the NSW Government has set cumulative and project specific criteria for assessing noise and dust impacts based on current scientific knowledge such that there is a reasonable balance between development and protecting the amenity of people in the community.

A key change to the Project compared to the Approved Project is an increase in the peak construction workforce from 60 to 500 people and operational workforce from 250 to 450 people. The Department considers that with the approved Boggabri Village accommodation facility, which has beds for 500 people and approval for 850 beds, there is sufficient capacity in the area to accommodate the construction workforce. While the social impact assessment completed for the Project identified there may be a shortfall in medium to long term accommodation for additional operational personnel moving to Boggabri, there is sufficient capacity across the Gunnedah and Narrabri LGAs to cater for the estimated increase in the regional population of around 340 people.

Whitehaven has offered to enter into Voluntary Planning Agreements (VPAs) with GSC and NSC generally consistent with the VPA accepted by both councils for the Approved Project, with a pro-rata increase from \$7.5 million to \$10.7 million - split 70% to GSC and 30% to NSC. GSC has accepted this offer, however NSC has rejected the offer and alternatively requested that Whitehaven increase its offer to \$22.4 Million, including \$7.5 toward upgrading Braymont Road. The Department notes the Project site, mining infrastructure, location where employees reside and heavy vehicle transport routes associated with the project are mainly within the Gunnedah LGA.

The Department considers Whitehaven's offer is reasonable, consistent with the offer made by Whitehaven for the Approved Project and is also well in excess of the 1% levy cap used to guide development contributions to Councils under Section 7.12 of the EP&A Act and under NSC's contributions plan. The Department has recommended conditions for the VPAs to be executed within 6 months. If the VPA cannot be agreed with NSC in this timeframe, Whitehaven would be required to

make a direct contribution of \$3.2 million under Section 7.12 of the EP&A Act, targeting contributions to projects in Boggabri.

The Department has recommended a range of conditions to manage the social impacts, including requiring Whitehaven to:

- comply with strict noise, blasting and air criteria and operating conditions, and prepare noise, blasting and air quality management plans;
- comply with water quality objectives, discharge requirements and compensatory water requirements for any loss of water supply as a result of mining operations;
- require an independent review of potential exceedances of applicable environmental criteria, at the request of landowners;
- maintain complaints and incident management and reporting systems;
- make a range of project-related information publicly available; and
- prepare and implement a detailed Social Impact Management Plan for the project in consultation with NSC, GSC, the Community Consultative Committee for the mine, and other stakeholders.

Greenhouse Gas Emissions

The Greenhouse Gas (GHG) emissions of the Project have been assessed on a cumulative basis incorporating the Approved Project, but consideration has been given to the additional impacts over and above those associated with the Approved Project for comparative purposes.

The main sources of Scope 1, Scope 2 and Scope 3 Greenhouse Gas (GHG) emissions from the Project are from electricity consumption, fugitive emissions of carbon dioxide (CO₂) and methane (CH₄), diesel usage, and the transport and end use of product coal.

The Project would generate approximately 3.1 Mt carbon dioxide equivalent (CO₂-e) of Scope 1 emissions, 0.8 Mt Scope 2 and 366 Mt CO₂-e Scope 3 emissions.

In comparison to the Approved Project, there would be a reduction of about 1 Mt CO₂-e of Scope 1 emissions, increase of about 0.15 Mt CO₂-e Scope 2 emissions and an increase of about 100 Mt CO₂-e of Scope 3 emissions over the life of the Project. The reduction in Scope 1 GHGE can be partially attributed to the inclusion of the Project CHPP, rail loop and rail spur, due to reduction in the consumption of diesel fuel associated with ROM coal haulage by truck to the Gunnedah CHPP.

The Project's Scope 1 emissions would contribute to about 0.028% of Australia's current annual GHG emissions and would remain a very small contribution when compared to Australia's commitments under the Paris Agreement, as identified in the Commonwealth government's nationally determined contribution (NDC).

The Department acknowledges that the Scope 3 emissions from the combustion of product coal is a significant contributor to anthropological climate change and the contribution of the Project to the potential impacts of climate change in NSW must be considered in assessing the overall merits of the development application.

However, the Department notes that the Project's Scope 3 emissions would not contribute to Australia's NDC, as product coal would be exported for combustion overseas. These Scope 3 emissions become the consumer countries Scope 1 and 2 emissions and would be accounted for in their respective national inventories.

Importantly, the NSW or Commonwealth Government's current policy frameworks do not promote restricting private development as a means for Australia to meet its commitments under the Paris Agreement or the long-term aspirational objective of the NSW Government's *Climate Change Policy Framework*. Neither do they require any action to be taken by the private sector in Australia to minimise or offset the GHG emissions of any parties outside of Australia, including the emissions that may be generated in transporting or using goods that are produced in Australia.

Overall, the Department considers that the GHG emissions for the Project have been adequately considered and that, with the Department's recommended conditions, are acceptable when weighed against the relevant climate change policy framework, objects of the EP&A Act (including the principles of Ecologically Sustainable Development) and socio-economic benefits of the Project.

The Department has recommended conditions to manage the GHG emissions of the Project, including requiring Whitehaven to:

- take all reasonable steps to improve energy efficiency and reduce Scope 1 and Scope 2 GHG emissions for the Project; and
- prepare and implement an Air Quality and Greenhouse Gas Management Plan, including proposed measures to ensure best practice management is being employed to minimise the Scope 1 and 2 emissions of the Project.

Traffic and Transport

The traffic and transport impacts of the Project have been assessed mainly on a cumulative basis incorporating the Approved Project, but consideration has been given to the additional impacts over and above those associated with the Approved Project for comparative purposes. However, some components such as the realignment of Blue Vale Road, heavy vehicle traffic movements from the mine site to the Gunnedah CHPP and the Kamilaroi Highway haul road overpass into the Gunnedah CHPP have already been assessed for the Approved Project.

Key concerns raised in submissions include the closure of part of Braymont Road and lack of access from Blue Vale Road to a travelling stock reserve (TSR) along the Namoi River for stock, road safety concerns, the construction of the Kamilaroi Highway overpass and use of Braymont Road to access the site from Boggabri. The Commission also sought further clarification around any recommendations to restrict road haulage once the rail spur line is commissioned and impacts on rail crossings between the mine site and Gunnedah.

Once fully operational, the Project rail spur would remove the need for ongoing use of the approved road haulage route and subsequently reduce the number of coal haul trucks using public roads. This is in line with NSW Government preference to remove heavy vehicle mine haulage from public roads.

To accommodate the extension of mining south of the Approved Project, the Project would require closure of approximately 3.5 km of Braymont Road between the intersection of Blue Vale Road and to the north-west of the Project rail loop. The closure of part of Braymont Road would restrict access to the Namoi River and graziers on the TSR to Blue Vale Road. In response, Whitehaven advised that it would facilitate continued access between Blue Vale Road and the TSR through Whitehaven owned land, subject to operational and safety requirements.

The traffic impact assessment completed for the Project predicts that the road network would remain at a good level of service (LOS A). RMS and Gunnedah Shire Council did not raise any concerns with the findings of the road transport assessment. However, NSC and submitters raised concerns that the unsealed Braymont Road may be used to access the mine site from Boggabri, and NSC requested Whitehaven contribute funds to the upgrade of Braymont Road along with road maintenance contributions. Whitehaven confirmed that employee and contractor access would be via Rangiri Road (Manilla-Boggabri Road) and the existing private haul road from the north and Blue Vale Road from the south.

The Approved Project includes a condition restricting Project related vehicles, including employee and contractor vehicles, from accessing the mine from Braymont Road, except for certain limited circumstances. The Department has recommended that this condition is retained for the Project.

Given that NSC's request for upgrade and maintenance of Braymont Road does not reasonably relate to an increase in heavy vehicle or employee/ contractor traffic related to the Project on the road, the Department considers that funding for the upgrade and maintenance contributions for the upkeep of Braymont Road is not warranted.

The rail assessment completed for the Project showed that the public rail network has sufficient capacity for the increased in rail movements. Whitehaven provided additional information in response to the Commission's concerns about potential delays at level crossings between the site and Gunnedah showing there would be a small increase (around 2 minutes per hour with peak rail movements) in the length of road closures at rail crossings.

The Department considers the transport, road and traffic assessments undertaken for the Project to be adequate and that proposed management and mitigation measures would ensure the ongoing road safety and road network efficiency in the areas surrounding the Project.

The Department has recommended conditions to manage the traffic and transport impacts of the Project, including requiring Whitehaven to:

- restrict road and rail haulage consistent with tonnages proposed in the EIS, including an allowance for road transport of 150,000 tonnes of coal for domestic markets (consistent with the Approved Project) once the rail spur line is commissioned;
- maintain its existing road maintenance agreement with Gunnedah Shire Council, subject to review once heavy road haulage ceases to the Gunnedah CHPP;
- ensure that all over-dimensional vehicle access and heavy vehicle access to the mine site is via the Blue Vale Road and Hoad Lane, and no development-related traffic uses Braymont Road, except in emergency or infrequent use such as for monitoring;
- undertake design and construction of proposed road re-alignments and the Kamilaroi Highway rail spur line overpass to the satisfaction of the appropriate road authority; and
- prepare and implement a Traffic Management Plan for the Project.

Evaluation

The Department has assessed the development application, EIS, submissions, agency advice, the Commission's Issues Report, Whitehaven's Submissions and Amendment Reports, the independent expert reports, and a range of additional information in accordance with the requirements of the EP&A Act.

The Department acknowledges that the Project would result in additional environmental and amenity impacts associated with increasing the disturbance footprint of the Approved Project and the additional mining-related infrastructure.

However, based on its assessment, the Department considers that the environmental and amenity impacts of the Project are not significantly greater than those associated with the Approved Project, and the additional impacts can be managed to achieve an acceptable level of environmental performance, in accordance with applicable guidelines and policies.

The Department also considers that the project would provide major economic and social benefits for the region and to NSW as a whole, including direct capital investment of \$607 million and up to 450 jobs during operations.

The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the project complies with relevant criteria and standards, that the impacts are consistent with those predicted in the EIS, and that residual impacts are effectively minimised, managed and/or at least compensated for.

The Department has carefully weighed the impacts of the Project against the significance of the resource and the socio-economic benefits. Overall, the Department's assessment concludes that the Project achieves a reasonable and appropriate balance between maximising the recovery of a high-quality coal resource of State significance and minimising the potential impacts on surrounding land users and the environment as far as is practicable.

Consequently, on balance, the Department considers that the project is in the public interest and is approvable, subject to the recommended conditions of consent.

Contents

1	Introduction	1
1.1	Background	1
1.2	Purpose of Report	4
1.3	Process to Date	4
2	Project Details	6
2.1	Vickery Extension Project Description	6
2.2	Amendments to the Project	12
3	Strategic Context	13
3.1	Gunnedah Coalfield	13
3.2	Whitehaven's Operations in the Gunnedah Region	14
3.3	Strategic Plans and Policies	14
4	Statutory Context	16
4.1	State Significant Development	16
4.2	Administrative and Procedural Requirements	16
4.3	Surrender of Development Consent	16
4.4	Mandatory Matters for Consideration	17
4.5	Objects of the EP&A Act	17
4.6	Permissibility	18
4.7	Integrated and Other NSW Approvals	18
4.8	Site Verification Certificate	18
4.9	Commonwealth Approvals	18
4.10	Independent Planning Commission of NSW	19
5	Key Issues	21
5.1	Overview of the Commission's Issues Report	21
5.2	Whitehaven's Submissions Report	22
5.3	Additional Consultation	22
6	Assessment	26
6.1	Project Justification – Additional Information	26
6.2	Water Resources	28
6.3	Amenity Impacts	65
6.4	Biodiversity	75
6.5	Rehabilitation, Final Void and Landform	91
6.6	Heritage	99
6.7	Traffic and Transport	103
6.8	Social and Economic	109
6.9	Visual Amenity and Lighting	116
6.10	Public Interest	120
6.11	Other Issues	125
7	Recommended Conditions	127
8	Evaluation	128
	Appendices	130

Appendix A – Environmental Impact Statement	130
Appendix B – Submissions	130
Appendix C – Preliminary Issues Report	130
Appendix D – IPC Issues Report	130
Appendix E – Submissions Report	130
Appendix F – Amendment Report	130
Appendix G – Additional Information	131
Appendix H – Consideration of Community Views and Commissions Issues Report	133
Appendix I – BCD Advice on Commonwealth Matters	139
Appendix J – Consideration of Commonwealth Matters.....	140
Appendix K – Statutory Considerations	150
Appendix L – Recommended Conditions of Consent.....	156

1 Introduction

1.1 Background

1. Vickery Coal Pty Ltd, a subsidiary of Whitehaven Coal Pty Ltd (Whitehaven) owns the Vickery Coal Mine, located approximately 25 kilometres (km) north of Gunnedah (see **Figure 1**). The project is located within the Gunnedah and Narrabri local government areas (LGAs).
2. The mine site has been subject to historic underground and open cut coal mining activities from the mid-1980s to the late 1990s including the Canyon Coal Mine currently in closure phase, leaving 5 rehabilitated voids within the landscape.
3. In September 2014, the delegate of the Minister for Planning approved the Vickery Coal Project (the Approved Project) as a State Significant Development (SSD-5000) under the *Environmental Planning and Assessment Act 1979* (EP&A Act). While the Approved Project was physically commenced within the 5-year period required by the *Environmental Planning and Assessment Regulation 2000*, production at the mine is yet to commence.
4. The Approved Project includes the extraction of 135 million tonnes of coal over a 30-year period, at a rate of up to 4.5 million tonnes of run-of-mine (ROM) coal a year (Mtpa). Extracted coal would be hauled by trucks on public roads to Whitehaven's existing coal handling and preparation plant (CHPP) near Gunnedah, where it would be processed and loaded onto trains for transport to the Port of Newcastle. The CHPP operates under a separate development consent (DA 79_2002) and is currently approved to operate until October 2022. The Gunnedah CHPP also accepts and processes coal from other Whitehaven's mines in the region, including the Tarrawonga mine.
5. Whitehaven is now proposing to extend the Approved Project and develop a new CHPP and train load out facility at the mine site. It also proposes to develop a rail spur across the Namoi River floodplain to connect the load out facility to the main Werris Creek to Mungindi Railway line.
6. The Vickery Extension Project (hereafter referred to as 'the Project'), would increase total coal extraction from 135 to 168 million tonnes and increase the extraction rate from 4.5 up to 10 Mtpa of coal over 25 years (rather than 30 years). The new CHPP would also receive and process coal from other Whitehaven mines including the Tarrawonga mine and would enable the cessation of road transport of coal to the Gunnedah CHPP near Gunnedah.
7. The Project is classified as a 'State Significant Development' under Part 4 of the EP&A Act, as it is development for the purpose of coal mining and mining-related works. The Independent Planning Commission of NSW (the Commission) is the consent authority for the proposal as there were more than 50 unique public objections to the Project.
8. In November 2018, the Department referred the Environmental Impact Statement (EIS), submissions received during public exhibition of the EIS and its preliminary review of the Project to the Commission for review. The Commission held public hearings in February 2019 and in April 2019 published its report which recommends the issues to be considered by the Department in its final assessment report.

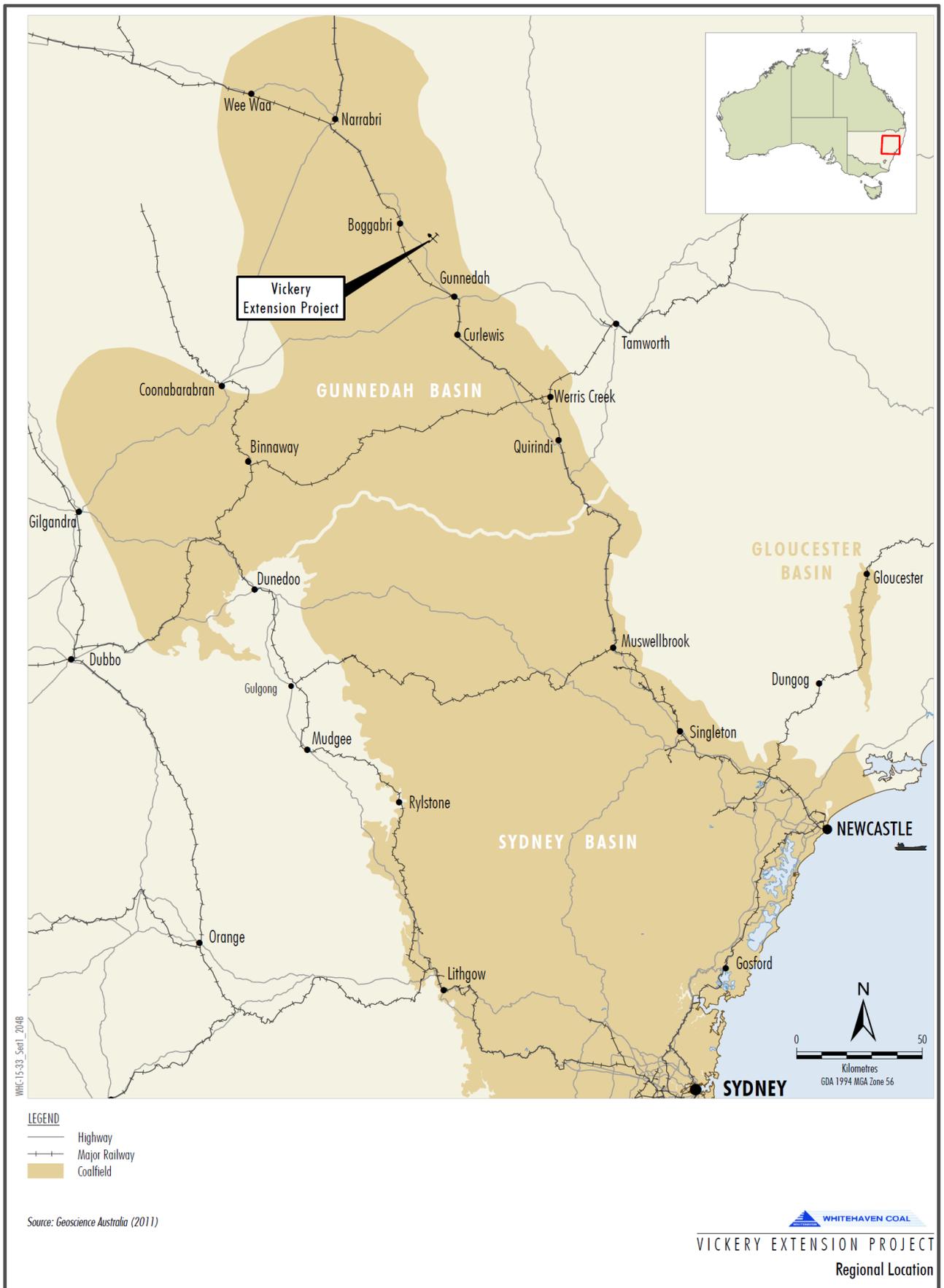


Figure 1 | Regional Context Map

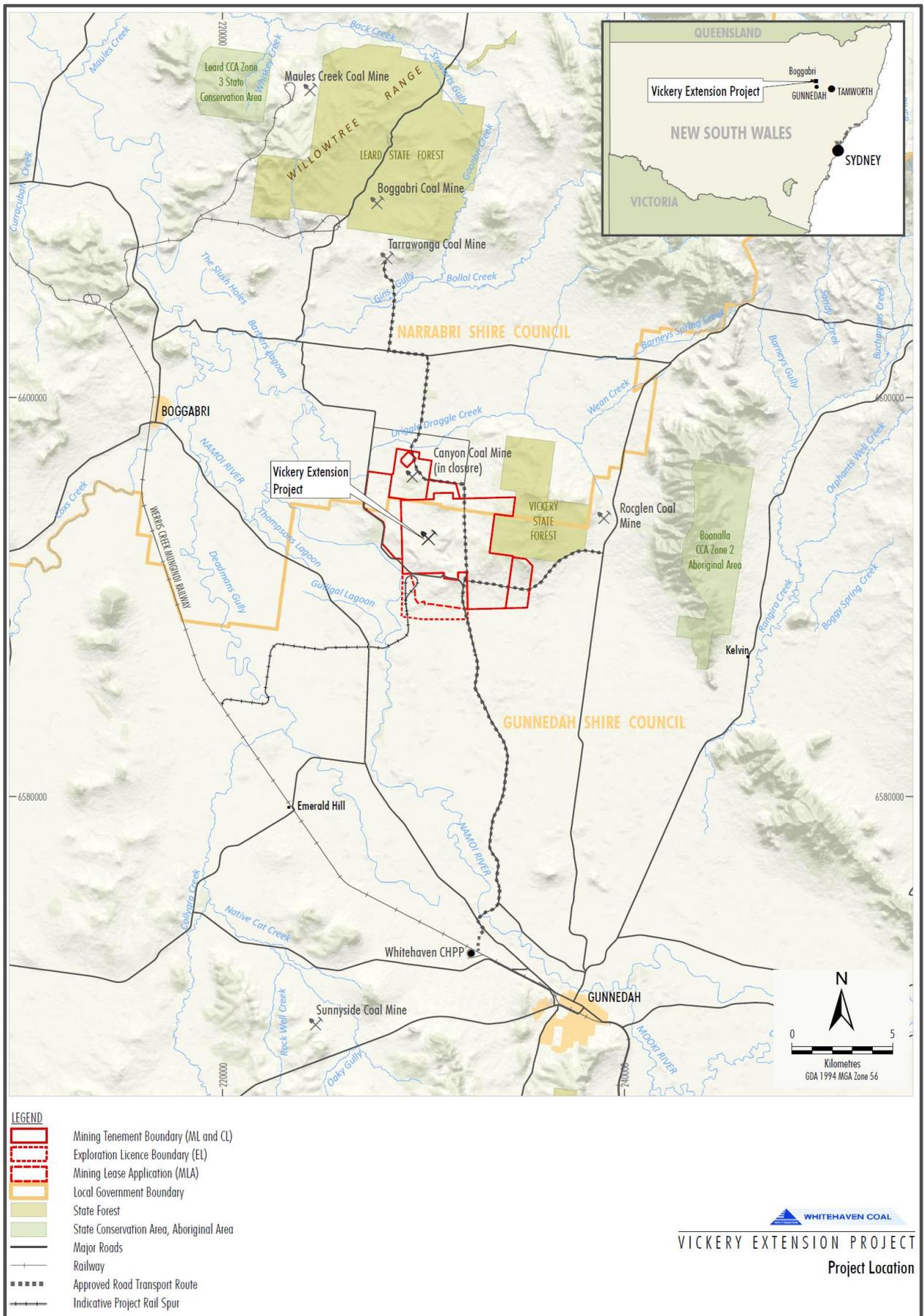


Figure 2 | Local Context Map

1.2 Purpose of Report

9. This Assessment Report and recommended conditions have been prepared for consideration by the Commission for its final determination.
10. This report considers:
 - the development application, EIS and Whitehaven's Amendment Report for the Project;
 - submissions received during public exhibition of the EIS and additional information received from landowners and community stakeholders;
 - the Department's Preliminary Issues Report (PIR), dated November 2018;
 - the recommendations made in the Commission's Vickery Extension Project Issues Report (Commission's Issues Report), dated 30 April 2019;
 - Whitehaven's Submissions Report, dated August 2019, responding to the submissions received during the public exhibition of the EIS and the Commission's Issues Report;
 - further advice from Government agencies and independent experts received following the Submissions Report and Commission's Issues Report; and
 - the Commonwealth *Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development* (IESC) advice.
11. This report includes a detailed consideration of the impacts of the Project and has been prepared to satisfy the requirements of the EP&A Act.
12. It has also been prepared to satisfy the requirements of the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), in accordance with the bilateral agreement between the Commonwealth and NSW Governments.

1.3 Process to Date

13. On 13 August 2018, following consultation with the Department and other relevant authorities, Whitehaven lodged an application and supporting EIS for the Project.
14. On 6 September 2018, the then Minister for Planning requested the Commission conduct an initial public hearing into the Project, as soon as practicable after the public exhibition of the EIS for the Project.
15. The Minister asked that the Commission consider the EIS, submissions on the Project, and any relevant expert advice and other information. The Minister also asked that the Commission publish a report on the hearing findings including, amongst other things, identification of the key issues requiring detailed consideration by the Department in evaluating the merits of the Project.
16. The Department publicly exhibited the EIS from 13 September 2018 until 25 October 2018 (42 days).
17. During the exhibition period, the Department received a total of 560 submissions including:
 - 20 from special interest groups; and
 - 540 from the general public (including individuals and businesses).
18. The Department also received advice from 14 government agencies.
19. Of the submissions received, 345 submissions (62%) were in support of the project, 201 submissions (36%) objected to the Project and 14 (2%) submissions provided comments on the Project.
20. As a comparison, 23 public submissions were received for the Approved Project, showing the change in the level of public interest towards coal mining more broadly and the changes to the strategic context of coal mining in the Gunnedah Basin.
21. On the 26 September 2018, the Department held a community information session in Boggabri to inform the community about the planning assessment process and to hear their views on the project. The information session was attended by around 70 community members. The Department and key government agencies also inspected the site on 26 September 2018.
22. The Department has also convened several meetings with local landowners and special interest groups (and their experts) throughout the process.

23. On 30 November 2018, the Department completed its PIR to assist the Commission in conducting its public hearing. The report provided a preliminary review of the development application, EIS and submissions for the Project.
24. The intention of the preliminary review was to identify issues raised in submissions during the exhibition period (see **Appendix B**) and provide the Commission with the key issues for consideration in its public hearing and subsequent Commission's Issues Report. The Department did not provide an assessment of the issues or conclusions in its PIR, but instead identified areas where further information would be required.
25. In the PIR, the Department identified the key issues for the assessment of the Project (as raised through the public submissions) to be the rail spur, impacts on water resources, amenity, biodiversity, final landform and land use economics and social considerations. Other issues included Aboriginal and non-indigenous heritage, traffic and transport, hazards and risk, and climate change (see **Appendix C**).
26. The Department also engaged the following independent experts to provide advice on key aspects of the assessment, namely surface water, flooding, groundwater and economics.
 - *Surface Water* - Mr Martin Giles, BMT
 - *Flooding* - Ms Erin Askew, WMA Water
 - *Groundwater* - Mr Hugh Middlemiss, Hydrogeologic
 - *Economics* - Mr Gavan Dwyer, Marsden Jacobs Associates
27. Initial public hearings were conducted by the Commission on 4 and 5 February 2019, in Boggabri and Gunnedah, respectively. The Commission's Issues Report was subsequently published on 30 April 2019 (see **Appendix D**).
28. On 8 May 2019, the Department requested Whitehaven respond to the issues raised in submissions received during the public exhibition period, including government agency advice, IESC advice and the advice and recommendations of the independent experts.
29. On 23 August 2019, Whitehaven provided its Submissions Report which included the information requested by the Department, a response to the Department's Preliminary Issues Report and a response to the Commission's Issues Report (see **Appendix E**).

2 Project Details

2.1 Vickery Extension Project Description

30. Whitehaven is proposing an extension of the mining and ancillary activities associated with the Approved Project, see **Figure 3**, **Figure 4** and **Figure 5**. The key changes include:
 - extracting an additional 33 Mt of coal by extending the footprint of the open cut mine to the north and south of the approved footprint;
 - increasing the extraction rate of ROM coal from 4.5 to 10 Mtpa, with an average extraction of 6.7 Mtpa, allowing for more efficient extraction of the coal reserves;
 - constructing and operating a CHPP, train load out facility, rail loop and rail spur line at the project site;
 - constructing and operating a water supply borefield and pipeline; and
 - changing the final landform by removing the eastern overburden emplacement area (which is now proposed to be used as a secondary infrastructure area), increasing the size of the approved western overburden emplacement area (the WEA) and retaining one pit lake void (rather than two).
31. A fundamental change proposed to the Approved Project is to construct the CHPP and rail load out facility at the project site and make this the central hub to receive coal from other Whitehaven mines. Whitehaven is proposing to continue to use the already approved road transport route to the Gunnedah CHPP at its approved rate until the Project CHPP, rail load-out facility and rail spur line reach “full operational capacity”. Once operational, the Project CHPP would remove coal haul trucks from public roads.
32. It is proposed that the Project CHPP and rail load out facility would:
 - stockpile and process a total of 13 Mtpa of ROM coal from the project and other Whitehaven mining operations;
 - produce up to 11.5 Mtpa of metallurgical and thermal coal products; and
 - transport up to 11.5 Mtpa of product coal from the rail load facility, the rail spur line and via the public rail network to Newcastle for export markets.
33. Whitehaven is also proposing to surrender the Vickery Coal Project and Canyon Coal Mine development consents if the Project is approved so that the entire site is regulated under a single consolidated development consent.

2.1.1 Key Elements

34. The key elements of the Project are outlined in **Table 1** and depicted in **Figure 3** and **Figure 4**. The approved activities associated with the Approved Project are also included for comparison purposes. The proposal is described in detail in the EIS (see **Appendix A**) as amended in Whitehaven’s Amendment Report (see **Appendix F**).

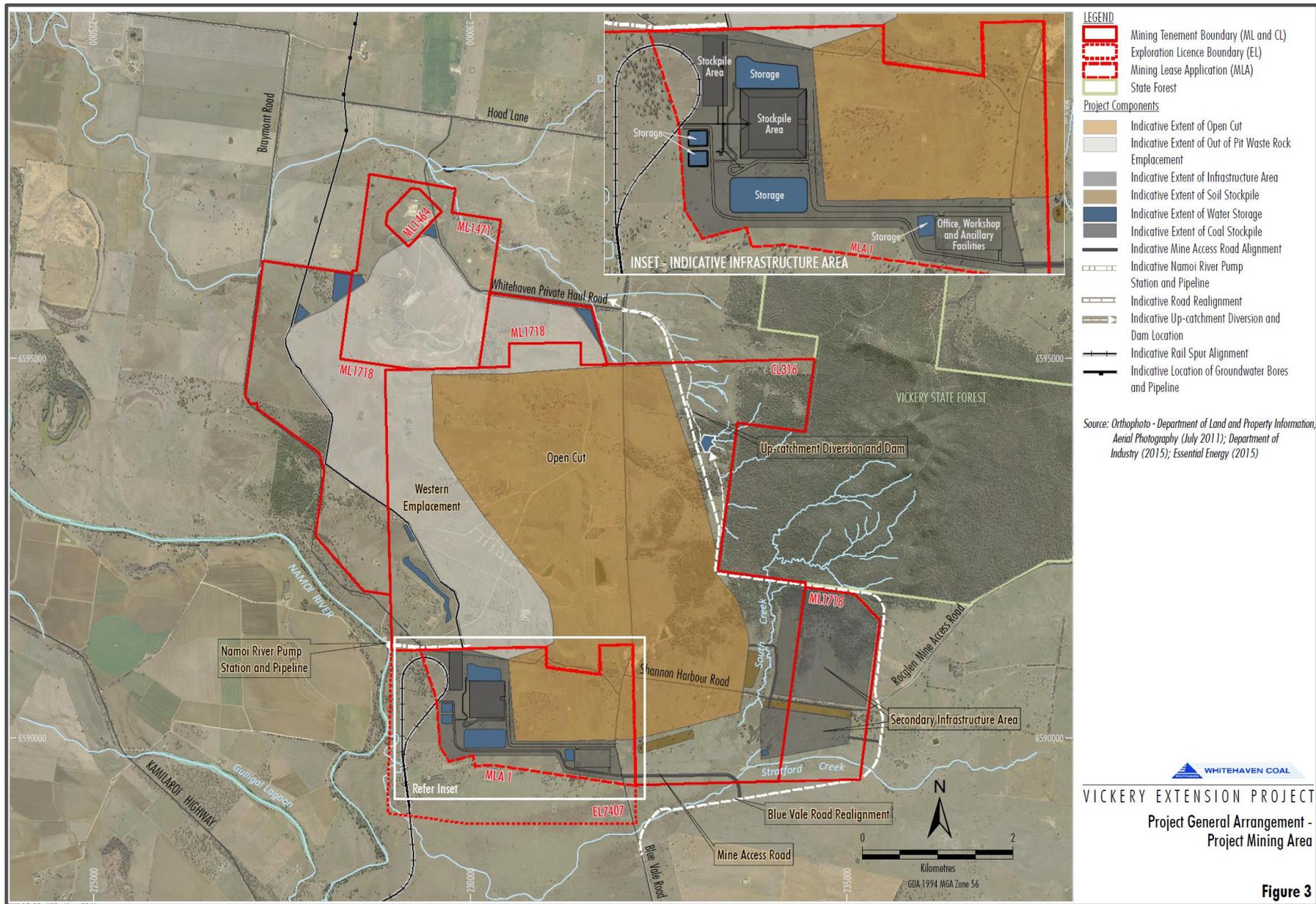


Figure 3 | Project Layout

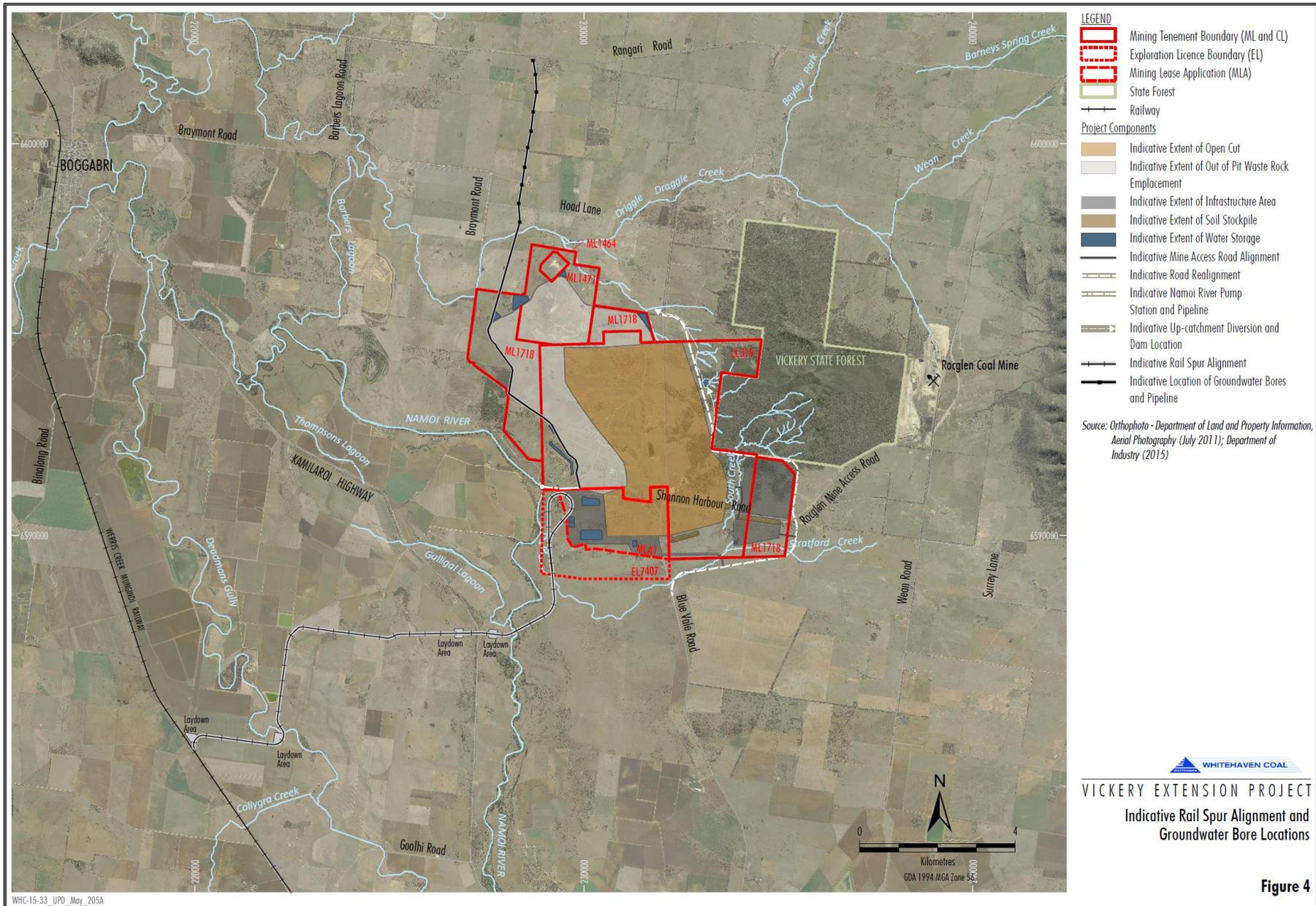


Figure 4 | Project Layout with Rail Spur and Groundwater Borefield locations

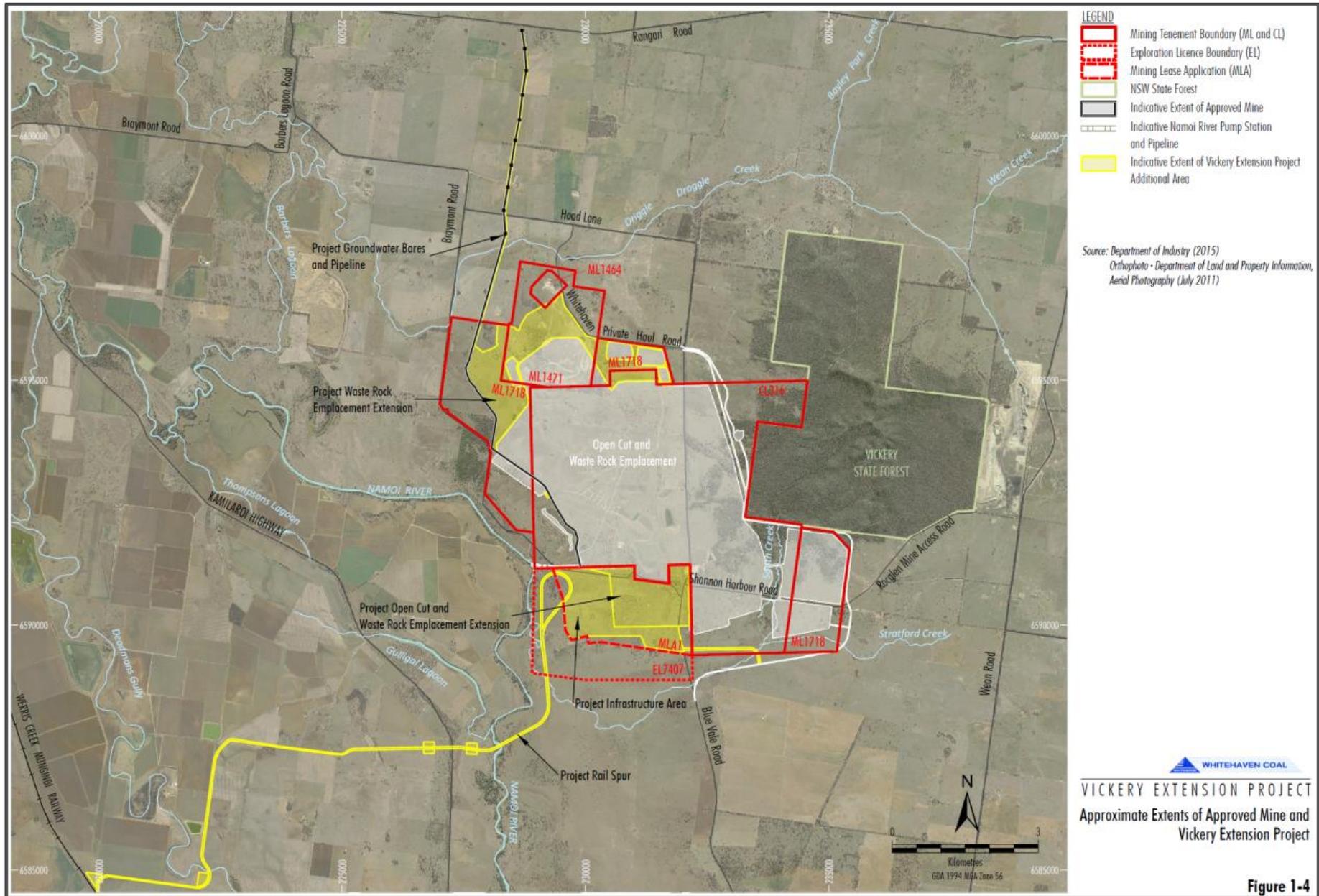


Figure 5 | Project Layout compared with Approved Project.

Table 1 | Main Components of the Project

Project Component	Approved Project	Vickery Extension Project	Key Changes
ROM Coal Production Rate	<ul style="list-style-type: none"> Up to 4.5 Mtpa 	<ul style="list-style-type: none"> Average rate of 6.7 Mtpa over 25 years, with a peak production rate of up to 10 Mtpa 	<ul style="list-style-type: none"> Up to 5.5 Mtpa increase No change to the depth of extraction
Project Life	<ul style="list-style-type: none"> Approximately 30 years 	<ul style="list-style-type: none"> 26 years (one year of construction and 25 years of mining operations) 	<ul style="list-style-type: none"> Approximately 4 year decrease
Mining and Reserves	<ul style="list-style-type: none"> Extraction of approximately 135 million tonnes of ROM coal from 7 coal seams within the Maules Creek Formation 	<ul style="list-style-type: none"> Extraction of approximately 168 million tonnes of ROM coal from 8 coal seams within the Maules Creek Formation 	<ul style="list-style-type: none"> 33 Mt increase One additional seam
Processing	<ul style="list-style-type: none"> On-site coal crushing and screening facilities ROM coal transported from the mine to the Gunnedah CHPP for processing 	<ul style="list-style-type: none"> As for the Approved Project until the commissioning of the Project CHPP and rail spur On-site stockpiling and processing of 13 Mtpa of ROM coal from the mine and other Whitehaven mining operations Production of up to 11.5 Mtpa of product coal from the Project CHPP 	<ul style="list-style-type: none"> On-site CHPP
Coal Transport	<ul style="list-style-type: none"> ROM coal transported by truck along the approved road transport route from the mine to the Gunnedah CHPP near Gunnedah at a cumulative rate not exceeding 3.5 Mtpa, or 4.5 Mtpa with construction of an overpass on the Kamilaroi Highway Product coal transported by rail from Gunnedah CHPP to market 	<ul style="list-style-type: none"> As for the Approved Mine, until the project CHPP, train load out facility and rail spur reach full operational capacity Up to 11.5 Mtpa of product coal to be transported to market by rail via the project rail spur to the Werris Creek Mungindi Railway 	<ul style="list-style-type: none"> Rail transport from the project site replacing transport by road
Materials Management	<ul style="list-style-type: none"> Production of 1,269 million bank cubic metres (Mbcm) of overburden Overburden emplacement in the Eastern and Western Emplacements and within the open cut void footprint Co-disposal of reject material from the CHPP within the overburden emplacement areas 	<ul style="list-style-type: none"> Production of approximately 1,707 Mbcm of overburden Overburden emplacement in the WEA and within the open cut void footprint Co-disposal of reject material from the CHPP within the overburden emplacement areas 	<ul style="list-style-type: none"> 438 Mbcm (35%) increase in overburden
Roadworks	<ul style="list-style-type: none"> Construction of a section of private haul road and overpass of the Kamilaroi Highway Realignment of Blue Vale Road, Shannon Harbour Road, Hoad Lane and Braymont Road 	<ul style="list-style-type: none"> Construction of the Kamilaroi Highway overpass, if required Realignment of Blue Vale Road Closure of southern section of Braymont Road and Shannon Harbour Road 	<ul style="list-style-type: none"> No realignment of Braymont Road

Project Component	Approved Project	Vickery Extension Project	Key Changes
Employment	<ul style="list-style-type: none"> Up to 60 construction workers Up to 250 operational workers with an average of 213 full time equivalent (FTE) workers over the life of the mine 	<ul style="list-style-type: none"> Up to 500 construction workers, with 90% of the workforce expected to reside in the approved Boggabri Accommodation Camp (currently operated by Civeo) Up to 450 operational workers with an average of 344 FTE workers over the life of the mine 	<ul style="list-style-type: none"> Up to 440 additional construction workers Up to 200 additional operational workers with an average of 131 full time equivalent
Capital Value	<ul style="list-style-type: none"> Approximately \$461 million 	<ul style="list-style-type: none"> Approximately \$607 million 	<ul style="list-style-type: none"> Approximately \$146 million increase
Hours of Operation	<ul style="list-style-type: none"> Mining operations 24 hours a day, seven days a week Road transport of ROM coal would occur between 6:00 am and 9:15 pm Mondays to Fridays, and 7:00 am to 5:15 pm on Saturdays 	<ul style="list-style-type: none"> Mining operations, CHPP, train loading and rail transport on the project rail spur 24 hours per day, seven days per week Road transport of ROM coal would occur between 6:00 am and 9:15 pm Mondays to Fridays, and 7:00 am to 5:15 pm on Saturdays 	<ul style="list-style-type: none"> No change
Disturbance Area, Vegetation Clearing and Biodiversity Offsets	<ul style="list-style-type: none"> Disturbance area of 2,242 ha including 1,748 ha of native vegetation comprising: <ul style="list-style-type: none"> - 464 ha of native woodland; and - 1,284 ha of derived native grassland 2,063 ha of land-based offsets 1,360 ha rehabilitation to native vegetation 780 ha rehabilitation to grassland/pasture 	<ul style="list-style-type: none"> Total disturbance area of 2,993 ha including 2,328 ha of native vegetation comprising: <ul style="list-style-type: none"> - 542 ha of native woodland; and - 1,760 ha of derived native grassland Additional 993 ha of land based offsets 2,385 ha rehabilitation to native woodland Additional offset areas, in accordance with the <i>Framework for Biodiversity Assessment</i> Land-based offsets (offset areas 6, 7 and 8 & Mount Somner property), an existing biobank site and/or additional biobanking credits; supplementary measures; and/ or contributing to the Biodiversity Conservation Trust 	<ul style="list-style-type: none"> Additional disturbance area of 776 ha including: <ul style="list-style-type: none"> - 78 ha of native woodland; and - 502 ha of derived native grassland Reduced disturbance of 26 ha (soil stockpile) Additional 20 ha land- based offset in Offset Area 5 1,005 ha rehabilitation of the project disturbance area to native woodland 523 ha additional mine rehabilitation to native woodland in the Approved Project area
Rehabilitation	<ul style="list-style-type: none"> Progressive rehabilitation of overburden emplacement and surface disturbance areas Final landform to include three final voids (the existing Blue Vale void and the Northern and Southern voids) 	<ul style="list-style-type: none"> Progressive rehabilitation of overburden emplacement and surface disturbance areas Final landform to include two final voids (the existing Blue Vale void and the open cut void) 	<ul style="list-style-type: none"> One less final void

2.2 Amendments to the Project

35. In accordance with Clause 55 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulations), a development application can be amended at any time before the application is determined.
36. Whitehaven's initial proposal for the Project sought to extract ROM coal within Mining Lease 1718 (ML 1718). The Department's Division of Resources and Geosciences (DRG) has subsequently advised that ML 1718 was issued for mining purposes (now ancillary mining activities) only. Consequently, the extraction of coal in this area is not currently permissible, and a new mining lease is required for extraction.
37. In response, Whitehaven no longer proposes to extract coal from ML 1718, reducing the total resource to be extracted from 179 Mt to 168 Mt (approximately 11 Mt of ROM coal or 10 Mt of product coal). Compared with the Approved Project total ROM coal resource (135 Mt), the Project would therefore allow an additional 33 Mt of ROM coal resource to be extracted.
38. Accordingly, Whitehaven has sought to amend its application and in September 2019 submitted an Amendment Report (see **Appendix F**).
39. Key changes to the Project, made after the Department's PIR and Commission's Issues Report, are included in the Submissions Report and Amendment Report, and summarised in **Table 2** below.

Table 2 | Key Changes to the Vickery Extension Project (post Commission's Issues Report)

Project Component	Proposed Project	Vickery Extension Project - Amendment
Mining and Reserves	<ul style="list-style-type: none"> • Extraction of approximately 179 million tonnes of ROM coal 	<ul style="list-style-type: none"> • Extraction of approximately 168 million tonnes of ROM coal (approx.11 Mt reduction)
Average Production Rate	<ul style="list-style-type: none"> • Approximately 7.2 Mtpa ROM coal 	<ul style="list-style-type: none"> • Approximately 6.7 Mtpa ROM coal
Total Waste Rock	<ul style="list-style-type: none"> • Approximately 1,830 Mbcm 	<ul style="list-style-type: none"> • Approximately 1,707 Mbcm
Net benefits	<ul style="list-style-type: none"> • \$1.21 billion 	<ul style="list-style-type: none"> • \$1.16 billion
Greenhouse Gas (GHG) Emissions	<ul style="list-style-type: none"> • Scope 1 – 3.2 Mt CO₂-e • Scope 2 – 0.9 Mt CO₂-e • Scope 3 – 389 Mt CO₂-e 	<ul style="list-style-type: none"> • Scope 1 – 3.1 Mt CO₂-e • Scope 2 – 0.8 Mt CO₂-e • Scope 3 GHG – 366 Mt CO₂-e

40. In the EIS, Whitehaven had proposed to construct the rail spur line to the west of the Namoi River using a combination of embankments and pylons/ piers.
41. However, in response to landowner concerns, Whitehaven has committed in its Submissions Report to construct the full length of the rail spur line on elevated pylon/ pier structures west of the Namoi River to the junction with the Werris Creek to Mungindi Rail Line, apart from a short connecting embankment into the public rail network to the north of Emerald Hill.

3 Strategic Context

3.1 Gunnedah Coalfield

42. The Project is located in the Gunnedah Coal Basin, which has a long history of coal exploration and mining, including open cut and underground mining activities since the mid-1980s.
43. There are several coal mines located across the Gunnedah Coal Basin, most of which are operated by Whitehaven. Nearby mines are likely to have some direct interaction with the Project, while mines located further away would potentially contribute to the cumulative impacts associated with the Project. The location of the nearby coal mines is shown in **Figure 2** and listed below, along with the other operating coal mines in the wider region.
 - Canyon (currently in closure phase), operated by Whitehaven, located within the northern part of the Vickery Extension Project area;
 - Rocglen Coal Mine (currently in rehabilitation), operated by Whitehaven, approximately 5 km to the east;
 - Tarrawonga Coal Mine (open cut), operated by Whitehaven, approximately 10 km to the north;
 - Boggabri Coal Mine (open cut), operated by Idemitsu Australia Resources Pty Ltd, approximately 15 km to the north;
 - Maules Creek Coal Mine (open cut), operated by Whitehaven, approximately 20 km to the north;
 - Sunnyside Coal Mine (currently in rehabilitation), operated by Whitehaven, approximately 25 km to the south west;
 - Narrabri Coal Mine (underground), operated by Whitehaven, approximately 40 km to the north-west;
 - Werris Creek Coal Mine (open cut), operated by Whitehaven, approximately 80 km to the south-east; and
 - Watermark Coal Project (open cut), operated by Shenhua Watermark Pty Limited, approved January 2015 but yet to commence construction of the mine, approximately 50 km to the south-east.
44. There are currently two main coal transport routes from mines operating in the area. The Tarrawonga mine transports coal via an approved haulage route to the Gunnedah CHPP for processing and rail load out to Newcastle. The Maules Creek and Boggabri coal mines operate a shared rail spur that crosses the Namoi River north of Boggabri before it joins the public rail network for coal transport to Newcastle.
45. The proposed project area and immediate surrounds have been widely used for mining and includes the former Vickery Coal Mine (also formerly known as the Namoi Valley Coal Project) and the Canyon Coal Mine (currently in closure phase). These mining activities have left five voids which have been rehabilitated to allow grazing. Mining commenced in the Vickery area in 1986 with around 4 Mt of coal extracted from 1991-1998 with the Canyon Coal Mine operating between 2000 and 2009.
46. In 2012, Whitehaven acquired an Exploration Licence (EL 7407) to the south of the Approved Project for the purpose of developing the Vickery South Project. If approved, the project would allow mining to access the additional coal resources identified within this area.
47. The urban centres located closest to the Project include the townships of Boggabri, located approximately 13 km to the north-west, and Gunnedah, located approximately 25 km to the south.
48. Land use in the area is largely pastoral agricultural enterprise, predominantly used for grazing purposes. The proposed project mining area has been mostly used for grazing the past 50 years with small scale cropping in areas of higher soil fertility. The Project rail spur has been located adjacent to property boundaries in this area to reduce the impacts on cropping areas (see **Figure 6**).
49. The Project area adjoins the Vickery State Forest (located immediately east), which covers an area of about 1,942 ha. The proposal would not directly disturb the forest.

50. The Project mining area is located within the Namoi catchment and drains to the Namoi River via its tributaries including Driggle Driggle Creek and Stratford Creek, both of which are ephemeral watercourses.

3.2 Whitehaven's Operations in the Gunnedah Region

51. Whitehaven commenced operations in the Gunnedah Basin in 1999 and has since grown to become the largest producer of coal in North West NSW.
52. Whitehaven currently operates four mines in the Gunnedah region, three open cut – Maules Creek, Tarrawonga and Werris Creek – and one underground - Narrabri Coal Project. The Rocglen and Sunnyside open cut mines recently ceased coal production and are currently undergoing rehabilitation.
53. Whitehaven also operates a CHPP located approximately 6 km north-west of the Gunnedah town centre and about 30 kms from the Project. The CHPP is approved to operate until 2022 under a separate development consent (DA79_2002). The CHPP currently accepts coal from the Tarrawonga mine and is approved to process up to 3 Mtpa of ROM coal and handle up to 4.1 Mtpa of product coal (including loading of CHPP bypass coal) at its rail load out facility.
54. Whitehaven's mines provide a supply of metallurgical and thermal coal to export markets in North and South Asia, including Japan, the Republic of Korea (South Korea) and the Republic of China (Taiwan).
55. Whitehaven is the single largest employer in North West NSW with about 75 per cent of its 2,000 employees living locally in the communities surrounding its operations. If approved, the Project would be the fifth Whitehaven mine operating in the region and provide ongoing and new employment opportunities for up to another 200 people.
56. The Approved Project involves the construction of an overpass of the Kamilaroi Highway, to avoid the need for coal haulage trucks to cross the highway to access the CHPP. The Project would continue to transport ROM coal via the approved road haulage route to the CHPP for processing until the Project CHPP, train load-out facility and rail spur infrastructure are fully operational.

3.3 Strategic Plans and Policies

3.3.1 Regional Plan

57. The Project area is located within land covered by the Department's *New England North West Regional Plan 2036*, which sets out the vision for the region with four key goals: a strong and dynamic regional economy; a healthy environment with pristine waterways; strong infrastructure and transport networks for a connected future; and attractive and thriving communities.
58. These goals are planned to be achieved through the implementation of a further 24 directions and 95 actions, which have been set out to support the delivery of new and established industries in the New England North West region. The Department has considered the objectives of the plan and provides further discussion of environmental, social and economic costs and benefits in Sections 6 and 8.

3.3.2 Strategic Land Use Plan

59. The *New England North West Strategic Regional Use Land Plan 2012* (SRLUP) was developed for the purpose of balancing economic growth while protecting agricultural land and ensuring the sustainable management of natural resources. This plan identifies key regional planning challenges and introduces the decision-making framework (known as the Gateway process) for the identification and assessment of potential impacts to highly productive agricultural land. The Gateway process is explained further in Section 4.6.
60. While the Project's new mining lease area is not located on mapped Biophysical Strategic Agricultural Land (BSAL) or Critical Industry Cluster (CIC) land, Whitehaven applied for and was issued a Site Verification Certificate (SVC) on 8 February 2016 in accordance with the SRLUP. The SVC verifies that the MLA associated with the Project (MLA1) is not located on BSAL.

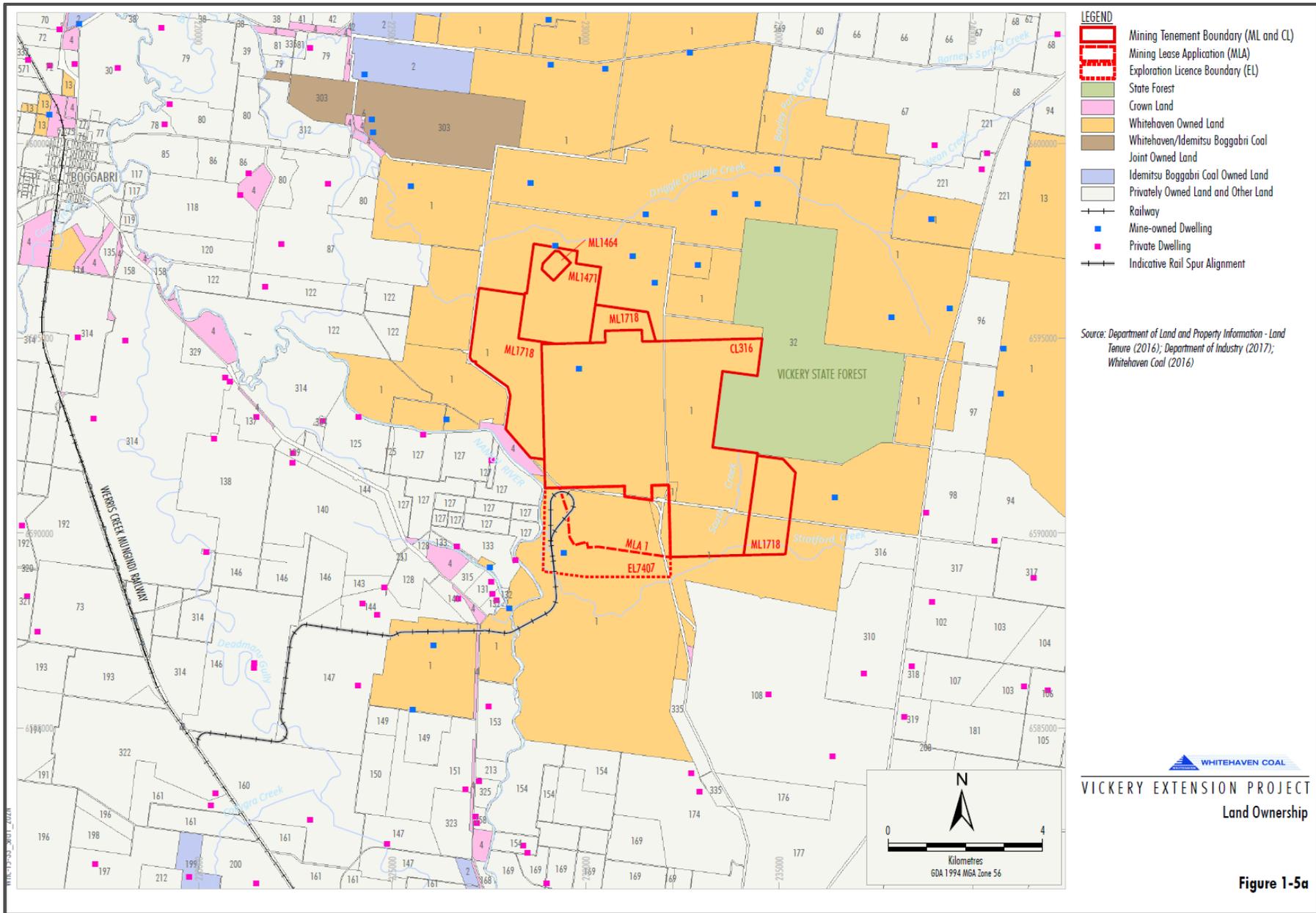


Figure 6 | Land Ownership and Receiver Locations

4 Statutory Context

4.1 State Significant Development

61. The proposed development is classified as State Significant Development (SSD) under Division 4.7 of the EP&A Act, as it is development for the purpose of coal mining and mining-related works, which is specified in clause 5 of Schedule 1 to *State Environmental Planning Policy (State and Regional Development) 2011* (the SRD SEPP).
62. In accordance with Section 4.5(a) of the EP&A Act and clause 8A of the SRD SEPP, the Independent Planning Commission is the consent authority for the development application as there were more than 50 unique objections to the Project.

4.2 Administrative and Procedural Requirements

63. Under the EP&A Act and Regulation there are several administrative and procedural requirements that must be addressed before a consent authority can determine a development application.
64. This includes the requirements:
 - applying to development applications generally in Part 4 of the EP&A Act and Part 6 of the EP&A Regulation, particularly the provisions in Division 1 and Schedule 1 of the EP&A Regulation;
 - applying specifically to development applications for SSD, including the provisions in Section 4.7 of the EP& Act and Divisions 6 of the EP&A Regulation;
 - applying to the preparation of EISs in Schedule 2 of the EP&A Regulation; and
 - for mandatory community participation, including the obligation to exhibit the development application for SSD projects and the associated EIS for at least 28 days.
65. The Department has conducted a detailed review of the steps taken so far on the Project, and can confirm that all of the relevant administrative and procedural requirements have been met.

4.3 Surrender of Development Consent

66. Section 4.63 of the EP&A Act (voluntary surrender of development consent) provides that if a development consent is surrendered as a condition of a new development consent and the new consent includes continuation of development that was authorised, then the consent authority:
 - is not required to re-assess the likely impact of the continued development to the extent that it could have been carried out but for the surrender of the consent;
 - is not required to re-determine whether to authorise that continued development under the new development consent (or the manner in which it is to be carried out); and
 - may modify the manner in which that continued development is to be carried out for the purpose of the consolidation of the development consents applying to the land concerned.
67. If the Project is approved, Whitehaven would surrender the Vickery Coal Project and Canyon Coal Mine development consents and all mining operations on the site would be regulated under a single consolidated contemporary development consent.
68. While the consent authority is not required to re-assess the impacts of the Approved Project, both the EIS and the Department's assessment have considered worst-case cumulative impact scenarios to ensure the full range of impacts are considered, including in regard to:
 - **Water Resources** - the assessment incorporates the potential impacts of the Project's mining operations, the proposed rail spur and borefield, and other mining operations in the region;
 - **Amenity** - the noise, blasting, air quality and visual assessments incorporate the potential cumulative impacts of the Project (which incorporates the Approved Project) together with other mining operations in the region, and are based on maximum production rates; and
 - **Other Matters** – traffic, social, economic and land use impacts (e.g. agricultural land) of the Project have all been assessed on a cumulative basis, but also consideration has been given to the

additional impacts over and above those associated with the Approved Project for comparative purposes.

69. The key exceptions are impacts associated with the additional disturbance within the extension area such as biodiversity and Aboriginal cultural heritage, which have been assessed primarily on an incremental basis, albeit with consideration of indirect and cumulative impacts associated with the Approved Project and other developments in the area.
70. This approach has been reflected in the recommended conditions of consent which incorporate the relevant requirements of the Approved Project, including existing biodiversity offset obligations and conditions related to the road haulage overpass over the Kamilaroi Highway to access the Gunnedah CHPP.

4.4 Mandatory Matters for Consideration

71. Under Section 4.40 of the EP&A Act, the Commission is required to evaluate the merits of the Project against the relevant matters for consideration set out in Section 4.15 of the prior to making its determination. This includes:
 - the provisions of any environmental planning instruments;
 - the terms of Whitehaven's offer to enter into planning agreements with NSC and GSC and whether it should impose a condition on the project;
 - the prescribed matters for consideration in Division 8 of the EP&A Regulation, including requirements for demolition and consideration of the relevant matters in the *Dark Sky Planning Guideline*;
 - the likely impacts of the project, including the environmental impacts on both the natural and built environments, and social and economic impacts in the locality;
 - the suitability of the site for the project; and
 - the public interest, which includes considering the relevant objects of the EP&A Act and Ecologically Sustainable Development (ESD).
72. The Department has considered all of these matters in its assessment of the Project and has provided a summary in the sections below. Further consideration has been provided in **Appendix K**.

4.5 Objects of the EP&A Act

73. The objects of the EP&A Act are the underpinning principles upon which the assessment is conducted, and they must be considered by the consent authority when determining a development application. The Department has assessed the Project against the current objects found in Section 1.3 of the EP&A Act. Table K1 of **Appendix K** summarises how the most relevant objects have been considered.
74. Under Section 4.15 of the EP&A Act, the consent authority is also required to take into consideration any environmental planning instrument (EPI) that is of relevance to the development. The following EPIs apply to the proposal:
 - *SEPP No.33 – Hazardous and Offensive Development*;
 - *SEPP No.44 – Koala Habitat Protection*;
 - *SEPP No.55 – Remediation of Land*;
 - *SEPP (State and Regional Development) 2011*;
 - *SEPP (Infrastructure) 2007* (the Infrastructure SEPP);
 - *SEPP (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP);
 - *Gunnedah Local Environmental Plan 2012* (Gunnedah LEP); and
 - *Narrabri Local Environmental Plan 2012* (Narrabri LEP).
75. Whitehaven has considered these matters in the EIS and the Department has assessed the Project against the relevant provisions of these instruments. The Department considers that the proposal can be undertaken in a manner that is generally consistent with the aims, objectives and provisions of these EPIs (see **Appendix K**).

4.6 Permissibility

76. The Project is located within the Gunnedah and Narrabri LGAs and located on land zoned RU1 (Primary Production) under both the Gunnedah and Narrabri LEPs.
77. Development for the purposes of open cut mining and railways is permissible within this zone, and hence the Project is permissible with development consent.

4.7 Integrated and Other NSW Approvals

78. Under Section 4.41 of the EP&A Act, a number of approvals are integrated into the State Significant Development assessment process, and consequently are not required to be separately obtained for the proposal. These include:
 - various approvals relating to heritage required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1997*; and
 - certain water approvals under the *Water Management Act 2000* (WM Act).
79. Under Section 4.42 of the EP&A Act, a number of other approvals are required, but must be substantially consistent with any development consent for the proposal. These include:
 - a mining lease under the *Mining Act 1992*;
 - an Environment Protection Licence (EPL) under *the Protection of the Environment Operations Act 1997*; and
 - consents under Section 138 of the *Roads Act 1993* for the re-alignment of public roads and intersection upgrades.
80. Whitehaven may also require other approvals for the Project which are not integrated into the State Significant process, including:
 - approval under the *Crown Lands Act 1989* for any works on Crown land;
 - approvals under the *Roads Act 1993* from Gunnedah and/or Narrabri Shire Councils to permanently close roads in the project area; and
 - certain water licences under the *Water Act 1912* and the WM Act.
81. The Department has consulted with the relevant public authorities responsible for the integrated and other approvals, considered its advice in the assessment of the Project, and included suitable conditions in the recommended conditions of consent to address these matters (See **Appendix L**).

4.8 Site Verification Certificate

82. Under Clause 50A of the EP&A Act, a development application for mining or petroleum development must be accompanied by either a Gateway Certificate or a Site Verification Certificate (SVC) that certifies that the land on which the proposed development is to be carried out is not BSAL.
83. The proposed mining extension area covered by existing or proposed mining lease applications is not located on mapped BSAL or CIC land, and the Department issued a Site Verification Certificate (SVC) on 8 February 2016 verifying that the MLA associated with the project (MLA 1) is not located on BSAL.
84. Consequently, a Gateway Certificate was not required for the proposed development.

4.9 Commonwealth Approvals

85. On 14 April 2016, a delegate of the Commonwealth Minister for the Environment determined that the Project (EPBC 2016/7649) is a 'controlled action' under the EPBC Act due to its potential impacts on listed threatened species and communities (Sections 18 and 18A), and a water resource (Sections 24D and 24E).
86. The assessment process under the EP&A Act has been accredited under a bilateral agreement with the Commonwealth Government to assess matters of national environmental significance (MNES). The Department's assessment on controlling provisions under the EPBC Act relating to biodiversity and

water resources is provided in Section 6 and further information that the Commonwealth Minister must consider is provided in **Appendix J**.

87. The Department sought advice from the IESC about the potential impacts of the Vickery Extension Project on water resources. This advice is provided as an attachment to the Department's Preliminary Issues Report (see **Appendix C**) and considered further in **Section 6.2**.

4.10 Independent Planning Commission of NSW

88. Under Clause 8A of the *State and Regional Development SEPP*, the Commission is the consent authority for the Project as there were more than 50 unique objections to the Project.
89. On 6 September 2018, the former Minister for Planning requested the Commission conduct an initial public hearing into the Project, as soon as practicable after the public exhibition of the EIS for the Project.
90. The Minister asked that the Commission consider the EIS, submissions on the Project, and any relevant expert advice and other information. The Minister also asked that the Commission publish a report on the hearing findings including, amongst other things, identification of the key issues requiring detailed consideration by the Department in evaluating the merits of the Project.
91. Initial public hearings were conducted by the Commission on 4 and 5 February 2019, in Boggabri and Gunnedah, respectively. Members of the public were also given the opportunity to provide written submissions via the Commission's website.
92. During the course of the Commission's initial public hearing process, Whitehaven provided additional material to the Commission, which included a presentation given to the Commission on 25 February 2019 and a response to the Department's PIR, and a Preliminary Response to Submissions report (received by the Commission on 7 March 2019).
93. In accordance with the Minister's request, the Commission's Issues Report (see **Appendix D**) was published on the 30 April 2019 and provides an overview of the Commission's actions (to date) with respect to the initial public hearing, summary of submissions received during public exhibition of the EIS and during the public hearing process, along with identification of key issues to be considered in the Department's assessment and evaluation of the merits of the Project.
94. On 19 February 2020, the Minister for Planning and Public Spaces requested that the Commission hold a further public hearing into the carrying out of the Project. The terms of the public hearing are provided below.

Request to the Independent Planning Commission

Vickery Extension Project

Section 2.9 (1) (d) of the Environmental Planning and Assessment Act 1979

A public hearing in relation to the proposed project was previously held by the Independent Planning Commission on 4-5 February 2019.

I, the Minister for Planning and Public Spaces, request the Independent Planning Commission to:

1. Conduct a further public hearing into the carrying out of the Vickery Extension Project (SSD 7480) prior to determining the development application for the project under the Environmental Planning and Assessment Act 1979, paying particular attention to:
 - a) the Department of Planning, Industry and Environment's assessment report, including any recommended conditions of consent;
 - b) key issues raised in public submissions during the public hearing; and
 - c) any other documents or information relevant to the determination of the development application.
2. Complete the public hearing and make its determination of the development application within 12 weeks of receiving the Department's assessment report in respect of the project, unless the Planning Secretary agrees otherwise.

5 Key Issues

5.1 Overview of the Commission’s Issues Report

5.1.1 Key Issues Raised by the Commission

95. The Department has considered the key issues, observations and comments in the Commission’s Issues Report in its final assessment of the Project. A summary of the Commission’s key issues requiring further consideration is provided in **Table 3** below which are based on its detailed consideration of community views through submissions and presentations at the public hearing. **Table H-1** in **Appendix H** provides a detailed reconciliation of these issues.

Table 3 | Issues requiring further consideration

Focus Area	Issues Requiring Further Consideration
Project Justification and Layout (Refer Section 6.1)	<ul style="list-style-type: none"> • Need for and potential relocation of mine infrastructure • Interaction between existing approvals and the project • Production thresholds required to support a new CHPP and rail loop
Water Resources (Refer Section 6.2)	<p><i>Groundwater</i></p> <ul style="list-style-type: none"> • Sensitivity of hydraulic parameters and further sensitivity analysis of the groundwater modelling • Predictions on final void pit lake levels and further analysis of a no void option • Adequacy of field data for the bore-field • Clarification of impacts on alluvial vs Permian aquifers • Clarification of impacts associated with the Approved Project vs the Extension Project, including cumulative impacts of other mines • Impacts and risk analysis on groundwater dependent ecosystems <p><i>Surface Water and Flooding</i></p> <ul style="list-style-type: none"> • Sediment dam discharges • Adequacy of surface water quality monitoring program • Additional flood modelling – concurrent flooding, changes to project infrastructure • Analysis of probable maximum flood (PMF) <p><i>Water Balance</i></p> <ul style="list-style-type: none"> • Sufficiency of water entitlements • Final void water balance
Amenity Issues (Refer Section 6.3)	<p><i>Noise</i></p> <ul style="list-style-type: none"> • Consideration of worst-case years over the mine life • Construction hours • Validation of train noise on the rail spur line • Consideration of noise/ blast performance at other mines and outcomes from the Maules Creek Mine Noise Audit • Acoustic cladding of the CHPP <p><i>Air Quality</i></p> <ul style="list-style-type: none"> • Consideration of worst-case years over the mine life • Reasons for dust impact reductions compared to the Approved Project
Biodiversity (Refer Section 6.4)	<ul style="list-style-type: none"> • Impacts on Koala populations • Rehabilitation to self-sustaining woodland communities • Staging of retirement of offsets and alternatives if rehabilitation is not successful

Focus Area	Issues Requiring Further Consideration
	<ul style="list-style-type: none"> Supporting information for credit calculations for mine rehabilitation
Rehabilitation, Final Void and Final Landform (Refer Section 6.5)	<ul style="list-style-type: none"> Management of soils in rehabilitated areas Final landform design including justification for final void Final land use objectives – agriculture vs biodiversity conservation Water quality from runoff and seepage from rehabilitated batters and sediment dams Final void water quality and potential beneficial use post mining Further clarification on cumulative post mining drawdown
Heritage (Refer Section 6.6)	<ul style="list-style-type: none"> Adequacy of consultation with Aboriginal community and surveys Impacts on the Kurrumbede homestead and details of measures to manage heritage values
Traffic and Transport (Refer Section 6.7)	<ul style="list-style-type: none"> Clarification for timing of removing coal transportation from the public road network Further information on impacts of rail transport of coal
Social and Economic (Refer Section 6.8)	<ul style="list-style-type: none"> Impacts of a mining-based economy on the local community Clarification on assumptions used in the cost benefit analysis Comparative economic analysis of relocating the CHPP and rail loop Social impacts and focused strategies for impacted communities
Visual amenity (Refer Section 6.9)	<ul style="list-style-type: none"> Visual impact mitigation options and additional photomontages Consultation with Siding Spring Observatory and additional light impact modelling
The public interest (Refer Section 6.10)	<ul style="list-style-type: none"> Consideration of the objects of the EP&A Act GHG emissions with regard to NSW and Commonwealth policy frameworks Demand for product coal and use by signatories of the Paris Agreement

5.2 Whitehaven's Submissions Report

96. In response to submissions received during the public exhibition of the Project and the recommendations of the Commissions Issues Report, Whitehaven has undertaken additional analysis of key environmental factors that relate to the assessment of the Project.
97. On the 23 August 2019, Whitehaven provided its Submissions Report to the Department (see **Appendix E**). The report provides a response to the issues raised in submissions received during the public exhibition period (including government agency advice), IESC advice, the advice and recommendations of the independent experts, the Department's PIR and the Commission's Issues Report.

5.3 Additional Consultation

5.3.1 Public Authorities

98. The Department sought feedback and comments from key Government agencies on Whitehaven's Submissions Report, Response to Commission's Review Report and draft conditions of consent. Narrabri Shire Council provided a late response to the Department in the form of objection to the Project. No other public authorities objected to the Project. However, most made comments and/or recommendations in relation to the potential impacts.
99. These comments are summarised below and provided in full in **Appendix G**.
100. The **Environment Protection Authority (EPA)** initially requested additional information in relation to the assessment of surface water, groundwater, noise, air quality and waste. The EPA has since noted

that the Submissions Report addresses the issues raised in its previous correspondence, but nevertheless provided further advice and/or recommendations on surface water monitoring, collection and re-use of mine water, re-consideration of the final end use of the void during the life of the mine, confirmation of the sound power level (SWL) proposed for all plant and equipment, applicability of low frequency modifying factor to noise, requirements of the Interim Construction Noise Guidelines (ICNG), emissions from onsite haulage of coal from neighbouring mines, dust mitigation and waste management.

101. Following review of the draft conditions, the EPA provided further comments, which have been incorporated into the recommended conditions of consent to address the likely environmental impacts of the Project. The EPA also noted that should an approval be granted, Whitehaven would be required to apply for a variation to the Approved Project's existing EPL 21283 to align with the Project conditions of consent.
102. The Department's **Biodiversity Conservation Division** (BCD) initially: requested clarification about the assumptions used in the Biodiversity Assessment Report (BAR) relating to Koala species credit requirements; raised concerns about flood flow distribution, flood erosion risks associated with increased flood flow velocity; and recommended further consideration is given to the Aboriginal heritage impacts, in consultation with Registered Aboriginal Parties (RAPs).
103. Following review of the Submissions Report, BCD advised that it had no further comments in relation to Aboriginal cultural heritage and confirmed that the method for determining the impact on potential habitat areas for EPBC Act-listed species has been adequately addressed. BCD provided additional comments and recommendations relating to biodiversity, flooding, completion of a Koala Plan of Management (KPoM), increasing potential squirrel glider habitat, updating the consolidated approval to capture the increased area of Offset Area 5 and the completion of the biodiversity offset strategy and biodiversity offset requirements. The Department has further considered the BCD comments and recommendations in its assessment of the Project (see **Section 6.4**).
104. Following review of the draft conditions, BCD provided recommendations for biodiversity and Aboriginal cultural heritage conditions, which have been incorporated by the Department in finalising recommended conditions of consent for the Project.
105. The **Division of Resources and Geoscience** (DRG now Department of Regional NSW – Mining, Engineering and Geoscience) noted that the Project represents an improvement to the Approved Project mine plan and final landform.
106. Following review of the Submissions Report, DRG noted that the Project's Amendment Report includes a reduced extraction area that removes the initial proposal to extract approximately 11 million tonnes of ROM coal within ML 1718, because coal extraction is not currently permitted under that mining lease. Nonetheless, DRG advised that it would support the option to secure a mining lease for the additional coal resource within ML 1718 that would otherwise be sterilised, noting the additional social and economic benefits.
107. DRG reviewed the draft conditions for the Project and raised no further concerns, concluding that should an approval be granted, identified risks or issues can be effectively regulated through conditions of mining issued under the *Mining Act 1992*.
108. **Primary Industries** (DPIE – Primary Industries) previously recommended that consideration is given to the cumulative impacts of the Project and other relevant industries on BSAL, and that rehabilitation objectives maximise the area of land suitable for agricultural land use. Following review of the Submissions Report, DPI advised that it had no further comment on the Project. The Department has considered DPI comments in **Section 6.2** and in finalising its recommended conditions of consent for the Project.
109. The Department's **Water Group** (DPIE Water) initially sought clarification on water entitlements and management of pit inflows and requested further assessment of the proposed borefield water take and additional assessment of the South Creek Diversion.
110. Following its review of the additional information in the Submissions Report, DPIE Water further requested that Whitehaven provides confirmation of its water entitlements and additional assessment on the risk of impact of the emplacement of overburden on the alluvium. In response, Whitehaven provided additional information and clarification including:

- confirmation of its requirement to consult with DPIE Water to address the relevant impact assessment criteria under the Water Resource Plans Fact Sheet - Assessing Groundwater Applications when it applies for licences to operate the borefield for the Project, following determination of the SSD application;
 - additional information to demonstrate that the borefield would comply with the relevant impact assessment criteria;
 - acknowledgement of the commercial risks associated with obtaining access to adequate water supplies and that it would need to apply for the relevant licences prior to construction of the borefield; and
 - additional information detailing the area of the alluvium covered by the emplacement of overburden, which would be about 202 ha, or 0.2% of the total area of the alluvial groundwater source.
111. Following review of the draft recommended conditions, DPIE Water provided general comments on condition wording and advised that it has no further comments on the assessment of water supply and entitlements and noted that it will be Whitehaven's responsibility to ensure it has sufficient entitlements for the Project's water take. DPIE Water also recommended that a Trigger Action Response Plan (TARP) be incorporated as part of the Water Management Plan to ensure ongoing monitoring and assessment of the proposal to place overburden on an embayment of the Namoi River.
112. The Department has considered the DPIE Water comments and advice in its assessment of the Project (see **Section 6.2**) and incorporated this information in its recommended conditions.
113. The Department's **Crown Land** (DPIE – Crown Lands) noted the requirement for written authorisation prior to development on Crown land (including for the purpose of investigation) and requested that Whitehaven obtain this authorisation prior to any construction commencing. Whitehaven has acknowledged this requirement and the Department has recommended a condition requiring Whitehaven to consult with DPIE – Crown Lands prior to undertaking development on Crown Land or Crown Roads.
114. The **NSW Heritage Council** (Heritage Council) initially noted that it supported the recommendations of the historic heritage assessment included in the EIS and further advised that any indirect heritage impacts could be addressed as part of a Heritage Management Plan for the Project. The Heritage Council provided recommended conditions, which have been considered by the Department in its recommended conditions of consent for the Project. Further discussion of historic heritage is included in **Section 6.6**.
115. The **Rural Fire Service** (RFS) noted in its response that no consideration has been given to bushfire risks associated with the Project. RFS also advised that the proposed Project area is not mapped bushfire prone land and has recommended a condition for the preparation of a Fire Management Plan. The Department has considered the RFS comments and included its recommendations in finalising the recommended conditions of consent for the Project.
116. The **Roads and Maritime Service** (RMS now Transport for NSW) noted that the matters raised in its initial comments relating to the rail-over-road overpass have been satisfactorily addressed in the Submissions Report.
117. RMS advised that it supports the existing arrangements with Gunnedah Shire Council and Narrabri Shire Council for road maintenance to continue over the life of the Project and the requirement to impose a condition requiring road haulage of Project coal to cease once the Project's train load-out facility and rail spur have been fully commissioned.
118. RMS also noted the requirement to obtain a Works Authorisation Deed (WAD) and requested that Whitehaven identify appropriate hold points for execution of the Deed and commencement of works, in order to ensure that road haulage of coal can cease in the required timeframe for the proposal. Whitehaven has acknowledged the RMS recommendations in its Submissions Report.
119. The Department has considered the RMS comments and advice in its assessment (see **Section 6.7**) and in its recommended conditions of consent for the Project.
120. The **Resources Regulator** (RR) provided comments in support of Whitehaven's rehabilitation commitments, provided in the EIS and updated in the Submissions Report, however, advised that it did not endorse the method to achieve the required rehabilitation outcomes. Instead, the RR advised that

a risk-based approach should be adopted and continuously updated and evaluated over the life of the Project and noted that this would be achieved through conditions of the of the Mining Lease for the Project.

121. Following review of the draft recommended conditions, the RR provided general comments on condition wording and recommendations to ensure there is consistency between the development consent conditions and requirements under the *Mining Act 1992*.
122. The Department has considered the RR comments and advice in its assessment (see **Section 6.5**) and in the recommended conditions of consent for the Project.
123. **Narrabri Shire Council** (NSC) provided a late response to the Submissions Report (see **Appendix G3-3**). In its response, NSC advised that it objects to the Project due to the direct and indirect economic and social impacts and on the basis that it is not in the public interest. NSC provided further information about how it has developed its views and highlighted concerns about the:
 - Voluntary Planning Agreement (VPA) with Whitehaven and Council's resolution to reject this offer;
 - social and economic welfare of the community, particularly:
 - employment and the accuracy of workforce data provided in the EIS;
 - change in residents and justification for expected workforce place of residence;
 - drought implications, and impacts on the local water market and the agricultural industry; and
 - economic implications and methods used to justify the economic benefits of the Project as compared with the Approved Project;
 - ecological sustainable development, including inter-generational equity associated with the proposed change in land use, land ownership, water supply and bushfire risk.
124. In response, Whitehaven provided a response to NSC (see **Appendix G6-2**) providing additional clarification for each of the concerns raised by NSC. The Department has considered this information in its assessment (see **Section 6**) and where relevant, included recommended conditions of consent to address any residual matters.
125. **Gunnedah Shire Council** (GSC) noted that the matters previously raised by Council in its initial review of the EIS were only partly addressed in the Submissions Report. GSC further requested information and actions in relation to:
 - further details on the staging of infrastructure construction;
 - detailed plans for the CHPP and landscaping plans;
 - flood design, including sufficient freeboard above the 1% ARI;
 - detailed plans and design for the rail spur;
 - preparation of management plans; and
 - recommendations for consent conditions.
126. The Department has considered GSC's further requests in its assessment (see **Section 6**) and where relevant, included recommended conditions of consent to address residual matters.

5.3.2 Community

127. In December 2019, the Department, the EPA and the independent water experts met with local landholders near the vicinity of the mine to discuss concerns about the Project. In February 2020, the Department also held several teleconferences with EDO experts on groundwater, heritage, greenhouse gas emissions and social impacts.
128. The Department has provided an overall summary of how key community views were considered in the assessment (see **Appendix H**).

6 Assessment

129. The Department has completed its assessment of the Project, which included consideration of submissions and the PIR, with a focus on addressing and responding to the areas identified in the Commission’s Issues Report requiring further consideration.

6.1 Project Justification – Additional Information

130. The Project justification issues identified in the Commission’s Issues Report are outlined in **Table 4** below and considered in detail in the following sections. Whitehaven provided a detailed response in Section

Table 4 | Commission Issues Report – Project Justification

Issues requiring further consideration
<ul style="list-style-type: none"> • Limitations and economic impacts on the Project due to conditions of the Approved Project, Tarrawonga and Rocglen Mines and the Gunnedah CHPP.
<ul style="list-style-type: none"> • Need for the CHPP and the rail load out facility at the Project site.
<ul style="list-style-type: none"> • Annual production threshold to support a new CHPP and rail loop at the Project site.
<ul style="list-style-type: none"> • Additional coal resources to the south and north of the mine and why these are not included in the Project application.

6.1.1 Existing Approvals

131. In response to the Commission’s Issues Report, Whitehaven’s provided additional clarification of the effect of road transport annual tonnage limits on the combined coal production rates at the Approved Mine, Tarrawonga Coal Mine and Rocglen Coal Mine.

132. Whitehaven also provided further analysis of the restrictions imposed by the development consent for the Gunnedah CHPP and rail load out facility (see **Appendix G-14**), which limits the processing of ROM coal to 3 Mt per year and dispatch of 4.1 Mt of product coal from the site each year.

133. A summary of the current limits on coal production at each of Whitehaven’s mines and the Gunnedah CHPP is provided in **Table 5**.

Table 5 | Summary of Limits Imposed by Relevant Consents

Mining Operation	Approval Limit	Conditions
Approved Project (SSD-5000)	Coal Extraction	4.5 Mtpa ROM coal
Tarrawonga Coal Mine (PA 11-0047)	Coal Extraction	3 Mtpa ROM coal
Rocglen Coal Mine (PA 06-0198)	Coal Extraction	1.5 Mtpa ROM coal (now ceased extracting coal)
Gunnedah CHPP (DA 0079.2002)	ROM Coal Processing	3 Mtpa ROM coal

134. The development consents each contain conditions which limit the total combined transport of coal from these mines to the Gunnedah CHPP to 3.5 Mtpa, which can increase to 4.5 Mtpa once the Kamilaroi Highway overpass is commissioned.

135. Whitehaven's analysis found that a 90% production efficiency at the CHPP effectively means the 4.1 Mtpa limit on dispatch from the CHPP would be equivalent to the current ROM coal road haulage limit of 4.5 Mtpa. Therefore, Whitehaven concludes that the CHPP limits would not restrict production from the mines greater than that imposed by the road transport restrictions.
136. Whitehaven estimates that the road transport restrictions under the current consents would reduce the production by approximately 28 million tonnes of ROM coal over the life of the mine, compared with the estimated production of the Project as described in the EIS (Table 2-3), as shown in **Figure 7**.

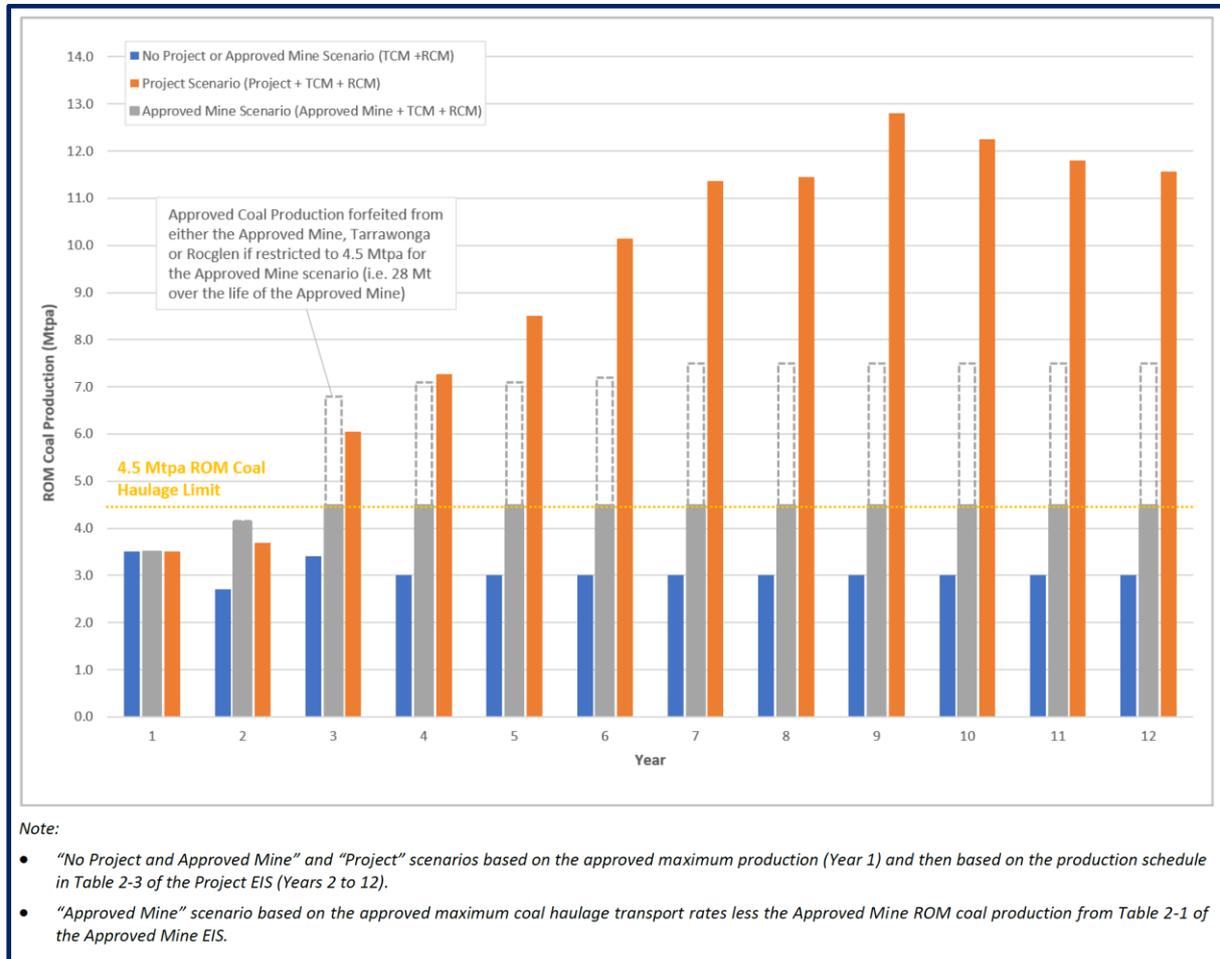


Figure 7 | Comparison of Projected Annual Coal Production

6.1.2 Need for the Project CHPP and Rail Load Out

137. Whitehaven indicated in its Submissions Report that the construction and operation of the new CHPP and rail load out facility at the Project site is justified because it would enable an increased rate of coal production compared with the restrictions imposed by the road haulage limits under the Approved Project development consent (see **Figure 7**).
138. Whitehaven noted that the economic costs and environmental impacts associated with transporting coal via public roads to the Gunnedah CHPP would be avoided, particularly associated with the ongoing use and maintenance of haul trucks and road pavement. Whitehaven also noted the likely improved road safety and amenity impacts associated with reduced road transport and amenity impacts of residences surrounding the existing CHPP.
139. The Department notes the benefits of reducing heavy vehicle movements on public roads and supports options to remove mine-related heavy vehicle haulage from public roads to reduce road safety risks.
140. The Department acknowledges that while there would be a reduction in impacts related to the heavy vehicle haulage and cessation of coal processing at Gunnedah, the Project would transfer impacts to new receivers, particularly residences along the rail spur line which introduces new industrial

infrastructure into an agricultural setting. These impacts have been assessed and considered by the Department in **Section 6.3**.

141. In regard to the benefits derived from the construction of the new Project CHPP and rail spur, compared with the Approved Project, Whitehaven reiterated the Project would include an additional:
- \$500 million in net benefits to NSW, mainly by way of royalties; and
 - up to 200 jobs during operations and 450 during construction.

6.1.3 Additional Coal Resources

142. In response to the Commission’s Issues Report, Whitehaven has provided additional information to describe the additional coal resource to be extracted by the Project.
143. As noted in the Submissions Report, Whitehaven has removed the extraction of coal from within ML 1718, reducing the total coal resource to be extracted by the Project from 179 Mt to 168 Mt. As noted in **Table 2**, compared with the Approved Project total resource of 135 Mt, the Project would enable the extraction of an additional 33 Mt of coal resource. Whitehaven estimates that the value of the additional coal to be extracted from the proposed extension of mining into the area covered by Exploration Licence (EL) 7407, is approximately \$2.3 billion.
144. The coal resource on the site is of relatively high quality and would be processed to produce both metallurgical coal (semi-soft coking coal and Pulverised Coal Injection (PCI) coal) for use in the steel making industry, and thermal coal for use in power generation. Approximately two thirds of the resource comprise PCI and semi-soft coking coal, and one third comprises thermal coal.
145. The Project (incorporating the Approved Project components) has a capital investment value of approximately \$607 million and would generate up to 450 full time operational jobs at the mine, compared to a peak of 250 operational jobs for the Approved Project. It is also predicted to generate \$1.16 billion in (net present value) economic benefits to NSW, compared to \$709 million for the Approved Project, an incremental increase of around \$500 million.

6.2 Water Resources

146. The key water resource issues identified in the Commission’s Issues Report are outlined in **Table 6** below and considered in detail in the following sections.

Table 6 | Commission Issues Report – Water Resources

Issues requiring further consideration
<p>Modelling</p> <ul style="list-style-type: none"> • Groundwater and surface water assessments – response to IESC and agencies and relative impacts of the Approved Project compared with the Project. • A more extensive sensitivity analysis in the groundwater model. • Post-mining studies, which should provide details of the groundwater flows to the east of the site.
<p>Final void</p> <ul style="list-style-type: none"> • Justification and costing for a “no void” option. • Long-term groundwater and water quality modelling for a “no void” option. • Final void water balance modelling.
<p>GDE</p> <ul style="list-style-type: none"> • Provision of maps that illustrate the potential distribution of GDEs. • A GDE risk analysis as requested by the IESC.
<p>Sediment dams and storage</p> <ul style="list-style-type: none"> • Permeability of sediment dams. • Water quality monitoring of sediment dams and mine water storages, discharge standards and triggers.
<p>Flooding</p> <ul style="list-style-type: none"> • Further flood modelling of tributary creeks and alternative infrastructure options. • Flood studies around mine infrastructure using alternative method to determine the probable maximum flood.

Issues requiring further consideration

- A Quantitative Risk Analysis of the off-site water quality consequences of flood exceedances of the on-site infrastructure.

Water Supply

- Reliability of water supply during dry periods.

6.2.1 IESC Advice

147. In September 2018, the Department and the Commonwealth Department of the Environment and Energy (now the Department of Agriculture, Water and Environment) jointly requested the Commonwealth Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC) provide advice on the Vickery Extension Project (*IESC 2018-099: Vickery Extension Project (EPBC 2016/7649 and SSD 7480) – Expansion*).
148. The IESC provided its advice to the Department and DoEE (see Appendix D of the Department’s PIR in Appendix C) which identified areas where it considers additional work was required.
149. The issues raised by the IESC were considered by the Commission as noted in **Table 6** and addressed by Whitehaven in its Submissions Report. The Department and independent expert have considered the additional information provided by Whitehaven to address the IESC issues in the following sections.
150. A summary of the IESC recommendations and how these recommendations have been addressed is provided in **Table 7**.

Table 7 | Independent Expert Scientific Committee Recommendations

IESC Recommendation	Additional information/ Consideration
Further transient predictive model simulations are needed to examine a greater range of variability in hydraulic conductivity and specific storage.	<ul style="list-style-type: none"> • Whitehaven provided additional information to in Section 6.2.3 of its Submissions Report, including a Technical memorandum on sensitivity analysis (see Appendix G6-4), which was subject to review by the independent groundwater expert (see Appendix G4-2). • See Department’s consideration and recommendations in Sections 6.3.1, 6.3.4 and 6.3.6.
<p>Maps that illustrate the distribution of potential groundwater-dependent ecosystems (GDEs), particularly terrestrial ones.</p> <p>An appropriate risk analysis (e.g. Serov et al. 2012) of the potential impacts of groundwater drawdown to GDEs is required, along with proposed mitigation strategies if impacts cannot be avoided.</p>	<ul style="list-style-type: none"> • Whitehaven provided a map of potential GDEs and a risk analysis in Section 6.2.3 of its Submissions Report. • See Department’s consideration and recommendations in Section 6.3.6 and Figure 22. • The independent groundwater expert is satisfied with the risk analysis of GDE impacts.
More information is needed on how groundwater drawdown may alter spatial and temporal patterns of surface water-groundwater exchanges in the Namoi River.	<ul style="list-style-type: none"> • The independent groundwater expert is satisfied with the understanding of the connectivity between the hard rock and alluvial aquifer as described in the EIS.

IESC Recommendation	Additional information/ Consideration
Further geochemical analyses should be undertaken using a range of environmental conditions (especially pH) that are representative of what may occur at the project site, particularly as the solubility and bioavailability of metals depends on water chemistry.	<ul style="list-style-type: none"> The independent groundwater expert is not satisfied with the information provided by Whitehaven, but acknowledges this could be carried out post-approval and has recommended further analysis be carried out during operation of the mine to inform mine planning. The Department has accordingly recommended conditions requiring Whitehaven to carry out this analysis.
Monitoring of surface water quality should be improved by increasing the frequency of monitoring and the range of analytes.	<ul style="list-style-type: none"> Further information has been provided at Section 6.3.3 of Whitehaven's Submissions Report. See Department's consideration and recommendations in Section 6.2.4.
More information is needed regarding the potential for localised increases in erosion and changes to flood characteristics associated with construction activities and infrastructure (e.g. rail spur) that could impact the state-listed 'Lowland Darling River Aquatic Ecological Community.'	<ul style="list-style-type: none"> Further analysis provided in Whitehaven's Submissions Report Section 6.4.3. See Department's consideration at Section 6.2.5.

6.2.2 Water Resource Setting

151. The project is located in the Namoi River catchment which covers an area of approximately 42,000 km². The catchment of the Namoi River upstream of the Project is approximately 16,000 km² and flows are regulated by the Keepit Dam, which has a capacity of 427,000 megalitres (ML). Use of surface water from this resource is regulated under the WM Act via the:
- Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016* (Lower Namoi Regulated River Water Source); and
 - Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012*, which applies to the unregulated water sources in the Namoi Basin.
152. The mining area is largely located within the sub-catchments of Driggle Draggles Creek and Stratford Creek, both of which are ephemeral watercourses that flow in a westerly direction (see **Figure 8**). There are four unnamed tributaries located within the development site, identified as South Creek and the North, North-West and West Drainage Lines. South Creek drains the southern portion of the Vickery State Forest in a southerly direction towards Stratford Creek. Various unnamed minor ephemeral tributaries drain the site and the western portion of the Vickery State Forest in a north to north-westerly direction before their confluence with Driggle Draggles Creek. Areas in the south-west of the site drain directly into the Namoi River.
153. The Namoi River catchment area contains an extensive floodplain, and the proposed rail spur is located on this floodplain. Flow paths crossed by the proposed rail spur include Stratford Creek, Deadmans Gully and Namoi River, all of which flow in a north-westerly direction (see **Figure 8**). The mining area is located outside the flood-affected area (including the Probable Maximum Flood, or PMF) for the Namoi River, but part of the secondary infrastructure area and the south-east corner of the open cut pit is within the extent of local flooding from Stratford Creek.

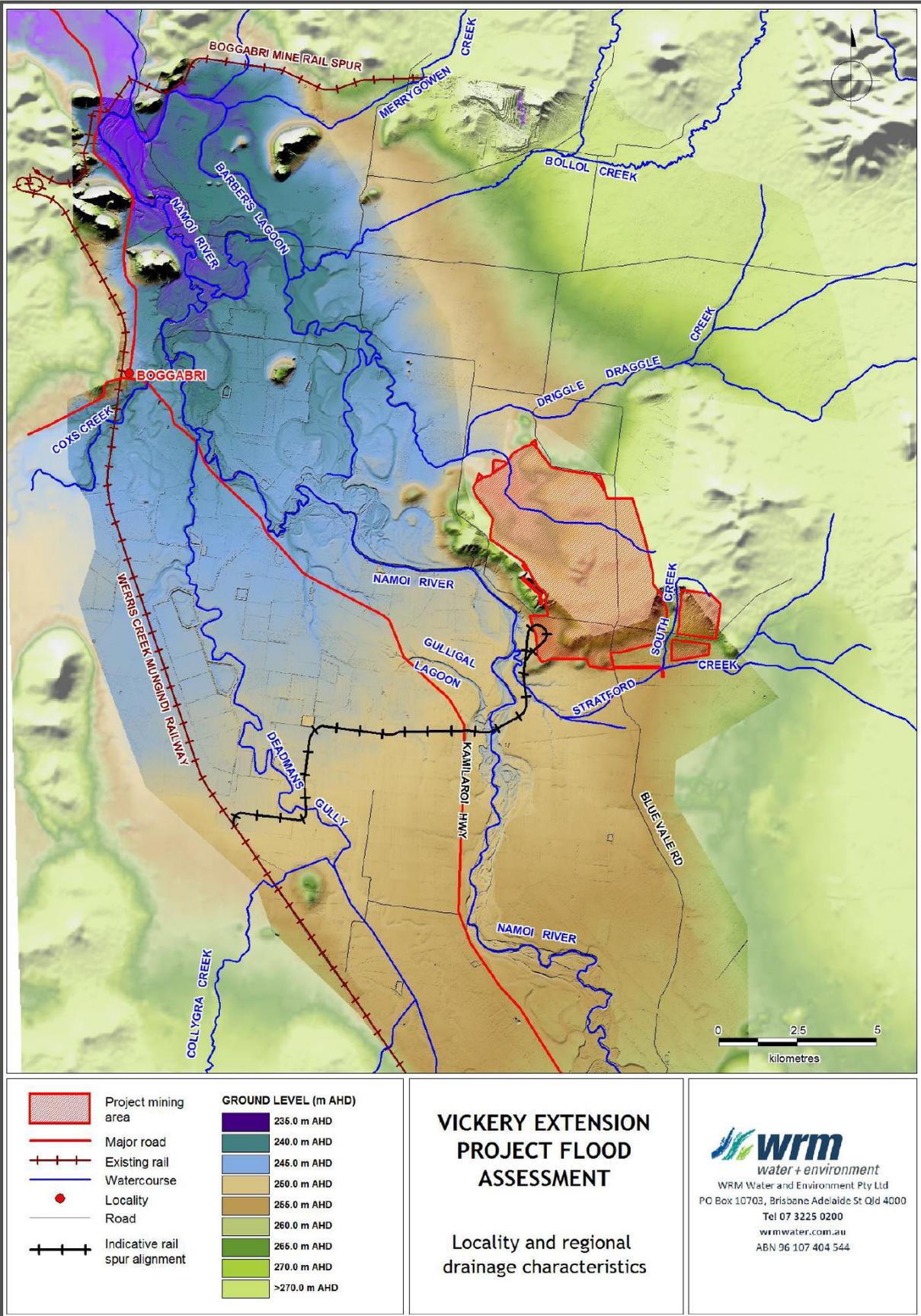


Figure 1.3 - Locality and regional drainage characteristics

Figure 8 | Regional catchment and drainage context

154. The groundwater environment surrounding the Project is characterised by two main aquifer systems, comprising:
- highly productive shallow alluvial groundwater (Upper Namoi Groundwater Source); and
 - less productive deeper groundwater within porous hard rocks of the Maules Creek Formation (Gunnedah Oxley Basin Groundwater Source).
155. The development site is bordered to the north, south and west by alluvial sediments associated with the Namoi River floodplain. These sediments are part of the Upper Namoi Alluvium and their groundwaters lie within the Upper Namoi Zone 4 – Namoi Valley (Keepit Dam to Gin’s Leap) Groundwater Source, regulated under the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003*. The aquifer contains highly productive groundwater and is used extensively by the agricultural industry in the region.
156. Use of groundwater from the porous rock aquifer is regulated under the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Water Sources 2011*. Groundwater in the Maules Creek Formation is not potable but is suitable for livestock and other uses such as irrigation. Approximately 635 registered bores are located within the wider regional model study area (33 km by 29 km area), the majority of which are located within the Upper Namoi Alluvium. The privately-owned groundwater bores in the vicinity of the Project are shown in **Figure 9**.

6.2.3 Water Demand and Supply

Water Demand

157. The main water demands of the Project would be for dust suppression and operation of the CHPP. Additional water demands include wash down of mobile equipment, and other non-potable uses such as ablutions and amenities.
158. Dust suppression of haul roads, stockpiles and hardstand areas would form the significant majority (approximately 75%) of total water demands for the Project. The water balance modelling estimated the maximum annual water demand for dust suppression would range between 1,200 – 1,350 ML/year, depending on weather conditions and the surface areas to be treated for dust suppression (particularly influenced by haul road distances). This water use is comparable with that required for the Approved Project based on improved haul distances which would offset the increased production rate.
159. The Department received a further submission (see **Appendix G5-1**) which raised concerns about the assumed rate of water demand for the Project, comparing the demand for the Boggabri Coal Project based on the production rate. The Department has considered this and notes that the water demand is not necessarily linked to production rate as the majority of demand is connected to dust suppression as noted above.
160. Operation of the CHPP is estimated to require up to 750 ML/year at full production, with the water balance assessment assuming an average of 55% of ROM coal would be processed through the CHPP, at a demand of 120 L/tonne. This demand is additional to that required for the Approved Project, given the processing of ROM coal was to occur at the Whitehaven CHPP (although the Department notes that once the Project CHPP becomes operational the Gunnedah CHPP would cease operations and no longer use water).

Water Supply

161. The main water supplies for the Project include runoff from within the mine’s water management area, and groundwater inflows to the open cut. These inflows would be collected, stored and distributed in a series of mine water storages, including the Blue Vale void which would be used during initial years of the Project (until the other water storages are constructed).

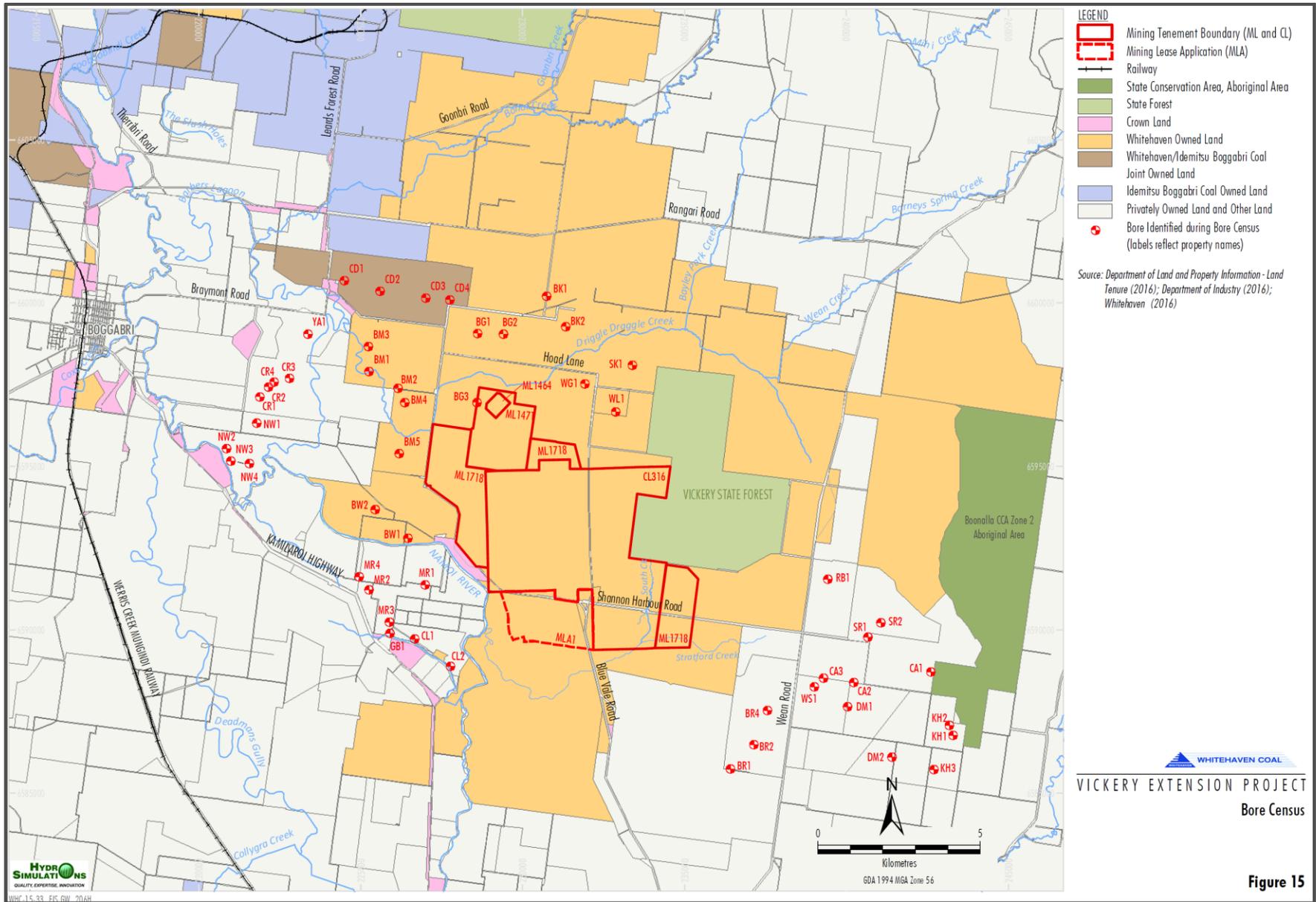


Figure 9 | Privately-owned bores surrounding the Project

162. External water supply would be sourced from the Project borefield and the Namoi River. This supply would be pumped to the Project’s water storages when required, based on operating rules to be established in Whitehaven’s Water Management Plan for the Project (see Table 8.6 of the Surface Water Assessment in Appendix A of the EIS).

163. Key design and operating principles of the Project’s water management system include:

- separating runoff from undisturbed, rehabilitated and mining affected areas, with runoff from undisturbed areas diverted around the Project site;
- capturing all coal contact water for reuse within the mining operations (nil discharge of coal contact water);
- minimising the volume of water to be obtained from external water sources; and
- designing storages to ensure an adequate supply of water is available during dry conditions and designing sediment dams with sufficient capacity (20% above the *Managing Urban Stormwater: Soils and Construction* (Blue Book) (Landcom, 2004), requirements) to capture and treat water prior to discharge during wet conditions.

Water Balance

164. The water balance estimates the supply from captured runoff would gradually increase over the initial years of the Project as the disturbance area increases. The estimated supply generated by runoff would vary depending on rainfall and climate conditions and Whitehaven’s assessment includes consideration of rainfall generated during dry, median and wet climate sequences (see **Figure 10**). Groundwater inflow is estimated to peak at approximately 533 ML/year.

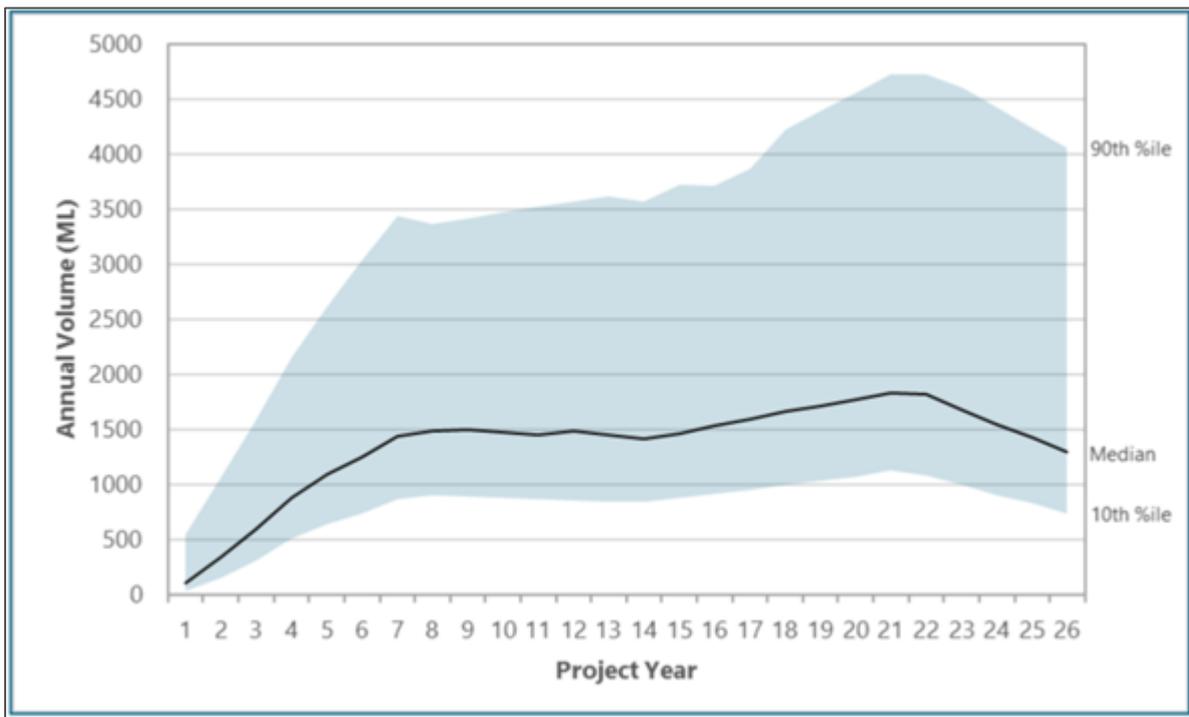


Figure 10 | Estimated water supply from captured runoff

165. External water requirements would vary from year to year and would be dependent on mine water requirements and water availability in the mine’s water management system. The water balance estimates that the average requirement for additional supply over the life of the mine ranges from about 530 ML/year to about 740 ML/year.

166. External water would be sourced from Whitehaven’s water access licences, which include (in order of decreasing reliability):

- 396 unit shares from the Project borefield in the Zone 4 Alluvium - Upper Namoi Groundwater Source;
- 50 unit shares of Namoi River high security water (Lower Namoi Regulated River Water Source);

- 1,638 unit shares of Namoi River general security water, equivalent to 1,638 ML when the available water determination is 100%, or 1 ML/share; and
- 63.5 unit shares of Namoi River supplementary water.

167. Whitehaven would also need to account for water captured in groundwater inflow to the open cut which would be covered by a 600 ML/year allocation held by Whitehaven in the Gunnedah-Oxley Basin MDB Groundwater Source within the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011*.
168. Whitehaven would also be required to ensure it complies with the excluded works and harvestable rights provisions of the WM Act in designing and constructing sediment dams and storage dams at the site.
169. Concerns were raised about the water entitlements held by Whitehaven to supply its operations across the region and whether Whitehaven is proposing to use entitlements allocated to other projects for the Vickery Project (and vice versa). In its Submissions Report, Whitehaven has confirmed (in Attachment 6 of the EIS) that the licence allocations used in the water balance model are applicable only to the Vickery Project.
170. The need to supplement the water demand for the project with water sourced from the Namoi River or borefield entitlements is predicted to reduce once the supply from site runoff increases. **Figure 11** and **Figure 12** show the predicted decline in the required water extraction from the Namoi River and Project borefield, which demonstrates that the project's external water demand is highest in the initial years. This reflects the reduced availability of water from site runoff in the initial years of the Project as shown in **Figure 10**.

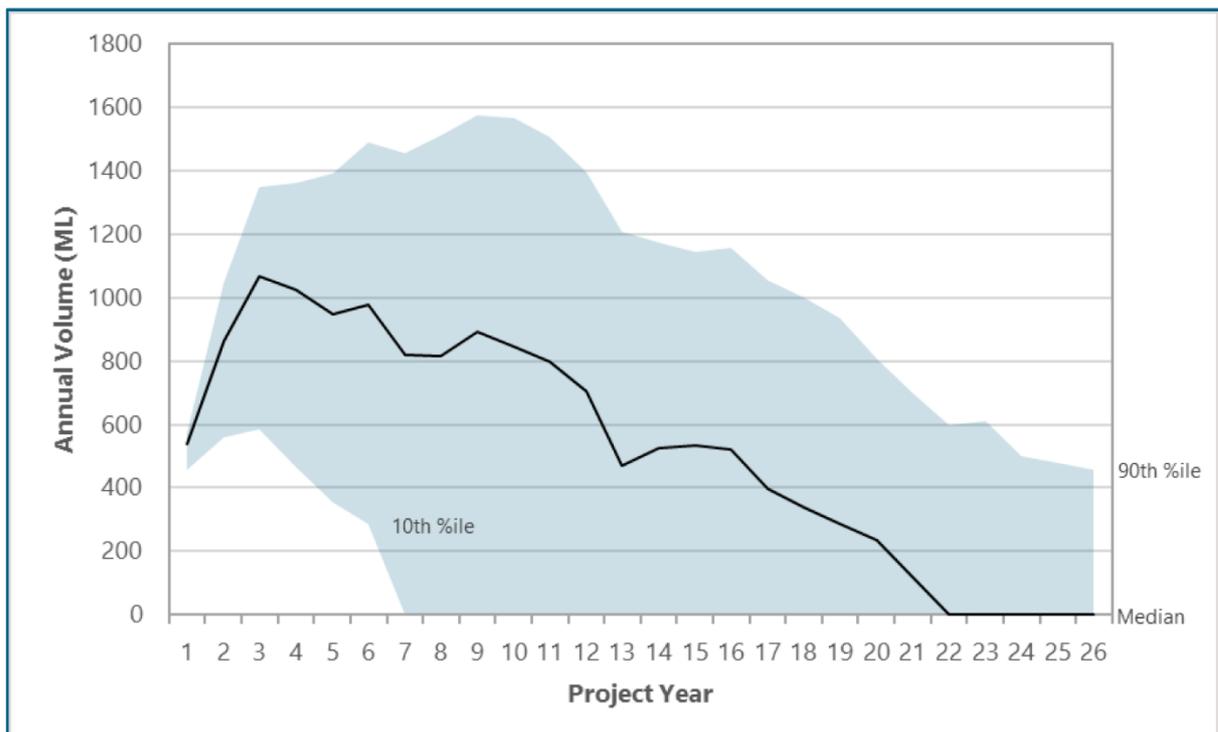


Figure 11 | Predicted Namoi River extraction requirements

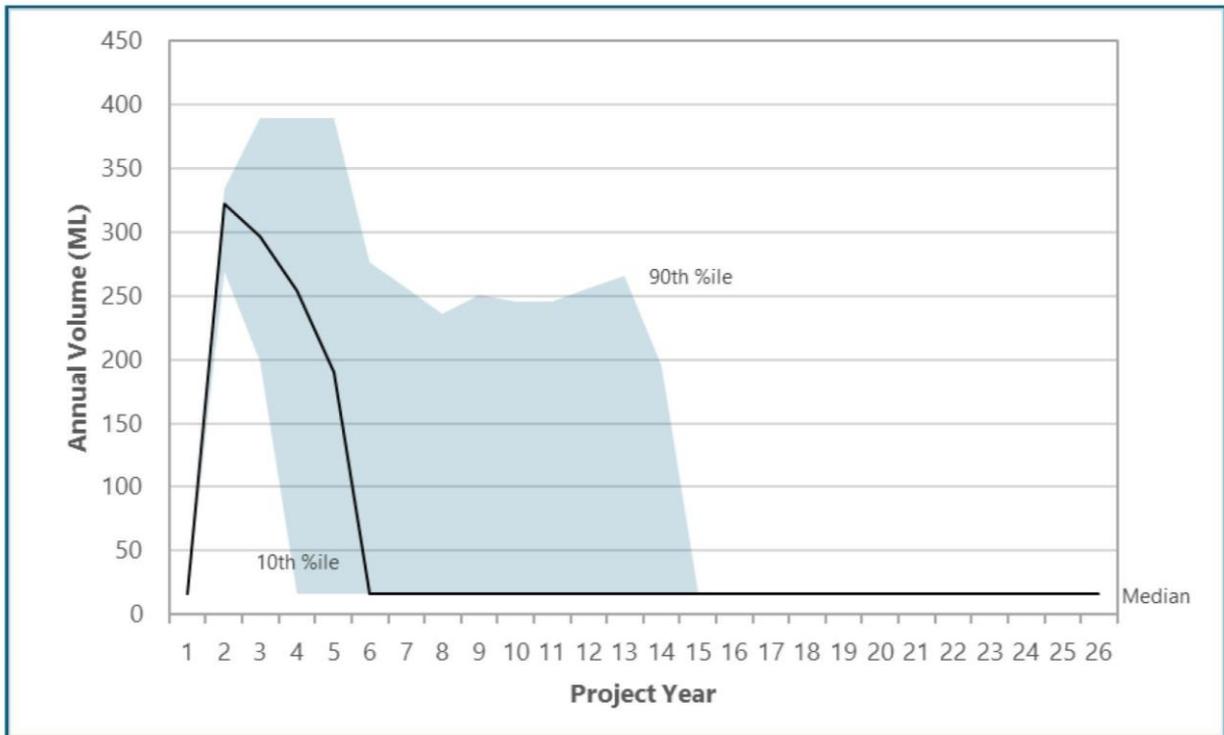


Figure 12 | Predicted Project Borefield extraction requirements

- 171. The water balance assessment considered external water supply requirements over the 26 year mine life based on 98 climate sequences, with detailed analysis of the median rainfall, 10th percentile (dry) rainfall and 90th percentile (wet) rainfall scenarios. The rainfall scenarios were based on 124 years of daily rainfall records from the nearby Boggabri (Retreat) Station. The modelled dry (10th percentile) rainfall scenario is based on the rainfall records commencing in 1915 and concluding in 1941.
- 172. Under the median rainfall scenario, the water balance assessment estimated that externally sourced water would be required for 18 of the 26 years of the mine life at an average of 889 ML/year, which would be adequately supplied by the available entitlements.

Dry Conditions

- 173. Under the dry rainfall scenario, the water balance assessment predicts that the project would have sufficient licence allocations to support the operation of the mine (see Figure 13).
- 174. However, the Department received submissions and representations from local landowners questioning the relevance of rainfall data used in Whitehaven’s water balance modelling and the likelihood of insufficient water availability for the Project, particularly during extended dry periods. This issue was discussed at a meeting held with the landowners and independent experts in December 2019 and the Department was provided with analysis of historical rainfall conditions at the nearby Barraba monitoring gauge (**Figure 14**).
- 175. The independent surface water expert has reviewed the information provided to the Department and notes the rainfall records adopted by Whitehaven for its dry rainfall sequence (the period between 1915 to 1941) are comparable with the drying trend indicated in the Barraba data and the Department considers that Whitehaven’s modelling provides appropriate representation of drought conditions. DPIE Water has advised that it has no further comments on the assessment of water supply and entitlements and noted that it will be Whitehaven’s responsibility to ensure it has sufficient entitlements for the Project’s water take.
- 176. The water balance assessment also incorporated a sensitivity analysis based on CSIRO climate change projections for seasonal variations in both rainfall and evapotranspiration, which found that the potential variations over the life of the Project do not exceed the modelled supply and demand.

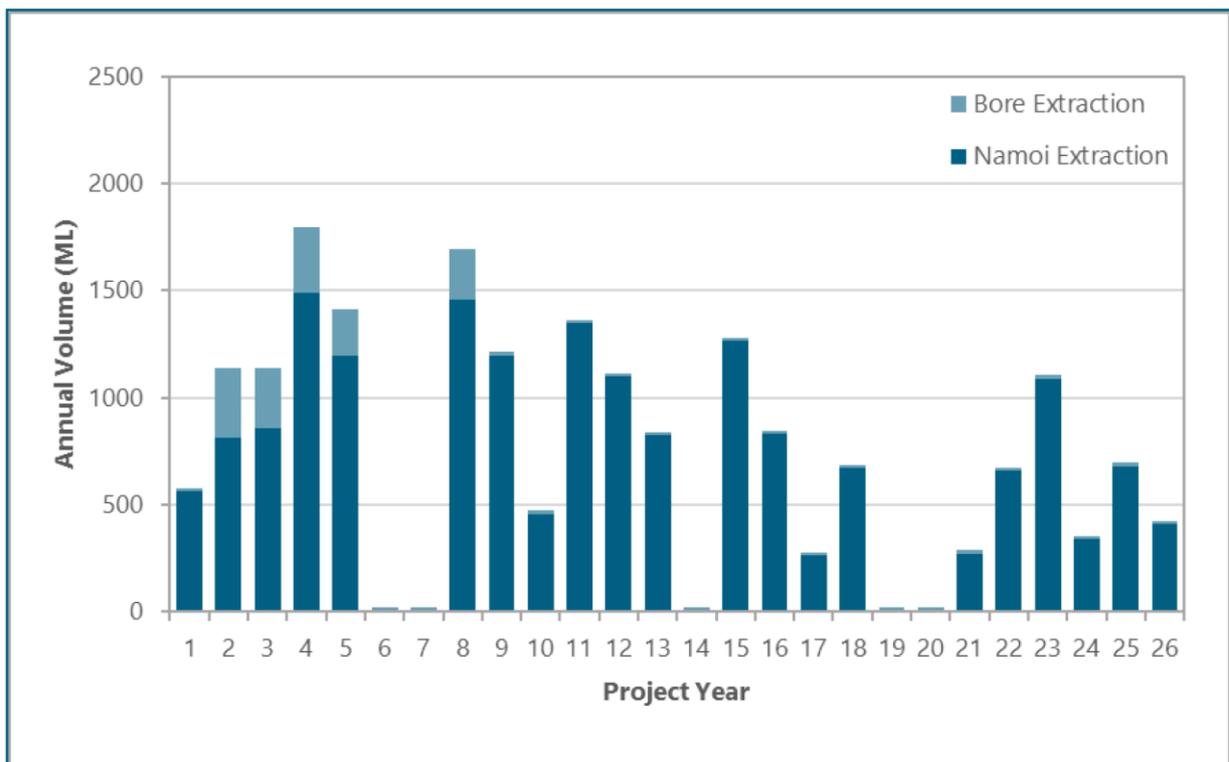


Figure 13 | Modelled external water supply requirements – dry rainfall

177. However, as with any other water user, the ability for Whitehaven to satisfy the external requirements would be dependent on the Available Water Determinations (AWD) for the *Lower Namoi Regulated River Water Source*. General security licences are dependent on the volume of water held in Keepit Dam and the AWD is often less than 100%, as is the case in the current extended drought conditions. Whitehaven’s Submissions Report notes that AWD allocations that relate to the Project borefield have not been restricted since the commencement of the *Water Sharing Plan for the Upper and Lower Groundwater Source, 2003*.
178. A review of the fluctuations in AWD was included in the water balance assessment in the EIS, indicating that the AWD has ranged from full allocation (1 ML per unit share) to less than 0.1 ML per share since 1977, with a median allocation of 0.76 ML per unit share.
179. If the median AWD is adopted, Whitehaven would typically be able to extract 1,245 ML of water from the Namoi River per year, which would satisfy the external water demands for the majority of the mine life during the median climate sequence. However, there would likely be a shortfall during the dry climate sequence with more frequent demand for more than 1,245 ML/year as shown in Figure 13.

Department’s Consideration

180. The Department acknowledges that the available volume of water may not be sufficient to satisfy demands in prolonged periods of dry conditions, particularly if these occur in the earlier years of the mine life. For example, the AWD for the 2012/2013 financial year was 0.126 ML, which would have allowed Whitehaven to extract only 206 ML from the Namoi River, leaving a substantial shortfall in water supply requirements. The recent drought conditions have resulted in zero allocations in the Namoi River water source which demonstrates the potential lack of available water from this source.

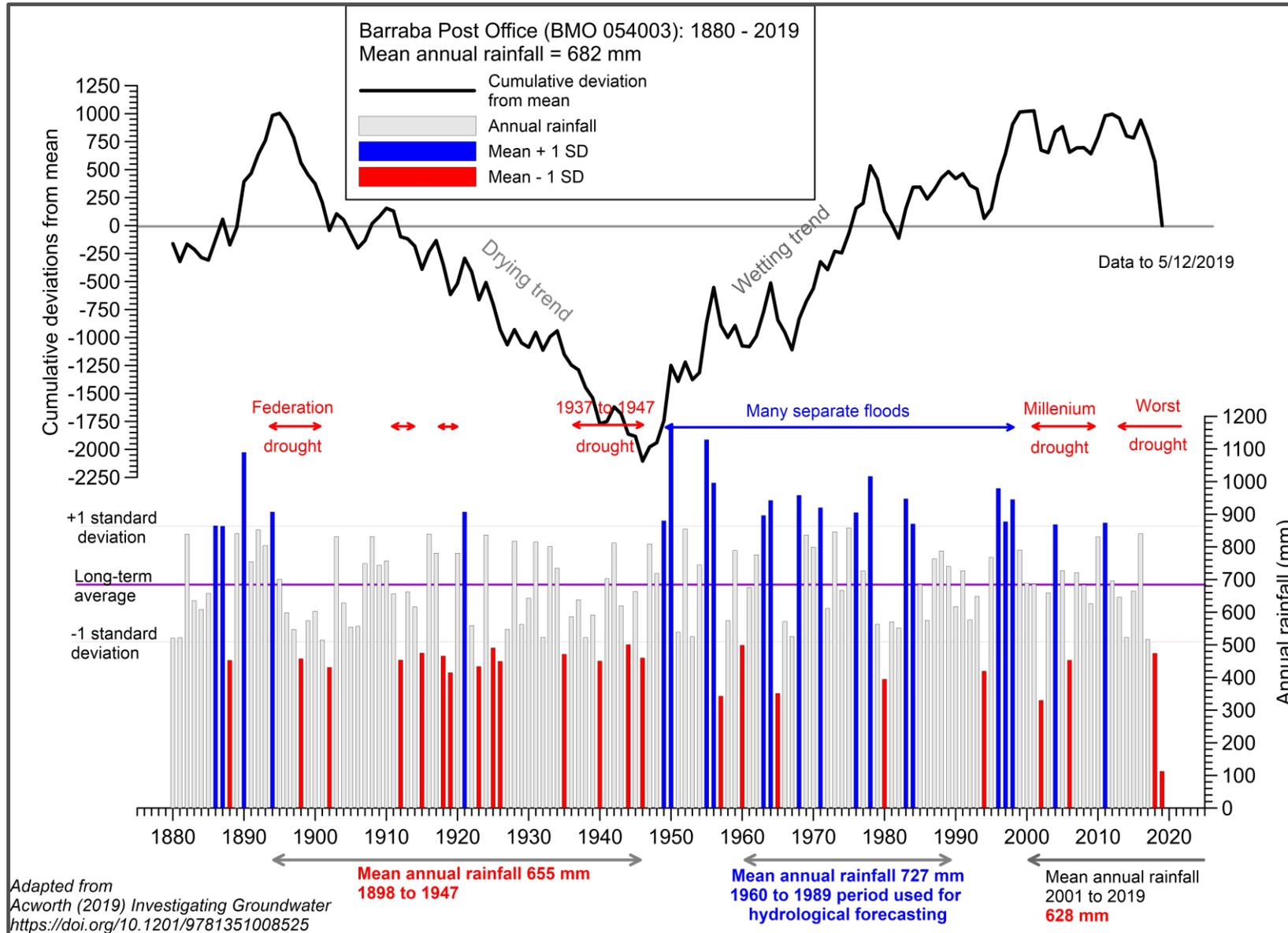


Figure 14 | Regional rainfall history – Barraba Post Office (supplied)

181. In this situation, Whitehaven proposes the following measures to address potential shortfalls in water supply during mining operations:
- periodic water balance reviews and forecasts to determine likely water availability and sources;
 - adjusting its operations to suit the available water entitlements;
 - implementing additional water efficiency measures; and
 - obtaining additional entitlements on the open market.
182. Whitehaven has also proposed the use of an additional existing licensed bore within land it owns (the Kurrumbede bore) to supplement its supply if required, in addition to the Project borefield (see **Appendix G6-6**). The Department notes that the acquisition of additional licence allocations would be subject to availability within the market.
183. Whitehaven also proposes to prepare and implement a water management plan to describe the monitoring and mitigation measures which include:
- monitoring of water use;
 - monitoring storage levels in mine water dams and other containment storages; and
 - contingency planning to accommodate variations in rainfall.
184. The independent surface water expert has advised that Whitehaven's water balance modelling is reasonable and includes appropriate considerations of the effects of climate change variability, particularly during dry rainfall periods.
185. DPIE Water has indicated that Whitehaven will need to address relevant impact assessment criteria under the *Water Resource Plans Fact Sheet - Assessing Groundwater Applications* when it applies for licences to operate the borefield for the Project, to confirm the borefield entitlements would be available for the project. Whitehaven notes this would be required following determination of the SSD application and has provided additional information to demonstrate the proposed borefield would comply with the criteria (see **Appendix G6-5**). DPIE Water has confirmed that Whitehaven would need to apply for the relevant licences prior to construction of the Project borefield.
186. The Department considers that Whitehaven has identified adequate contingencies for the ongoing and appropriate management of mining operations, in the event that there is insufficient water from Whitehaven's general security access licences during dry conditions. These include the forward planning of mining operations based on climate forecasts, regular review of water consumption and measures to reduce reliance on external supply.
187. The Department also notes that, like any other significant water user in the State, access to adequate water supplies is a commercial risk for Whitehaven and would be regulated under the water sharing principles established under the WM Act. If Whitehaven is not able to secure enough water to meet its demands it may need to investigate additional water efficiency measures, or its operations may need to be reduced accordingly.
188. The above measures would be enforced by the Department through the monitoring of Whitehaven's compliance with the recommended development consent through all stages of the Project. This includes:
- requiring the implementation of a Water Management Plan to describe Whitehaven's strategies to plan, monitor and adjust its operations based on water supply availability;
 - monitoring and annual reviews of the water management, dust suppression and water consumption;
 - independent audits of Whitehaven's performance; and
 - the nature and frequency of complaints about dust generation during dry periods.
189. The NRAR would also enforce Whitehaven's compliance with the conditions of its Water Access Licenses under the WM Act, which also includes an annual review of water consumption.
190. To ensure the appropriate management of water for the operation of the development, the Department has recommended conditions in consultation with DPIE Water requiring Whitehaven to:
- ensure that it has sufficient water for all stages of the proposal, and if necessary, adjust the scale of the operations to match its available water supply;
 - demonstrate that all necessary licences and contingencies are in place to account for any water take from mining activities;

- minimise the use of clean and potable water and external water sources for mining operations and maximise the recycling of water within the operations;
- describe mitigation measures to ensure rehabilitation and dust suppression would not be limited in dry years; and
- prepare and maintain a detailed water balance for the development, to be reviewed annually, including requirements to investigate measures to minimise water use.

6.2.4 Surface Water

191. The EIS includes a surface water assessment undertaken by Advisian, as well as a flood assessment undertaken by WRM Water & Environment. It also includes a peer review of the Advisian surface water assessment undertaken by Professor Tom MacMahon of Melbourne University.
192. The Department also commissioned Martin Giles of BMT as an independent expert to provide advice on the surface water assessment and Erin Askew of WMA Water to provide advice on the flooding assessment. The initial advice was provided with the Departments Preliminary Issues Report, with updated advice provided based on the review of Whitehaven’s Submissions Report and additional information (see **Appendix G4-3** and **Appendix G4-5**).
193. The total reduction in the Namoi River catchment would be negligible, with the EIS indicating that the maximum reduction in catchment area would be 0.07% in Year 21. The assessment also considered the cumulative impacts from all mining operations in the region, concluding that the maximum cumulative reduction in contributing catchments to the Namoi River would be approximately 0.18% (an increase of approximately 0.02% compared with the Approved Project). Given the relatively minor changes in catchment areas and surface flow regimes, the Department considers that the reduced catchment attributed to the project is unlikely to result in significant impacts to flows in the Namoi River.
194. Surface water flow regimes in Driggle Draggles and Stratford Creeks would be affected by progressive changes in the catchment area and reductions in runoff. During mining operations, the predicted maximum catchment reduction would be 9.7% of the Driggle Draggles Creek catchment, and 4.2% of the Stratford Creek catchment. These losses would be partially restored following the completion of rehabilitation, resulting in long term reductions of 3.4% and 1.9%, respectively. A comparison of the change in catchment area due to the Project compared with the Approved Project for Driggle Draggles Creek and Stratford Creek is provided in **Table 8** below.

Table 8 | Change in catchment area due to the Extension Project compared with Approved Project

Project Component	Approved Project	Extension Project	Difference
Driggle Draggles Creek (201.7 km²)			
Maximum during operations	-6.8%	-9.7%	-2.9%
Post-mining	-4.3%	-3.4%	+0.9%
Stratford Creek (106.1 km²)			
Maximum during operations	-5.1%	-4.2%	+0.9%
Post-mining	-0.5%	-1.9%	-1.4%

195. The proposal also involves extraction of water from the Namoi River, as its primary source of makeup water when the supply from the mine is insufficient to meet demand. Water would be extracted using a pump station and would be pumped to the MIA for storage. As discussed above, all external water would be extracted in accordance with licences held by Whitehaven under the rules of the applicable Water Sharing Plan/s (WSP).

Department’s Consideration

196. The independent surface water expert and the Commission’s Issues Report noted the limited available information about the water quality in ephemeral creeks downstream of the mine discharge location/s,

acknowledging the extended drought conditions limits surface water monitoring, and recommended further enhancement to the baseline water quality monitoring prior to construction of the Project.

197. The Department acknowledges the prevailing drought conditions have constrained Whitehaven's ability to obtain meaningful data in the Namoi River and particularly the ephemeral creeks (Driggle Draggie Creek and Stratford Creek). Whitehaven has adopted EPA's recommendation and has committed to monitor water quality downstream of the Project to develop trigger values consistent with the ANZECC¹ water quality triggers or site specific measurements. The independent expert has recommended the water quality parameters include pH, Electrical Conductivity, Total Suspended Solids, Total alkalinity/acidity, Sulphate, Aluminium, Arsenic, Molybdenum, and Selenium.
198. In this regard, the Department has recommended conditions requiring Whitehaven to implement a water quality monitoring program consistent with the IESC advice and to be prepared in consultation with DPIE Water and the EPA to include baseline water quality monitoring upstream and downstream of proposed discharge points, prior to commencing construction.
199. The proposed water management system includes mine dewatering systems, water storages including the Blue Vale void, sediment detention basins, mine water (coal contact) storages, drains, levee banks, laydown hardstand areas and fuelling areas. The Project would convey clean water around mining operations and segregate, store and reuse mine-impacted water within the operations to minimise adverse effects on water quality from mining operations to downstream waterways. Whitehaven has committed to retaining all mine water (coal contact) on site, with all available CHPP process water to be recycled.
200. To address the potential issues with infiltration from overburden emplacements impacting receiving water quality, Whitehaven proposes to place dewatered coal reject material in the overburden emplacement adjacent to the open cut and with sufficient cover so any infiltration and runoff would be directed to the mine water storages and the open cut, instead of drainage lines that flow to the receiving environment. Potential acid forming (PAF) material would be blended with non-acid forming material to minimise the potential for acid formation.
201. The Department has recommended water quality management objectives to require the emplacements to be designed and constructed to ensure PAF material and coal contact water does not migrate to receiving waters, with the measure to be described in the Water Management Plan for the Project.
202. The mine water management system has been designed to provide sufficient capacity in extended periods of above average rainfall, with the objective of no discharge of mine water. However, discharges from sediment dams would occur during prolonged wet periods. Sediment dams would be managed to allow settlement of suspended sediment and discharges would be undertaken in accordance with an Environment Protection Licence (EPL). This approach is consistent with standard practice across the mining industry and the design requirements of the Blue Book.
203. Concerns were also raised in submissions, IESC advice and the Commission's Issues Report about potential pollutants in sediment dams and the potential impacts of water discharged from the project on water quality of the Namoi and its tributaries. To address the concerns raised about the potential for sediment basins to overtop and discharge to the environment, Whitehaven proposes to design the sediment basins with a 20% greater capacity than required under the Blue Book. This approach is supported by the independent surface water expert. The Department also agrees with the recommendations of the Commission's review and considers it appropriate for Whitehaven to implement a water quality monitoring program to monitor analytes in the detention basins prior to discharge.
204. Whitehaven has committed to monitor water quality in sediment dams capturing runoff from the overburden emplacement, which would include monitoring of the following parameters: TSS, pH, EC, total alkalinity/acidity, sulphate, aluminium, arsenic, molybdenum and selenium. Whitehaven has also committed to monitor pH, EC, TSS, oil and grease and total organic carbon in water discharged from

¹ Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*

sediment basins. The independent expert has advised that this approach adequately addresses the issues raised in the initial review.

205. The EPA supports Whitehaven's commitment to operate the site to achieve nil-discharge of coal contact water and it has recommended conditions to require a short-term discharge monitoring program to verify the levels of key pollutants in mine water and review mitigation measures to ensure mining operations would achieve the required performance objectives. The Department has therefore recommended a condition requiring Whitehaven to monitor the quality of water in the sediment dams prior to any discharge from these dams.
206. With the proposed measures to monitor water quality in the basins to ensure water quality meets the relevant criteria prior to any discharge, the Department considers that any releases from licensed discharge points would have a very low risk of adverse water quality impacts, and would be unlikely to affect downstream waters and users.
207. The independent expert also raised an issue regarding the potential failure of pumping infrastructure, which may result in overtopping of the mine water storages and recommended Whitehaven outline available backup measures. Whitehaven's Surface Water Assessment indicates that a Water Management Plan would be developed to include regular inspection and maintenance procedures to ensure the water reticulation system continues to function adequately.
208. While the implementation of these procedures is likely to address the risk of system failure, the Department considers that the Water Management Plan should also include contingency response measures in the unlikely event of the pumping infrastructure failing to operate and has incorporated this into the recommended conditions.
209. In response to the Commission's recommendation to address potential impacts of water seepage on groundwater quality in the alluvium, to be addressed through limiting the permeability of Project water storages, Whitehaven has committed to design the storages to comply with requirements of any conditions of consent and EPL conditions.
210. The EPA recommended imposing permeability standards of 1×10^{-9} m/s using clay or equivalent geosynthetic liner, which is a standard commonly applied to landfills. While this would be an appropriate standard for storages with potentially high concentrations of pollutants entering the groundwater, the Department considers this would be unreasonable on storages for the Project where this is not the case. For example, the EIS groundwater assessment predicts that storage of mine water in the Blue Vale void could increase the salinity of the Namoi River baseflow by approximately 0.007% to 0.03%.
211. Consistent with the approach adopted for other mining projects in NSW, the Department has recommended water quality performance measures requiring compliance with the AIP minimal impact water quality criteria and that Whitehaven implement reasonable and feasible mitigation measures to prevent the migration of saline water from the mine water storages, to the satisfaction of the EPA and the Planning Secretary.
212. To ensure the appropriate management of surface water for the operation of the development, the Department has recommended contemporary conditions in consultation with DPIE Water and EPA requiring Whitehaven to:
 - implement its commitments in the EIS and Submissions Report;
 - comply with a comprehensive range of performance measures including water quality, clean water diversion, water storages and material handling and storage; and
 - prepare and implement a surface water management plan to detail how these water quality performance measures will be achieved, including a program to monitor flows against contemporary surface water and stream health impact assessment criteria.
213. With the implementation of the required water management and monitoring measures, the Department, independent water expert and EPA consider that the development can be managed such that it would not result in significant impacts on surface water resources.

6.2.5 Flooding

214. The EIS includes a flooding assessment that assesses the project against the objectives and management rules of the *Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain 2016* (Draft FMP). Since the exhibition of the EIS, the *Floodplain Management Plan for the Upper Namoi Valley Floodplain 2019* (FMP) was gazetted which, for the purposes of this assessment, is consistent with the objectives and rules described in the Draft FMP.
215. The EIS flood modelling assessed conditions during the 20%, 5% and 1% AEP events and a probable maximum flood (PMF) based on an event three times greater than the 1% AEP event (an estimated discharge of 27,246 m³/s). Whitehaven's Submissions Report also considered an alternate event up to approximately 7.5 times the 1% AEP event (an estimated discharge of 70,400 m³/s) in response to the Commission's Issues Report.
216. The Commission's Issues Report also raised the need to individually consider the flood flows in Namoi, Stratford and South Creek. Whitehaven's Submissions Report compared revised modelling of both individual and coincident flood events in the Namoi and two tributary creeks Collygra Creek and Stratford Creek and this modelling found an imperceptible change in flood level impacts.
217. While Whitehaven's modelling does not specifically reference Cox's Creek or Rangira Creek, the independent flood expert has noted that Whitehaven has demonstrated that the smaller tributary systems, which include Coxs and Rangira Creeks, are unlikely to impact on the flooding regime of the Namoi, given the substantial difference in catchment area between the Namoi and its tributaries.

Mining and Infrastructure Area

218. The footprint of the mining operations area, including the MIA and CHPP, is above the Namoi River's peak flood levels (see **Figure 15**) and no changes to flood flows due to the mining operations are predicted during all modelled events. The realigned Blue Vale Road would be constructed at-grade and would not include structures such as culverts that would affect flood levels.
219. The south eastern area of the project mining area is located within the South Creek/Stratford Creek flood zone during the modelled 3 x 1% AEP flood event (see **Figure 16**). The modelled flood depths in these locations range between 0.3 m and 1.6 m. The alternate PMF event modelling in Whitehaven's Submissions Report indicates a maximum flood depth in the MIA of 1.3 m, with the flood extent up to 150 m further than EIS modelling (3 x 1% AEP) but not reaching the open cut (see **Figure 17**).
220. Whitehaven proposes to construct levees/bunds to protect the open cut and infrastructure area during flooding events. The flood protection works would also be designed to prevent floodwater flows into the final void following the completion of mining operations.
221. The EIS modelling predicts the effects of these measures on flooding characteristics of the Stratford and South Creek catchments. The modelling found the project would result in localised changes to flood levels of less than 5 cm and flood velocities less than 0.5 m/s, consistent with the objectives of the FMP. The flood modelling indicates that no privately-owned residences or land would be affected by flood changes as a result of the levees.
222. No significant changes are predicted in Stratford Creek or South Creek for the alternate PMF event compared with the EIS modelling.
223. Whitehaven's modelling demonstrates that the design of the project mining area would comply with the objectives of the FMP and it has committed to design the project to meet these objectives.

Rail spur

224. Given the location of the proposed rail spur within the Namoi floodplain, the potential impacts of the rail infrastructure on flooding characteristics is a key consideration for the Project and was a major concern raised in submissions from the local farming community.

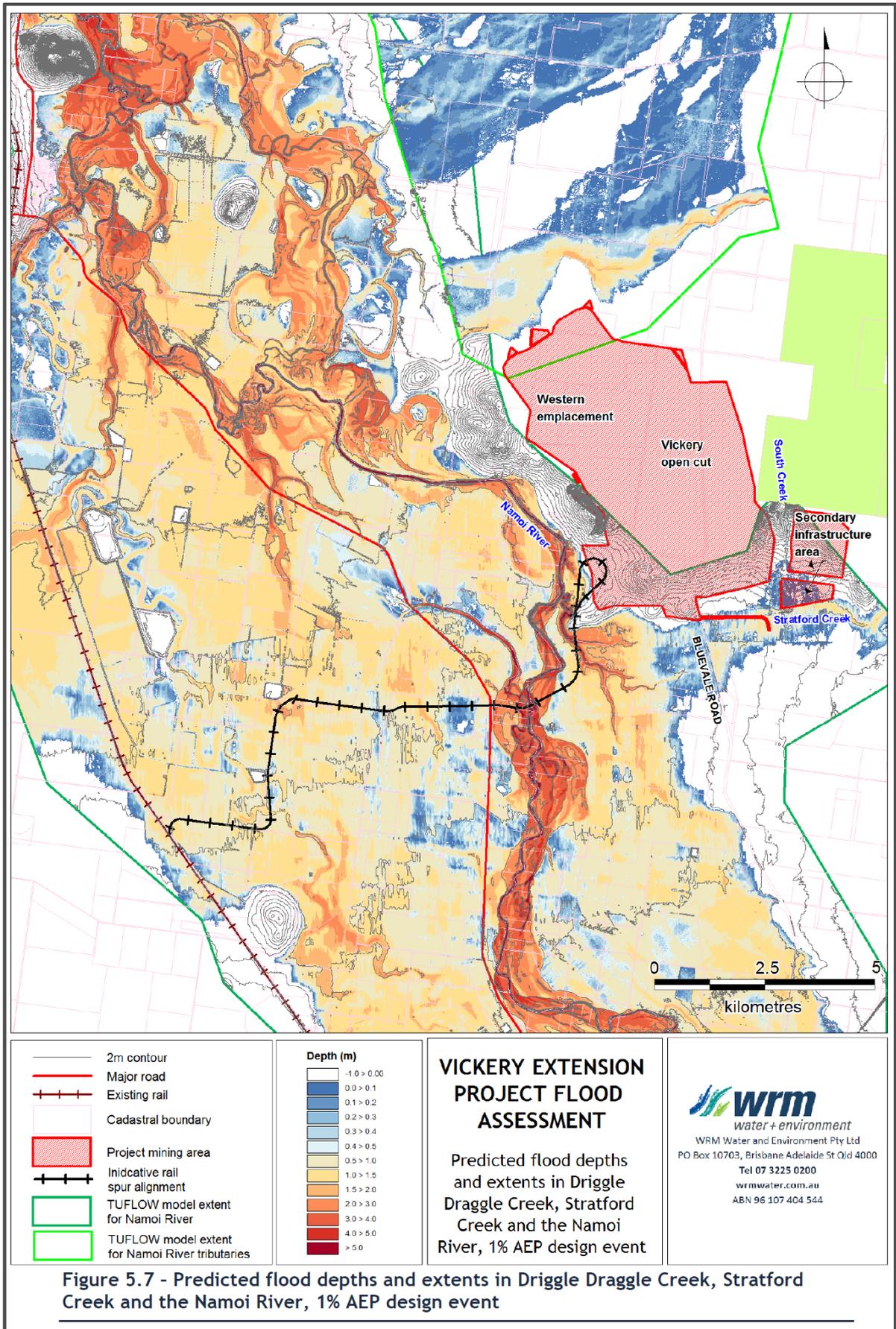


Figure 5.7 - Predicted flood depths and extents in Driggle Draggle Creek, Stratford Creek and the Namoi River, 1% AEP design event

Figure 15 | Namoi River peak flood levels during a 1% AEP event

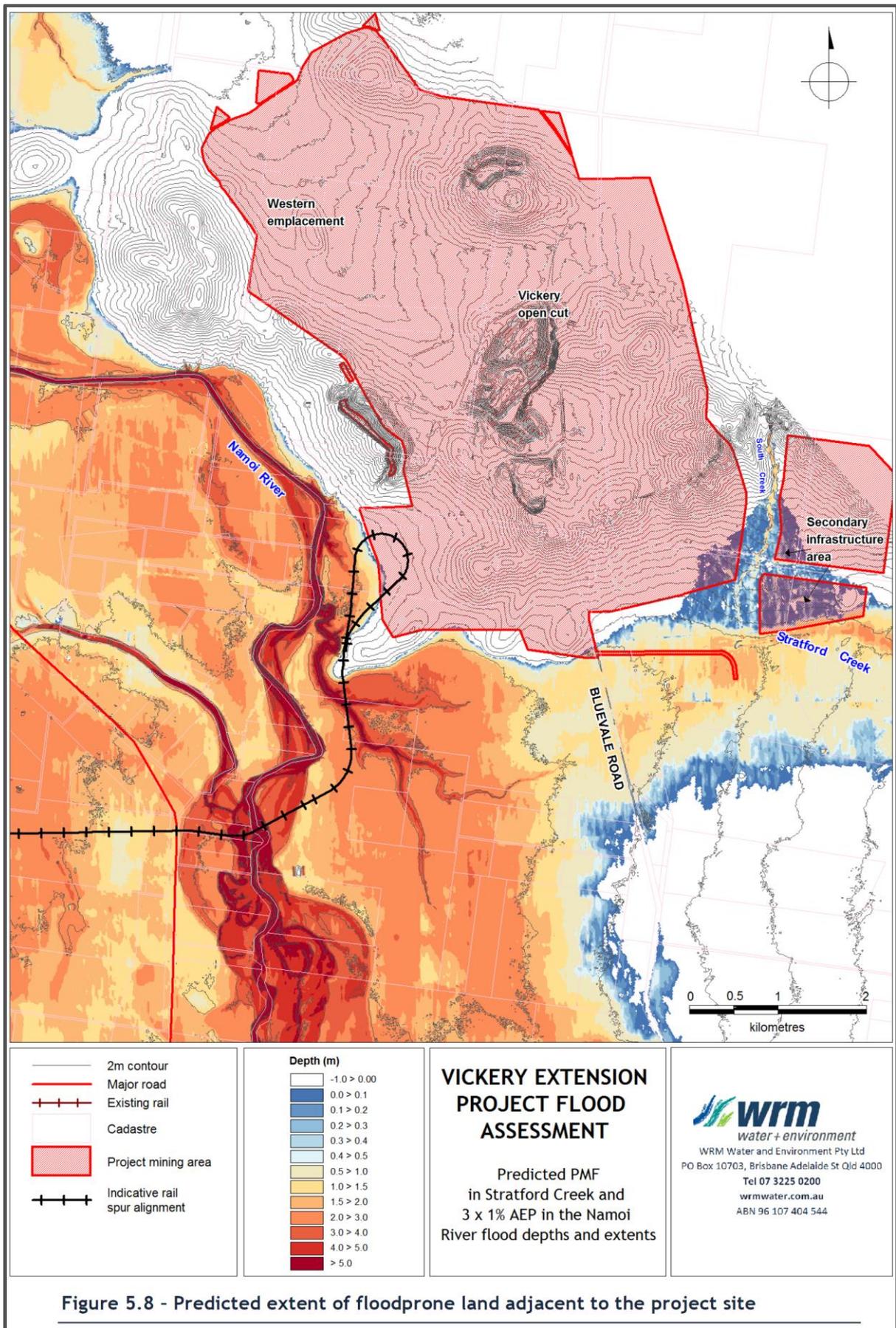


Figure 5.8 - Predicted extent of floodprone land adjacent to the project site

Figure 16 | Flood modelling 3 x 1% AEP event

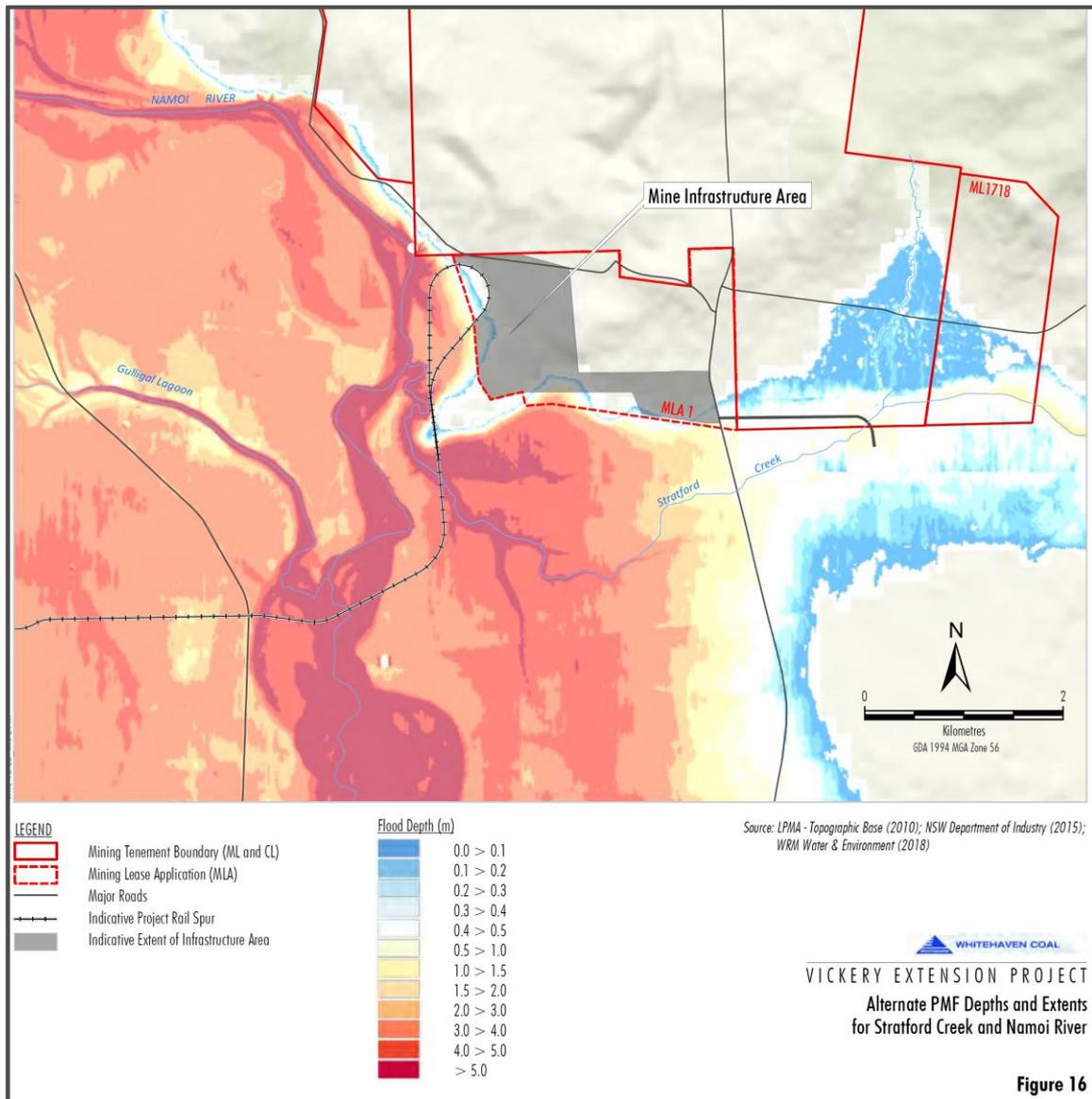


Figure 17 | Flood modelling Alternate PMF (7.5 x 1% AEP) event

225. Whitehaven has committed in its Submissions Report to no longer build a rail embankment to the west of the Namoi River, instead proposing to construct the rail spur on pylon structures from the Namoi River crossing to a short section of embankment at its connection with the Werris Creek to Mungindi Rail Line. The rail superstructure will be constructed above the 1 in 100-year ARI (1% AEP) flood level, exceeding the objectives of the FMP which require design to a 1 in 20-year ARI (5% AEP) flood level (“large design flood” in the FMP).
226. Revised flood modelling based on the amended rail spur design indicates the only section of the rail line potentially affecting flood flows is to the east of the Namoi River, within Whitehaven owned land. Predicted effects of the rail embankment during the 1% AEP event are a maximum increase in flood heights of between 5 and 10 cm to a distance of up to 500 m from the embankment within Whitehaven land (see **Figure 18**).
227. The EIS modelling predicted the maximum increases in flood depth during the 1% AEP event would be above 10 cm, localised to the area immediately upstream of the rail embankment to the east of the Namoi River (see **Figure 19**). The EIS modelling predicts flood levels during a 1% AEP flood event would increase by between 1 and 5 cm at the closest potentially impacted private residence (127c). During a large design flood event under the FMP (5% AEP), the maximum increase in flood level at residence 127c would be less than 1 cm, within the objectives of the FMP (inset to **Figure 19**).

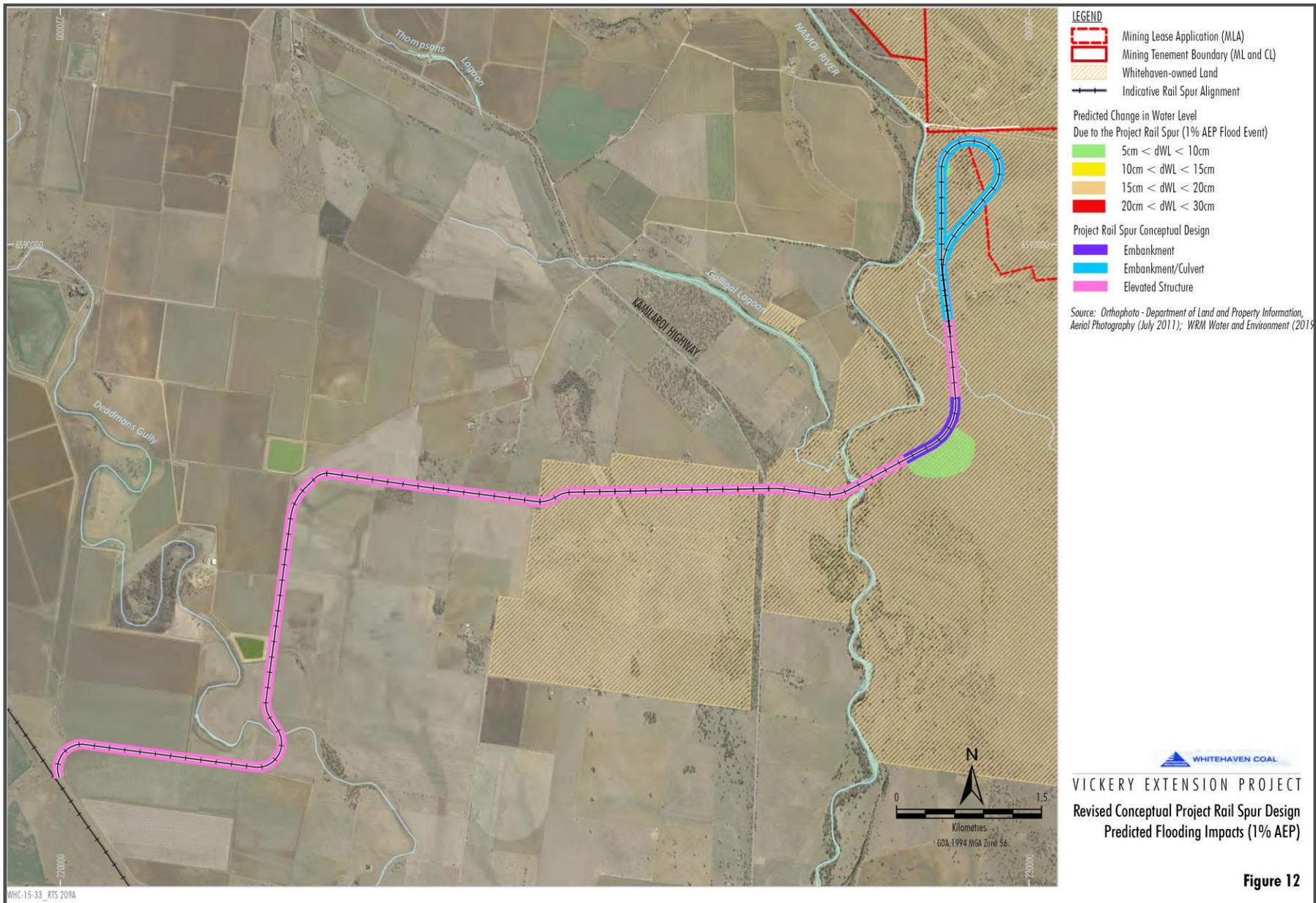


Figure 18 | Revised flood modelling with elevated rail spur on pylons/piers west of the Namoi River

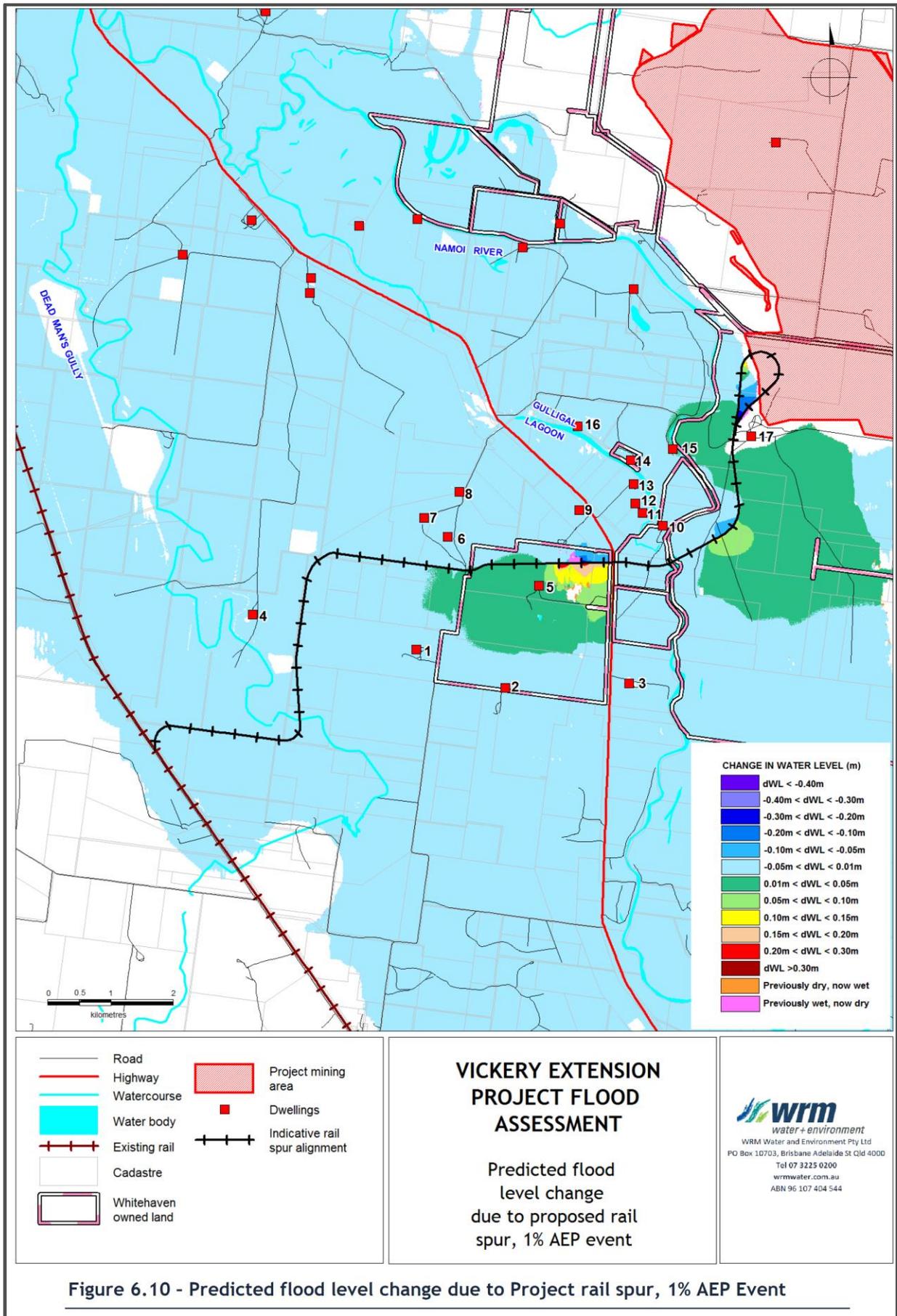


Figure 6.10 - Predicted flood level change due to Project rail spur, 1% AEP Event

Figure 19 | Flood modelling for the Project Rail Spur

Department's Consideration

228. Public submissions raised concerns about the potential effects of the proposed embankment at the rail spur's connection with the Werris Creek Mungindi rail line, which intersects the flow direction of Collygra Creek. Whitehaven estimates that the Project rail embankment would extend approximately 50 m from the embankment of the existing rail line and is to be located between two culverts in the existing embankment. Given the embankment of the existing rail line currently forms a barrier to flood flows and Whitehaven's commitment to design the Project rail spur to comply with the objectives of the FMP, the Department and the independent flooding expert consider the rail spur would not result in unacceptable flooding impacts on private property or public infrastructure.
229. Impacts of the rail spur structures and embankment on flood flow velocity, distribution and potential erosion would be generally limited to the larger embankment structures within Whitehaven's land to the east of the Namoi River and would be addressed by Whitehaven in its detailed design of the infrastructure. Whitehaven has committed to implement erosion protection and control measures where required and to comply with the requirements of the FMP.
230. Whitehaven proposes to design the Project rail spur to ensure the superstructure is above the 1 in 100-year (1% AEP) flood level, plus freeboard considerations which it considers to be sufficient to account for any changes in peak discharge due to climate change. The independent expert has recommended Whitehaven incorporate sensitivity analysis in its detailed designs to ensure it accounts for potential variability due to climate change.
231. The BCD has advised that Whitehaven's Submissions Report has adequately responded to the issues it raised on the flooding assessment and has requested that it be given the opportunity to review the final design, as Whitehaven has committed to.
232. The Department has recommended conditions requiring the design of the Project to account for climate change variability, consistent with the recommendations of the independent expert, including periodic review of climate data and projections and consulting with the BCD on the design of the Project rail spur. On this basis, the Department and the independent flooding expert consider the Project would be able to comply with the requirements of the FMP and minimise flooding impacts on the floodplain.

6.2.6 Groundwater

233. The EIS includes a groundwater assessment by HydroSimulations Pty Ltd, which was peer reviewed by Dr Frans Kalf of Kalf and Associates Pty Ltd. The groundwater assessment draws on historical assessments of groundwater conditions, modelled mining impacts and monitoring programs that have occurred since the early 1980's at the site and surrounds. The groundwater assessment of the Project includes updated modelling using MODFLOW-USG to reflect current best practice.
234. The Department commissioned an independent groundwater expert, Hugh Middlemiss of Hydrogeologic, to provide advice on Whitehaven's groundwater assessment.
235. The Project mining area is primarily within the porous hard rock system, with the proposed open cut located wholly outside the alluvial system (see **Figure 20**). The Project borefield would be located within the alluvial aquifer. No high priority groundwater dependent ecosystems (GDE) or stygofauna are identified in the relevant Water Sharing Plans (WSP) in the vicinity of the Project.
236. Water quality in the 'highly productive' shallow alluvial aquifers is generally classified as being fresh, with the thicker alluvial deposits suitable for drinking and irrigation. The groundwater assessment found the groundwater quality within and surrounding the Project mining area, within the Maules Creek Formation as well as the adjacent alluvium and colluvium near the former mining operations, is "highly variable but generally poor," noting that most groundwater is suitable only for livestock and irrigation of some salt tolerant crops.
237. Given the high quality of the alluvial groundwater source and access to the Namoi River, the land generally to the west of the Project is extensively used for cropping and irrigation. The groundwater assessment review of the DPI Water database identified 635 registered bores within the bounds of the model domain (33 km by 29 km area), and a census in 2012 identified 122 production bores (the closest of which are shown in Figure 9).

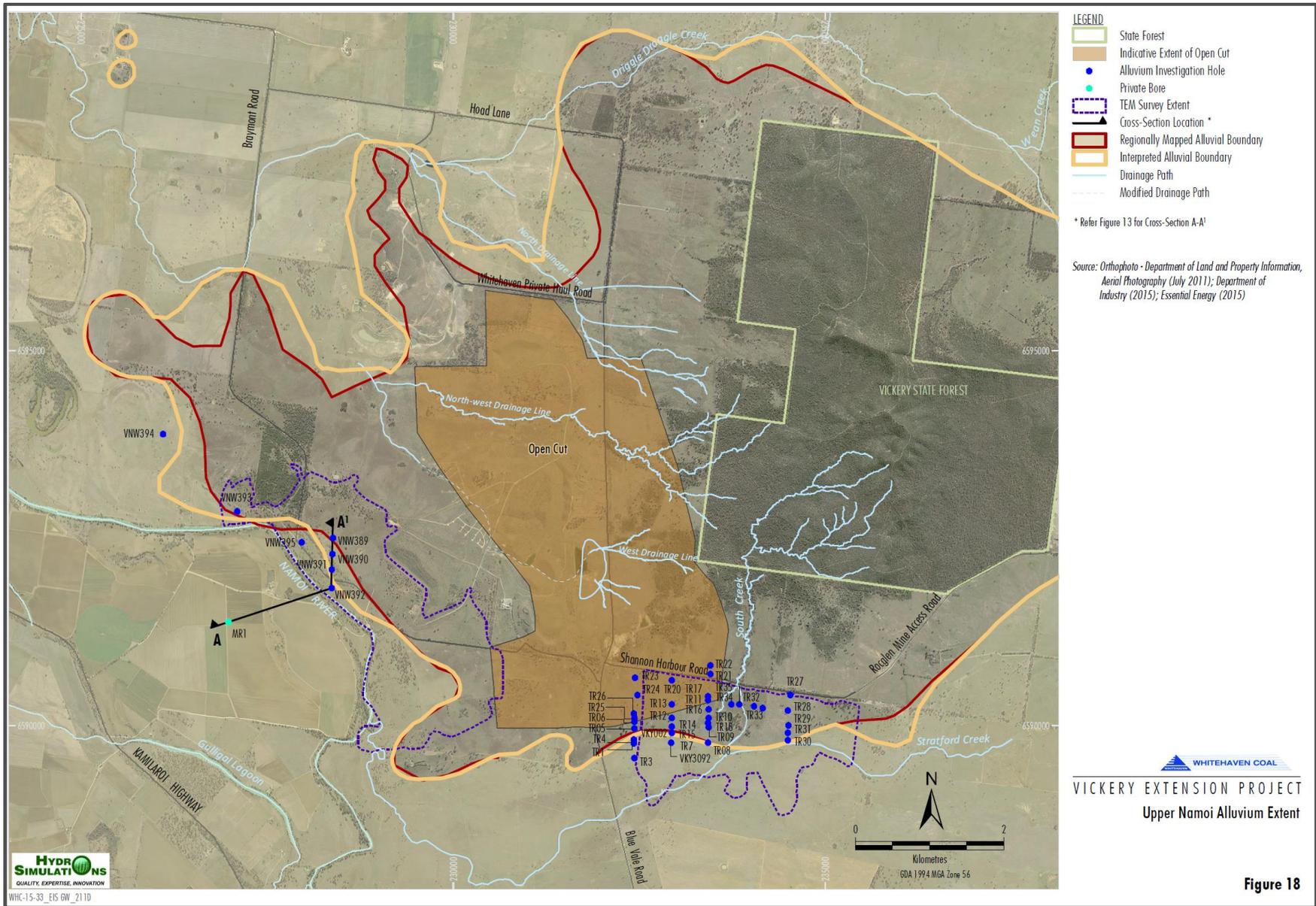


Figure 20 | Location of open cut and Upper Namoi alluvium boundary

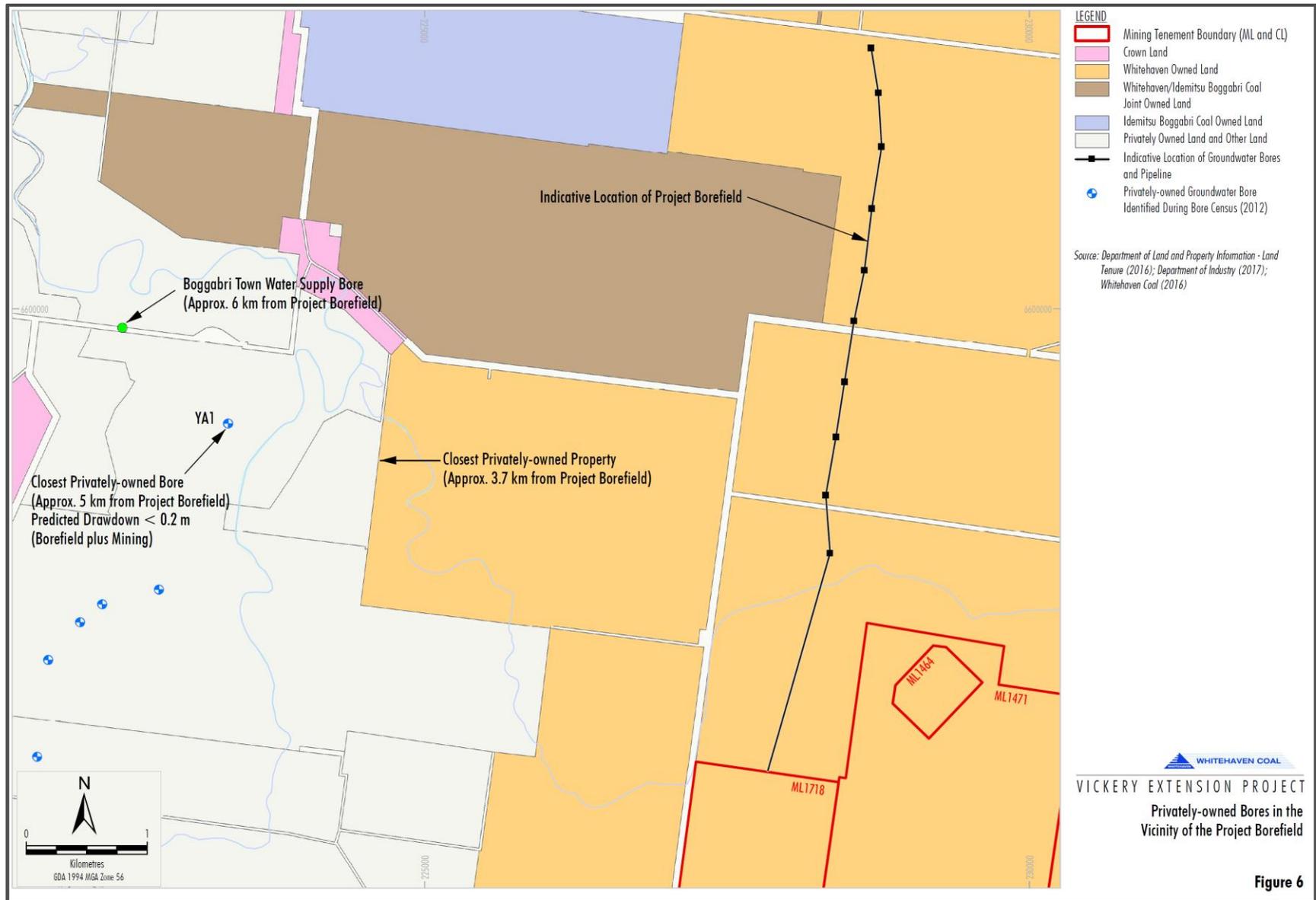


Figure 21 | Proximity of closest privately-owned bores to the proposed borefield

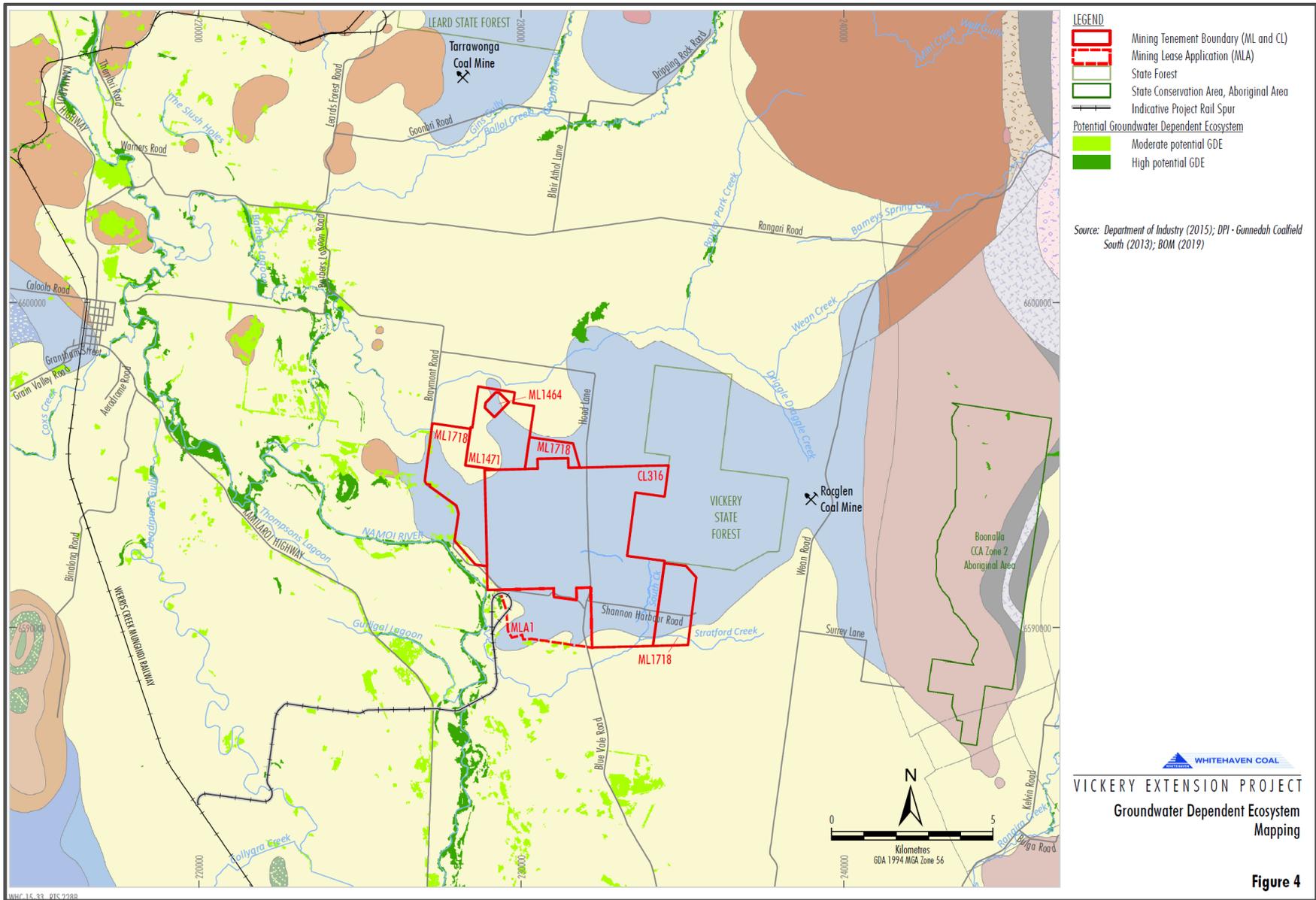


Figure 22 | Groundwater Dependent Ecosystem mapping (Submissions Report)

238. Submissions on the EIS and comments received by the Commission during the public meeting highlighted the community's concerns around the impacts of mining operations on private access to water including privately-owned bores and the Namoi River.
239. To supplement the water supply from the Namoi River, Whitehaven proposes to establish a borefield to the north of the mining area with an estimated extraction requirement of between 200 and 390 ML/year (see **Section 6.2.3**). The Groundwater Assessment notes that the Project borefield is positioned in accordance with the requirements of Clause 36 of the *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* (Namoi WSP). The closest privately-owned bore is located approximately 5 km from the Project borefield, with the Boggabri town water supply bore located approximately 6 km away (**Figure 21**).

Groundwater Dependent Ecosystems

240. While the EIS notes that no high priority Groundwater Dependent Ecosystems (GDE) are identified in the relevant WSPs, the Commission's Issues Report noted the IESC's request for mapping to indicate the distribution of potential GDEs that may be impacted by the Project and a risk analysis of the potential drawdown impacts to GDEs.
241. In its Submissions Report, Whitehaven provided further information mapping the distribution of high and moderate potential GDEs in the region (see **Figure 22**) and reiterated the limited extent of drawdown due to open cut mining in the Maules Creek Formation, which demonstrates that the drawdown associated with the open cut would not interact with potential GDEs. The proposed water supply borefield is located in an area devoid of potential GDEs and as shown in **Figure 25**, the predicted drawdown of 1 m does not interact with any mapped GDEs in **Figure 22**.
242. The independent groundwater expert has advised that Whitehaven's response to groundwater dependent ecosystem and risk analysis is adequate.

Aquifer Connectivity

243. A key issue for consideration raised by the Commission is the potential hydraulic connectivity between the Maules Creek Formation and Namoi River alluvium and concerns around the potential drawdown effects of mining in the Maules Creek Formation on the alluvial aquifer and the Namoi River.
244. Whitehaven's assessment relies on restricting the open cut to within the Maules Creek Formation and the low hydraulic connectivity between the Maules Creek Formation and the alluvium. This influences the assessment's conclusions that the drawdown caused by the open cut and final void would not materially affect water levels in the alluvium and Whitehaven's justification for a final void.

Department's Consideration

245. The reliance on the hydraulically disconnected aquifers influences key aspects of Whitehaven's assessment, including the:
- uncertainty analysis;
 - comparison of the impacts of the Project with the Approved Project;
 - cumulative impact assessment;
 - justification for a final void; and
 - conclusions that the Project would have negligible impacts on groundwater dependent ecosystems and private bores.
246. The Commission's Issues Report and the IESC recommended the Department consider the need for a clearer distinction between the alluvial aquifers (primarily the Narrabri and Gunnedah formations) and the deeper fractured rock aquifers, noting that DPIE Water raised no issues in regard to aquifer connectivity.
247. The independent groundwater expert is of the view that the EIS has adequately documented the distinctions between the alluvial and fractured rock aquifers, in terms of their characterisation and connectivity properties which have been derived from a combination of field studies, monitoring and modelling (see **Figure 20**).

248. Based on its review of the EIS and advice from the independent expert, the Department considers that there is adequate understanding of the connectivity between the two aquifers to assess the potential impacts of the Project on the groundwater systems.

Groundwater Model Uncertainty and Sensitivity Analysis

249. In response to the Commission's recommendations and IESC review comments, Whitehaven provided further analysis of the uncertainties within the groundwater modelling.

250. Whitehaven's sensitivity analysis considered the model's response to changes in key parameters including hydraulic conductivity, storage coefficients, specific yield and recharge. The analysis found that the values used in the model would lead to conservative estimates of impacts on the alluvial aquifer, as the values represent a greater saturation area and a larger potential area for drawdown caused by the Project.

251. Whitehaven also conducted additional uncertainty analysis to address the potential sources of uncertainty identified by the IESC in its advice (*IESC 2018-099: Vickery Extension Project (EPBC 2016/7649 and SSD 7480) – Expansion*) and the matters raised in the Commission's Issues Report. The key findings of Whitehaven's analysis are that the level of uncertainty is minimised because mining is contained within the low permeability Maules Creek Formation and due to the extensive site specific data obtained to verify the nature of the hydrogeological characteristics.

252. Notwithstanding Whitehaven's confidence in its modelling, it has committed to ongoing groundwater monitoring and will incorporate the results of this monitoring in periodic (every 5 years) revised modelling to compare the results of modelling with monitoring data and refine any residual uncertainties. The Department notes the IESC's recommendation that the results of monitoring should be compared with modelling predictions more frequently, therefore the Department has included a recommended condition which requires Whitehaven to prepare its Water Management Plan to address the IESC advice.

253. During discussions with landowners and independent experts in December 2019, the Department heard concerns raised about the understanding of the hydraulic connectivity between the basement volcanic geology (Boggabri Volcanics shown conceptually in **Figure 23**) and the Namoi Alluvium. To improve the understanding of this connectivity, the Department agrees that monitoring bores should be established to undertake additional monitoring of the basement volcanics to verify the extent of any hydraulic connection.

254. EDO experts also considered that further field investigation would be useful to support the hydraulic assumptions and recommended the use of multi-level nested bores to verify the inputs into the Whitehaven's groundwater modelling.

255. The independent groundwater expert has reviewed the additional information and has advised that the groundwater model sensitivity analysis, and the application of the results to justify its interpretation of the uncertainty analysis, is adequate for assessing the potential groundwater impacts of the Project. Mr Middlemiss also agrees that additional monitoring information would be useful to verify the modelling predictions during the progressive development of the Project.

Department's Consideration

256. Based on the above, the Department considers that Whitehaven's groundwater modelling is adequate to assess the potential impacts of the Project on potentially impacted groundwater users.

257. To ensure the effects of the Project on the groundwater system are closely monitored the Department has recommended conditions requiring the development of a comprehensive Groundwater Management Plan which includes ongoing monitoring of the hydrogeological properties used in the modelling and validation of the modelling against the recorded data, with minimum 5-yearly independent reviews of the groundwater model.

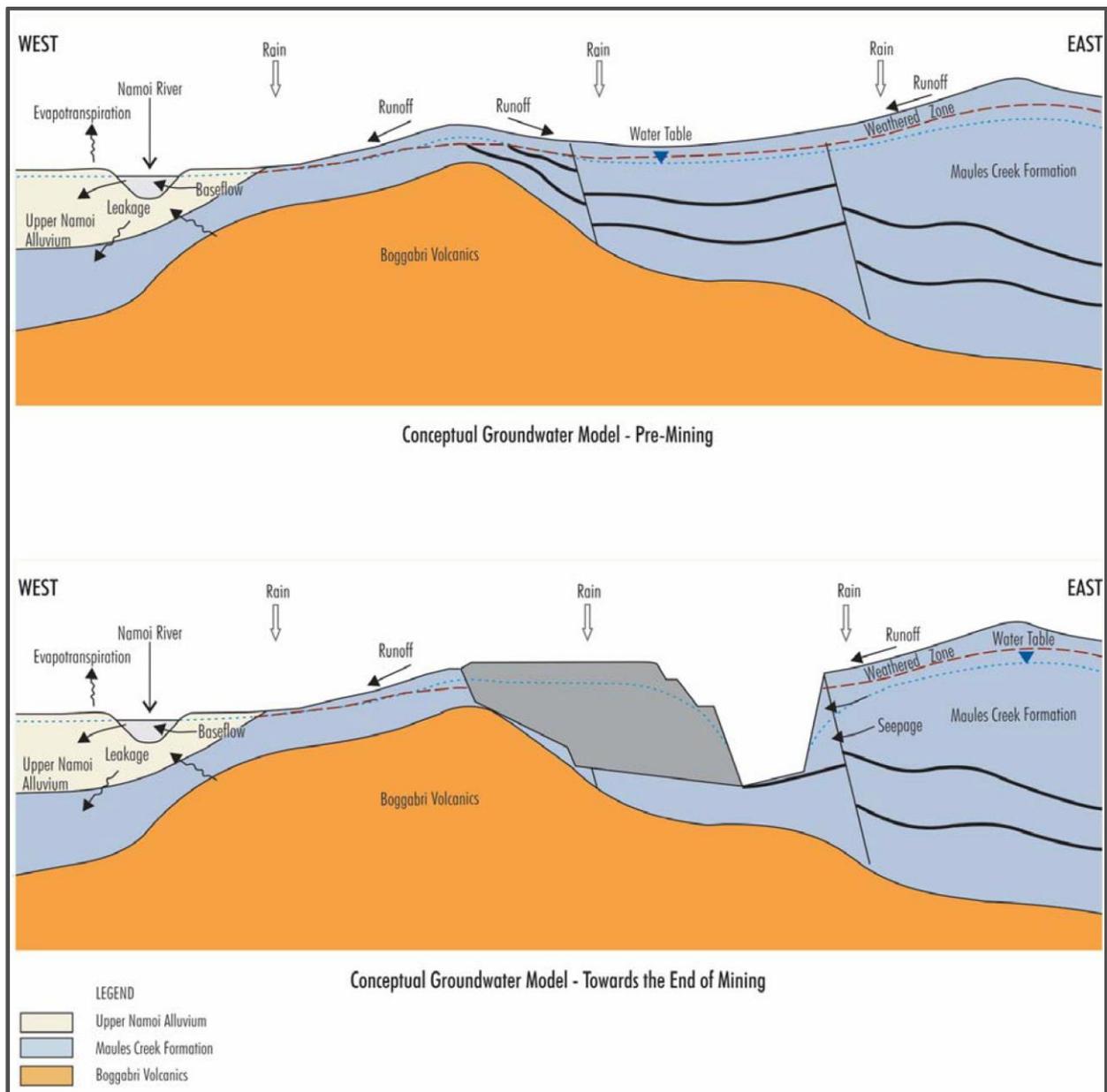


Figure 23 | Conceptual groundwater model

Groundwater Predictions

258. The EIS predicts average annual groundwater inflows into the open cut pit of 0.93 ML/day with a maximum inflow of about 1.42 ML/day from the poorer quality porous rock aquifer, with no direct flows from the highly productive alluvial water source.
259. In comparison, the Approved Project predicted average groundwater inflows of approximately 1.2 ML/day (with a maximum of 1.9 ML/day). Incidental or induced (due to deepening of the rock below the alluvium) losses from the alluvium to the hard rock system were predicted to be approximately 0.15 ML/day in the area south of the open cut and approximately 0.11 ML/day in the area to the north. In this regard, drawdown from the proposed Project is predicted to be less than that predicted for the Approved Project based on improved calibration of the modelling based on additional data, the reduced life of the Project and a single open cut rather than two for the Approved Project.
260. Whitehaven has compared the results of project-only modelling with cumulative mining modelling (incorporating Rocglen and Tarrawonga) to determine the predicted drawdown within the hard rock aquifer. As demonstrated in Figures 50 and 51 of the Groundwater Assessment (EIS Appendix A), extracts of which are provided in **Figure 24**, drawdown caused by the Project-only scenario is generally confined to the immediate vicinity of the Project.

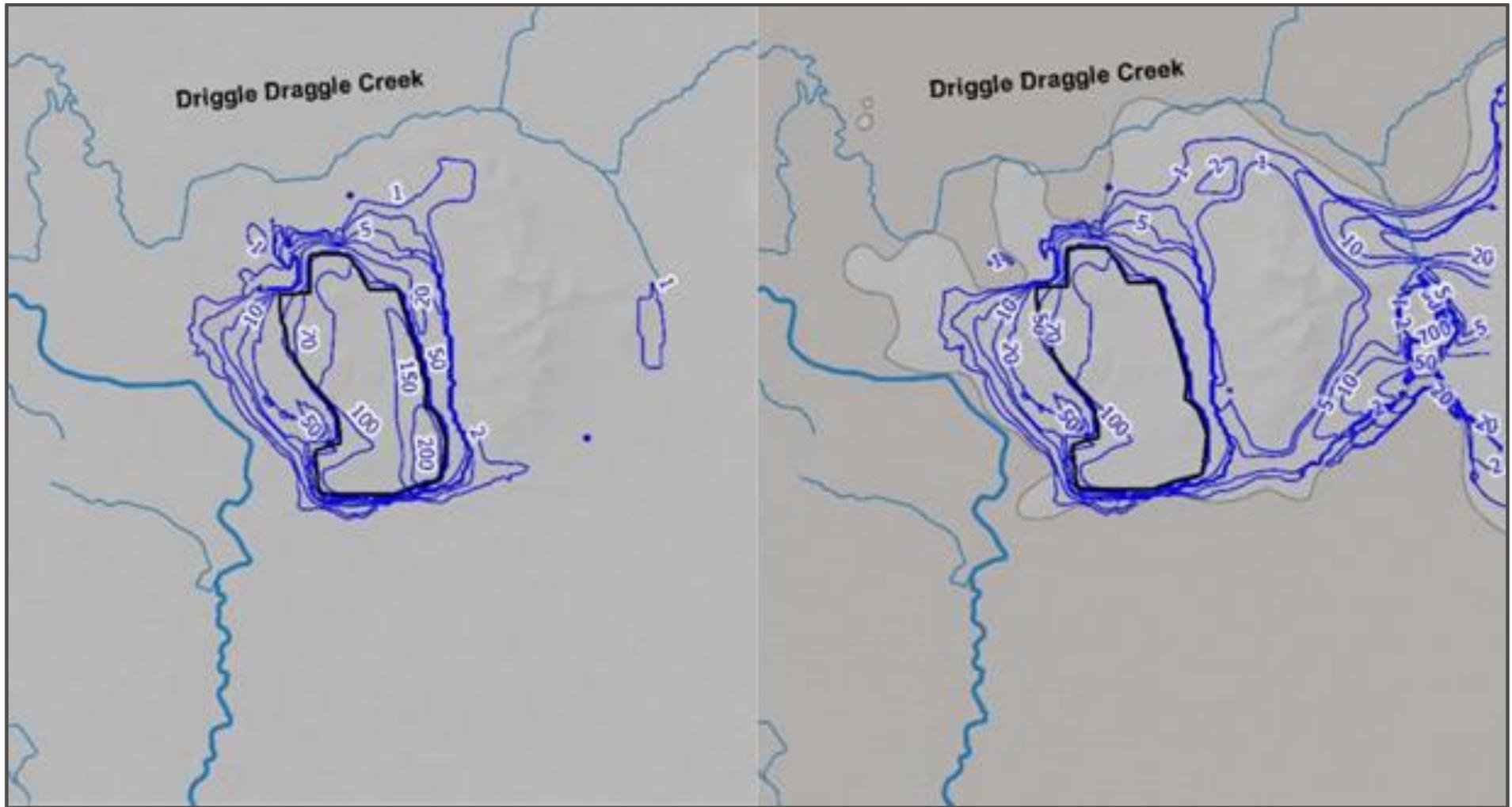


Figure 24 | Comparison between predicted Project only (left) and cumulative groundwater drawdown (right)

261. The independent groundwater expert has advised that “the plots of water table drawdown presented in the EIS adequately quantify the cumulative impacts across these aquifer systems due to the drawdowns from mine drainage and water supply borefield pumping.”

Department’s Consideration

262. Given the low hydraulic connectivity between the Maules Creek Formation and the Upper Namoi Alluvial aquifer, the EIS predicts that the groundwater drawdown from open cut mining operations would be essentially limited to the hard rock aquifer, thereby minimising the potential drawdown within the alluvial aquifer. Incidental losses from the alluvium to the hard rock system are predicted to be less than 0.1 ML/day.

263. The largest potential contribution to drawdown in the alluvial aquifer is borefield pumping for contingency mine water supply during the open cut mining period. The groundwater assessment conservatively assumed an extraction of 600 ML/year (greater than the 396 ML/year licence extraction limit), which predicts that the 1 m drawdown would extend approximately 2 km to the west and east of the borefield in the Upper Namoi Alluvium, with the northern and southern extent of the 1 m drawdown intersecting with the Maules Creek Formation (see **Figure 25**).

264. The largest predicted drawdown due to the Project at the nearest privately-owned bore is less than 0.2 m, well below the 2 m *minimal impact criteria* in the AIP at any privately-owned properties.

265. Four mine-owned bores are predicted to experience drawdown greater than 2 m, all of which are to the south of Driggle Draggie Creek and all but one within the Maules Creek Formation, including the bore to experience the greatest drawdown.

266. The predicted drawdown would not extend into the nearest high potential GDE at Driggle Draggie Creek to the northeast of the Project site.

267. This consumptive take of water from the borefield would be regulated in accordance with the WM Act and Water Sharing Plan for the *Upper and Lower Namoi Unregulated Groundwater Sources 2003*. These regulations set rules to limit the take of water to protect all users in the relevant water source, in particular to protect stock and domestic users, and ensure sustainable take of water in the long term.

268. This consumptive take from borefield pumping can be readily controlled in accordance with the regulatory requirements of the WM Act and rules of Water Sharing Plans to protect all water users.

269. Notwithstanding, should monitoring or an investigation show greater than 2 m drawdown at a privately-owned bore, and the drawdown is attributable to mining operations at the Project, Whitehaven has committed to implement “make good” provisions for the affected groundwater user, which include:

- deepening the affected groundwater bore;
- construction of a new groundwater bore; and/or
- provision of an alternative water supply of appropriate quality and quantity.

270. The Department has recommended conditions which require Whitehaven to provide a compensatory water supply to the owner of any privately-owned land whose water supply is adversely affected because of mining operations the development. The Department’s recommended condition requires Whitehaven to provide a compensatory water supply if the loss of supply (other than a negligible impact) is due to the mine. This condition would not apply to drawdown associated with the northern production borefield as this would be regulated through bore extraction limits determined by NRAR and the provisions of the WM Act and Water Sharing Plan.

271. Concerns were raised in submissions about the onus of proof being on the landowner to demonstrate the mine has impacted bore water levels. The Department has drafted the compensatory water condition to make it clear that the burden of proof is on Whitehaven to demonstrate that its operations has not affected a private water supply. That is, it would be expected that unless there is clear evidence provided through Whitehaven’s monitoring and modelling program and investigation and action trigger process, that Whitehaven would be required to provide compensatory water supply – particularly for stock and domestic supply.

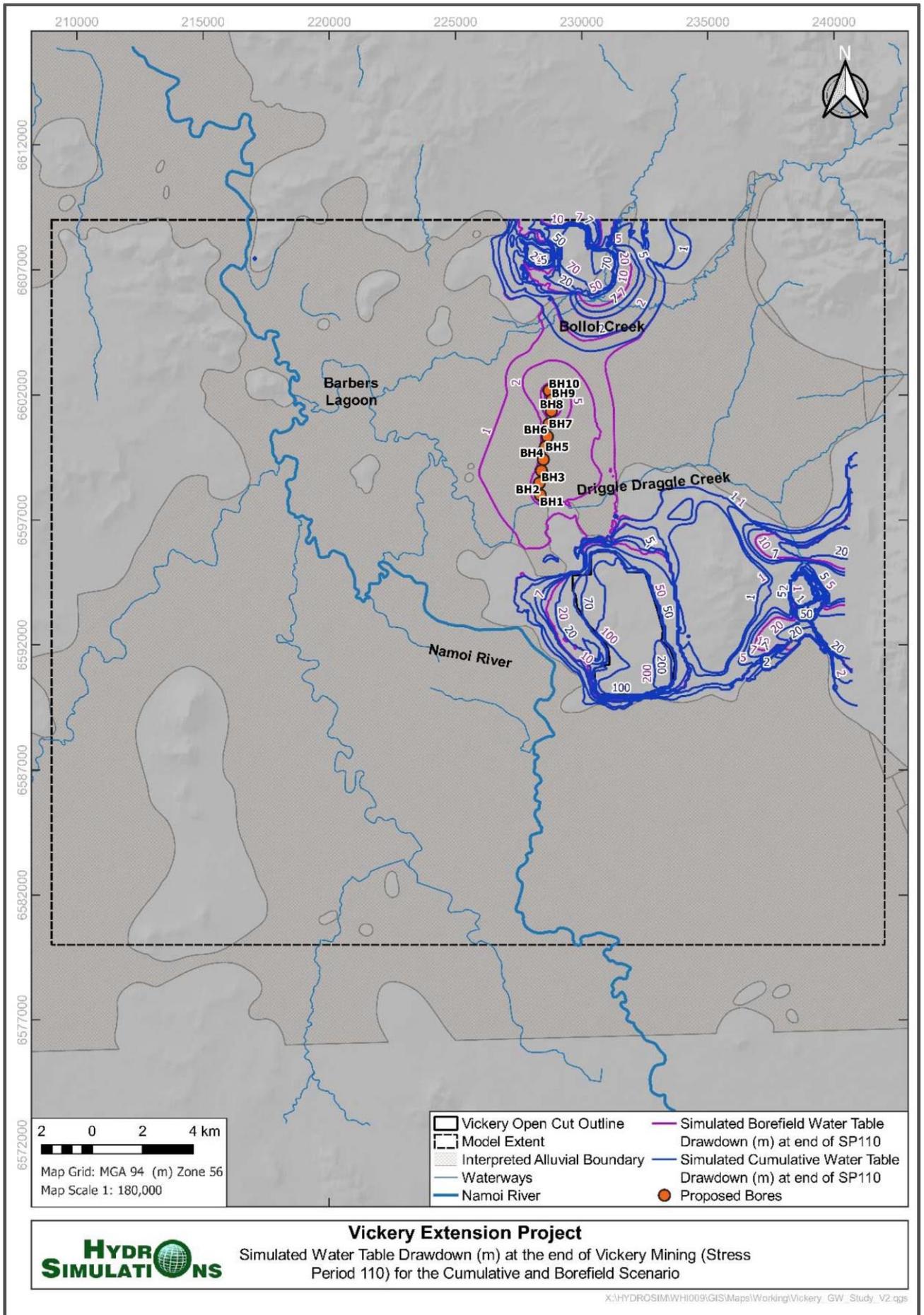


Figure 25 | Simulated cumulative groundwater drawdown due to Project borefield and mining – end of mine life

272. The recommended conditions require Whitehaven to identify groundwater investigation triggers, including triggers for impacts on groundwater levels and water supply. To ensure that delays are limited to ensure that compensatory water is delivered quickly for stock and domestic purposes, the proposed groundwater monitoring program by Whitehaven would need to include clear investigation triggers on groundwater drawdown.

Consolidation of Aquifer

273. The Department received additional correspondence which raised concerns about the potential for the rail embankment to consolidate the clays within the alluvial formation, leading to a potential aquifer interference. In response, Whitehaven has advised that while some limited compaction of the clays may occur directly beneath the railway pylons, the spacing between the railway supports would limit potential compaction of subsurface clays the immediate area to beneath the pylons, therefore not resulting in subsurface compaction to the extent that it would inhibit groundwater flow (see **Appendix G6-11**).

Western Emplacement

274. The groundwater assessment noted that the WEA would be located over an embayment of alluvium and assessed the potential impacts of seepage from the emplacement on alluvium water quality. The assessment predicts that the maximum long-term seepage rate from the WEA to the alluvium embayment would be very minor, ranging from 0.03 ML/day during initial recovery to 0.02 ML/day over the long-term. This is primarily due to the design of the emplacement to direct seepage towards the open cut void.

275. The assessment predicted that the seepage from the WEA into the alluvium embayment is likely to be of similar salinity to the groundwater in the coal measures adjacent to the alluvium and significantly lower salinity than the groundwater currently within the shallow alluvium in that location. The groundwater assessment concluded that the small amount of seepage from the WEA would cause no adverse water quality impacts to the alluvium.

276. Whitehaven's Submission Report also notes that some material may have a higher salinity and acid generating potential, but only if left exposed for an extended period of time (within weeks of exposure). As discussed in **Section 6.2.4**, Whitehaven proposes to blend this PAF material to reduce the acid forming potential and place the material in areas in the emplacement that would be less exposed to the atmosphere and to direct seepage towards the open pit and final void.

277. Whitehaven provided additional information in response to DPIE Water's enquiry about the potential loss of aquifer storage caused by the overburden emplacement over an embayment of alluvial deposit (see **Appendix G6-13**). This information indicates that the area of the alluvium covered by the emplacement is approximately 202 ha, or 0.2% of the total area of the Upper Namoi Zone 4 Alluvial Groundwater Source (**Figure 26**). Whitehaven also noted that the alluvium in this location has previously been subject to disturbance associated with the void created by mining in the Canyon Coal Mine.

278. DPIE Water has advised that it does not support the emplacement of spoil over the alluvium, however noted that if it was approved, a monitoring and Trigger Action and Response Plan (TARP) would need to be prepared to respond to adverse monitoring results. The independent groundwater expert has noted the emplacement would be designed and constructed to direct potentially polluted groundwater seepage towards the open cut and final void, therefore minimizing potential for seepage towards the alluvium. The independent expert also noted the existing impacts on this area of alluvium by the Canyon Coal Mine.

279. The Department notes that seepage of water through the emplacement near the alluvium is still a possibility, however it considers that the emplacement can be designed and constructed to ensure that the material that may pose the highest risk of pollution is placed closer to the pit, and the areas of the emplacement over the alluvium are constructed with more inert material.

280. To ensure the seepage of PAF, saline and sodic materials towards the alluvium is prevented, the Department has recommended conditions including specific performance measures and the preparation of a Water Management Plan which includes baseline data, monitoring and a TARP to respond to exceedances of the criteria in the development consent.

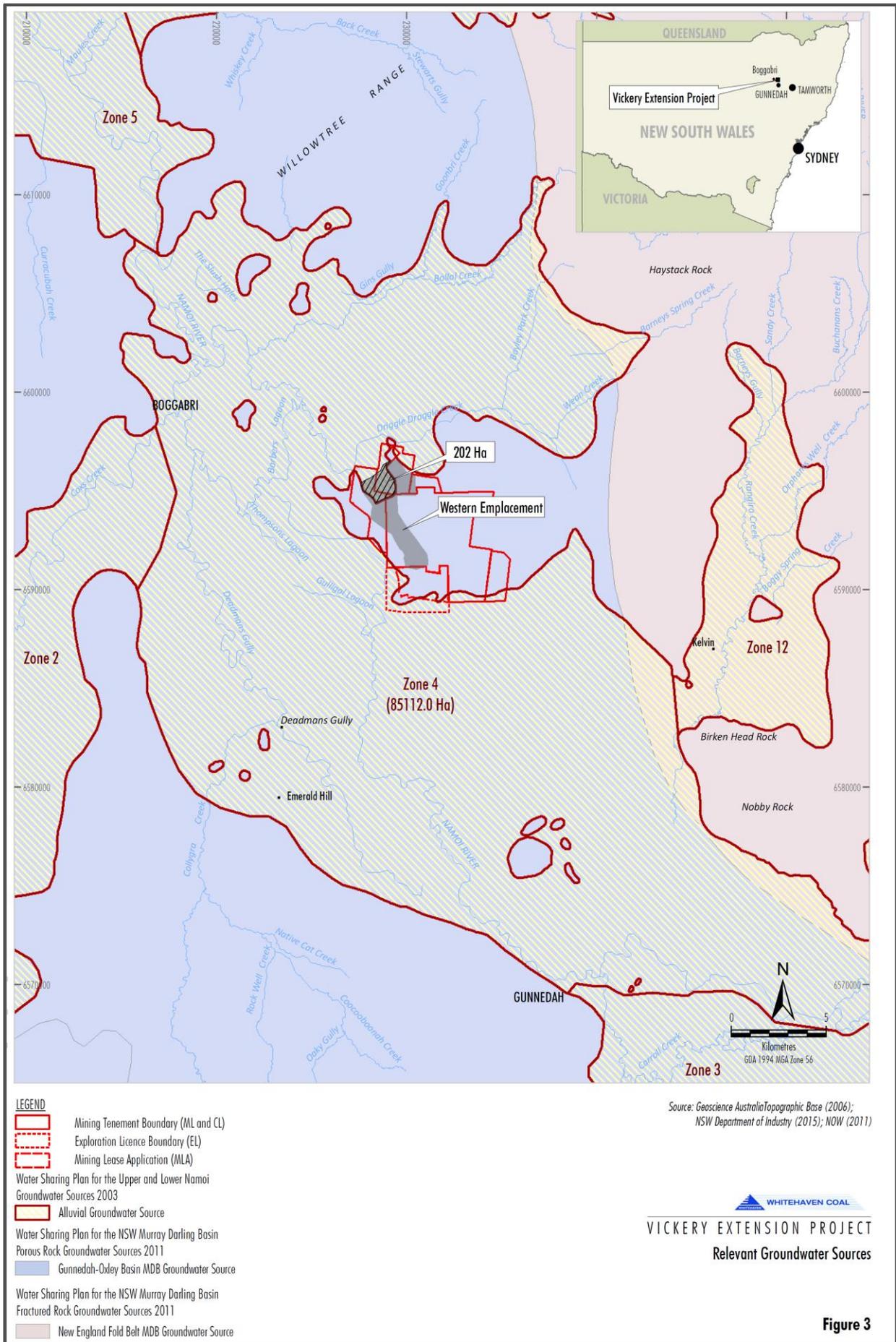


Figure 26 | Area of alluvium affected by Western Emplacement Area

Final Void

281. The proposed final void would continue to function as a groundwater sink, with inflows exceeding outflows and evaporation exceeding rainfall. Inflows are predicted to equilibrate at approximately 0.3 to 0.5 ML/day, sustained primarily from infiltration through the WEA. The predicted equilibrated inflows of the Approved Project voids are approximately 0.8 ML/day in the northern void and 0.6 ML/day in the southern void, therefore there would be a slight reduction in long term pit inflows to the Project void. A pit lake would slowly form at the base of the void, reaching a dynamic equilibrium level of around 120 m AHD after about 300 years post mining (see **Figure 27**).

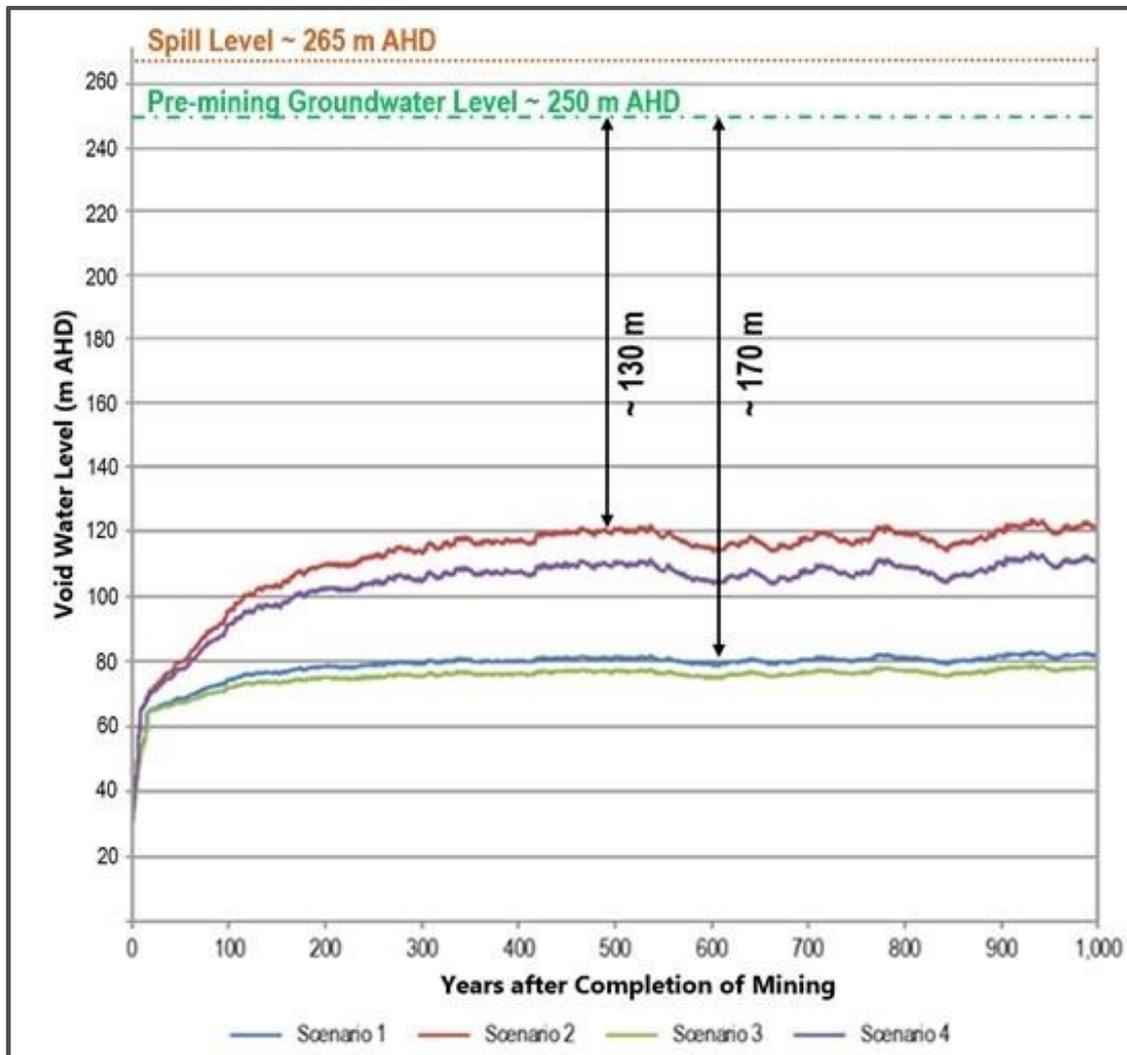


Figure 27 | Modelled final void water levels

282. The predicted lake level would be well below the crest height of the void (around 260 m AHD), and would therefore not spill under any circumstances. This would generally prevent the release of saline water into the surrounding environment, but as a result the salinity of the pit lake would rise over time, reaching a salinity of 11,000 to 14,000 mg/L (higher rainfall cases), and up to 37,000 to 46,000 mg/L (lower rainfall cases) after about 1,000 years post mining.

283. Whitehaven has considered the potential for groundwater impacts from the final voids (existing Blue Vale void and the Project final void) and has concluded that the Project would comply with the minimal impact considerations of the *NSW Aquifer Interference Policy*.

284. In response to the Commission's request to consider the justifications for a final void, Whitehaven conducted additional groundwater modelling of a backfilled void. This modelling indicates that the groundwater levels would increase above surrounding levels, resulting in the flow of water from the backfilled void towards the alluvium (see **Figure 28**). Whitehaven predicts that this would potentially lead to poorer quality water from overburden emplacements in the void flowing towards the alluvium.

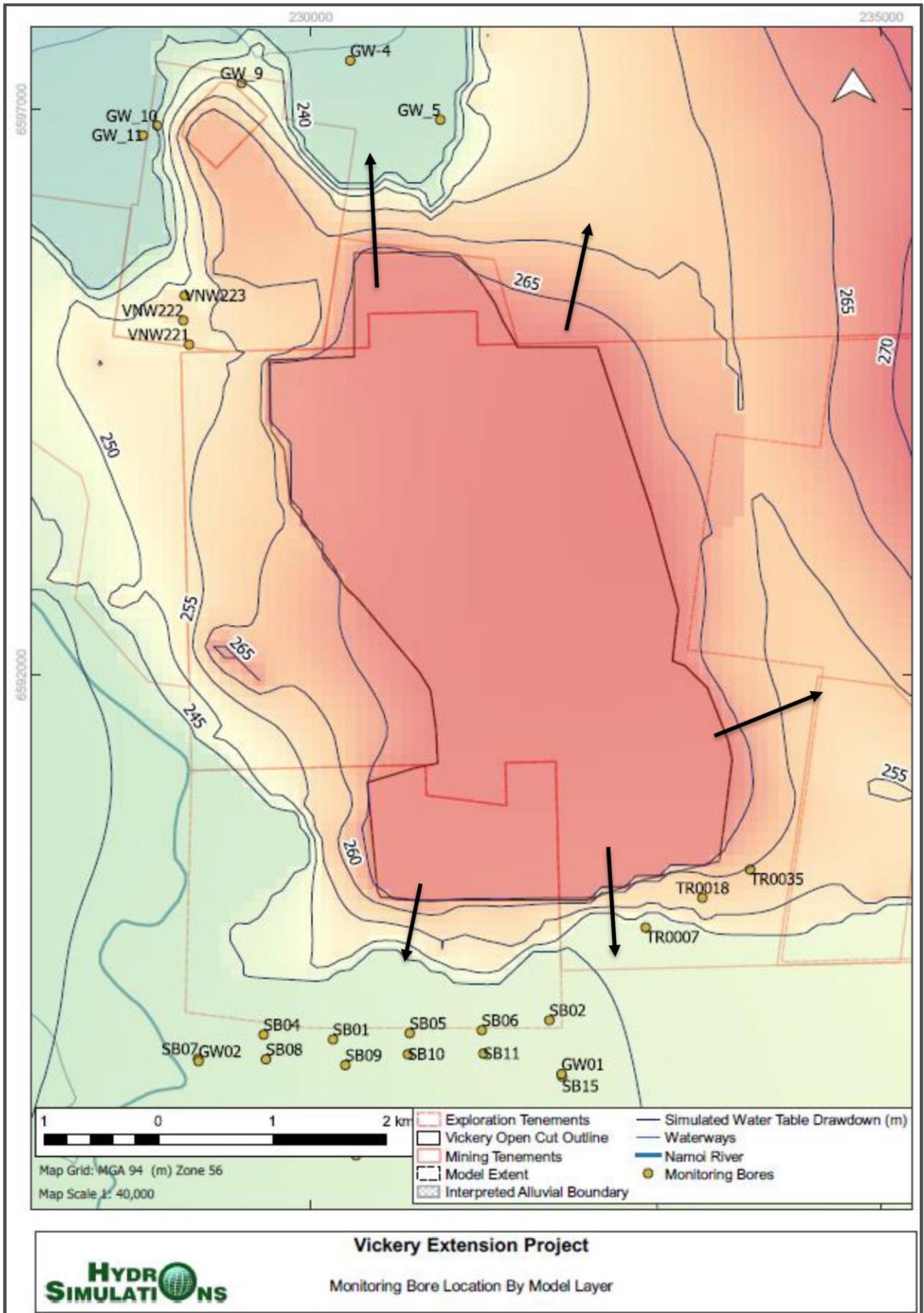


Figure 28 | Simulated water table 100 years after mine closure – backfilled void

285. Whitehaven also estimates that the cost of backfilling the open cut is approximately \$600 million, which it states is conservative as the estimate does not incorporate mine plan redesign costs and potential additional costs associated with overburden haul truck movements.

Department's Consideration

286. The Department accepts Whitehaven's justification for retaining a final void in the rehabilitated mine landform given the groundwater sink created by the void would not affect flows in the alluvial aquifer or groundwater users. Further discussion on other matters relevant to the Department's consideration of the proposed final void is provided in **Section 6.5** (Rehabilitation, Final Void and Landform).

287. Whitehaven's Submissions Report considered the likelihood of density driven flow of a saline plume from the void lake, however this indicates that the depth difference between the void water level and surrounding groundwater is of such a scale that there would be zero risk of this occurring.

288. Whitehaven has committed to ongoing review of the mine plan during operations to minimise the size of the final void (depth and area) and catchment area reporting to the final void, as far as is reasonable and feasible.

289. DPIE Water did not raise concerns with the proposed final void and noted that Whitehaven would need to acquire sufficient entitlements to account for long term water take caused by the groundwater sink created by the void. The Resource Regulator also did not raise concerns with the proposed final void. Consequently, the Department considers that the Project would be unlikely to have any significant impacts as a result of the configuration of the final voids.

290. The independent groundwater expert has indicated that the modelled final void water balance is adequate, however Mr Middlemiss considers additional geochemical analysis and updated modelling could be undertaken to establish the optimum design of the final void, with the modelling results to be used to refine the mine plan during the course of mining operations.

291. Mr Middlemiss has recommended that Whitehaven's mine planners work closely with groundwater consultants and use the final void scenarios during the life of mine planning and optimisation process to minimise operational costs as well as the rehabilitation and post-mining legacy impacts and costs, rather than simply minimising operational costs by minimising overburden emplacement costs.

292. Based on the recommendations of the independent groundwater expert, the Department believes that Whitehaven should be required to optimise the size of the final void, to find a balance between minimising the size and depth of the final void and ensuring water from within the final void does not migrate off the site towards the alluvium. To achieve this, Whitehaven would need to periodically undertake geochemical analysis of the waste rock and other material to be placed in the open cut and update its modelling to predict the likely character of flows into and out of the final void.

293. The Department has therefore recommended conditions requiring Whitehaven to refine its mine plan every 5 years during mining operations to optimise the design of the final landform, taking into consideration long term void and groundwater management, overburden emplacement operations and rehabilitation outcomes. These measures would be described in the Project's Water Management Plan and Rehabilitation Strategy in consultation with DPIE Water, the EPA and Resource Regulator. Whitehaven's performance against these objectives would be monitored and enforced by the Department and Resource Regulator, via the development consent and requirements under a Mining Lease issued under the *Mining Act 1992* respectively.

294. To ensure the Project minimises impacts on groundwater resources, the Department has recommended conditions of consent which include:

- incorporating the results of the ongoing groundwater monitoring program in updated modelling to verify the EIS predictions;
- mine planning to incorporate the results of monitoring and updated modelling to optimise the final void design; and
- the preparation of a Groundwater Management Plan in consultation with DPIE Water and the EPA to describe the baseline conditions, ongoing monitoring program and management measures.

6.2.7 Conclusion

295. The Department has carefully considered the Project's water balance assessment particularly with regard to how Whitehaven proposes to manage its operations to address shortfall in its supply during potentially extended dry rainfall conditions. The Department considers that Whitehaven's modelling has incorporated historical climate conditions representative of the driest period and applied potential variations due to climate change. The Department also considers that the Project could be operated during dry conditions subject to the implementation of water efficiency measures, particularly maximising the reuse of water within the operations, reducing reliance on external supply.
296. The Department notes that Whitehaven's proposal to restrict the open cut to the less permeable hard rock would limit the groundwater drawdown caused by open cut mining operations and long-term post-mining to the hard rock aquifer. The information and sensitivity analysis in Whitehaven's assessments adequately demonstrates that the hard rock aquifer has low connectivity with the alluvial aquifer, therefore minimising impacts of the Project on the productive Upper Namoi alluvial aquifer.
297. The 1 m drawdown caused by the proposed Project borefield to be established in the alluvium is predicted to avoid registered private bores and potential GDEs. The operation of the bores would be regulated under the WM Act, including further review by NRAR in setting bore extraction limits to ensure the rules of the WSP and provisions of the WM Act are met to ensure long term sustainable use of the aquifer. No high priority GDEs or privately-owned bores, including the Boggabri town water supply bore, would be impacted by a 2 m drawdown caused by the Project, with the closest affected bore predicted to experience a drawdown of less than 0.2 m.
298. The Department considers the potential impacts of the overburden emplacement on the alluvial aquifer, particularly due to the seepage of pollutants from the emplacement, can be adequately managed through design of the emplacement to direct the potentially polluted seepage towards the final void and monitored through a TARP to be developed as part of the Water Management Plan for the Project.
299. Therefore, the Project is predicted to comply with the minimal impact criteria of the AIP. Notwithstanding, the Department has recommended conditions of consent that require Whitehaven to ensure the impact of the Project on groundwater, including private bores, is negligible (i.e. no worse) compared with the predictions in the EIS modelling and to provide compensatory water supply in the unlikely event of a loss in water supply caused by the mining operations of the Project.
300. The independent expert, Mr Middlemiss, considers the groundwater modelling is fit for purpose for the assessment of the project and has recommended that ongoing groundwater model development supported by a robust monitoring program
301. In regard to flooding impacts, the flood modelling predicts that the Project would comply with the flood impact criteria of the recently gazetted *Floodplain Management Plan for the Upper Namoi Valley Floodplain 2019* (FMP). As outlined above, Whitehaven has committed to construct the rail viaduct on piers to the west of the Namoi River to ensure that there would be minimal obstruction to flood flows up to the 1 in 100 year average recurrence interval (ARI) design flood, which is in excess of the FMP requirement to assess impacts on flood flows up to the 1 in 20 year ARI design flood. The Department, the independent flood expert, and DPIE Water's flood experts consider that the rail spur line can be designed and constructed such that the 1 in 100-year design flood can be conveyed without exceeding the impact criteria in the FMP.
302. In regard to surface water impacts, the Project includes a water management system that is designed to separate clean water and dirty water, with the dirty water to be reused through the mining operations and to include controls to ensure any coal contact water is not discharged from the site. This is a standard water management approach for the mining industry. In addition, the overburden emplacement would be design and constructed to direct seepage toward the open cut and final void, with surface runoff directed to sediment detention basins for reuse in the mine's water management system. The sediment dams would be maintained until successful rehabilitation of the emplacement and the cessation of mining operations.

6.3 Amenity Impacts

303. The key amenity issues identified in the Commission's Issues Report are outlined in **Table 9** below and considered in detail in the following sections.

Table 9 | Commission Issues Report – Amenity

Issues requiring further consideration
Air and Noise Modelling <ul style="list-style-type: none">Justification for worst-case years used for the noise and air assessments and whether modelling should be undertaken for every year of the mine life.
Noise <ul style="list-style-type: none">Construction hours outside standard hours of the Interim Construction Noise Guideline.Rail noise impacts – monitoring of noise levels from the existing rail viaduct at Leard Forest mines and increased noise from rail viaduct superstructure.Consideration of noise and blast exceedances at other Whitehaven mines and implementation of recommendations from Noise Audit at Maules Creek Coal Mine.
Blasting <ul style="list-style-type: none">Establish blast criteria for Kurrumbede homestead.
Air Quality <ul style="list-style-type: none">Clarification of why dust levels are lower for the Project compared to the Approved Project, including comparison of modelling assumptions.
Mine infrastructure Area <ul style="list-style-type: none">Need for acoustic cladding of the CHPP.Modelling an option of relocating CHPP and rail spur 400 m to the east of the proposed MIA location and within secondary infrastructure area to the south-east – quantifying costs and benefits.

6.3.1 Amenity Setting

304. The Project site is located in a rural area, with the closest urban settlements being the townships of Boggabri, approximately 13 km to the north-west, and Gunnedah, approximately 25 km to the south.
305. Whitehaven has purchased a large proportion of the landholdings in and around the site. The nearest private residences are located to the west/ south-west of the mine, the closest of which are located on the Mirrabinda property (property 127) including receiver 127c, located approximately 1.7 km from the infrastructure area and 127b, approximately 2 km from the Western Emplacement Area (WEA) (see **Figure 6**). The Department notes that the development consent for the Approved Project includes conditions granting acquisition rights to the owners of Mirrabinda. Additional privately-owned properties are located to the south and south-east, approximately 4 km or more from the mining operations.
306. Seven receivers are located within approximately 1 km of the proposed rail spur, which traverses the flood plain with minimal topographic shielding or attenuation. One additional receiver location within 1 km of the rail line (receiver 144) has development approval for a dwelling but construction of this dwelling is yet to commence.
307. Two receivers are located within approximately 500 m of Blue Vale Road, which is the primary haul route for the Approved Project. These receivers are currently subject to road noise from daytime haulage of coal from the Tarrawonga coal mine.
308. Ambient noise and dust levels at all surrounding receivers are relatively low and are characteristic of the rural setting. Baseline noise data from 3 representative monitoring locations concluded that Rating Background Levels (RBL) at all residences are 35 dBA or less during the day and 30 dBA or less during the evening and night. Annual average PM₁₀ concentrations are between 10 to 14 µg/m³ (compared to the criteria of 25 µg/m³).
309. Key elements of the Project that would potentially increase amenity impacts on receivers compared with the Approved Project include (see **Figure 5**):

- the operation of the CHPP, rail load out facility and rail movements along the spur line across the Namoi River floodplain;
 - increased intensity of mining operations but over a shorter timeframe; and
 - locating the Mine Infrastructure Area (MIA) closer to the residences to the south-west.
310. The air and noise modelling predicted operational emissions for three representative mine plan years (Years 3, 7 and 21) under both neutral and noise-enhancing weather conditions.
311. The Commission's Issues Report recommended the Department consider Whitehaven's demonstration of which years are the 'worst-case' years for operations and to consider the predicted noise and air quality emissions and impacts at sensitive receptors for all years of operation to verify the likely worst-case years.
312. Whitehaven's Submissions Report includes further details which demonstrates that the years selected for modelling represent the worst-case operational scenarios. As the location of noise sources from the fixed plant in the MIA remain unchanged, the key variable in the noise and air assessments is the location and intensity of the mobile fleet. Whitehaven provided further analysis using a year by year scheduling assessment of the extraction and movement of overburden and ROM coal and proximity to receivers to demonstrate that Years 3, 7 and 21 are representative of worst-case years.
313. The EPA has advised the Department that it considers that the adopted scenarios are appropriate and there is no need to model every year of operation.
314. The Department also notes that the noise criteria would apply over all years and that Whitehaven would be required to manage its operations to meet the criteria regardless of year to year variation in the mobile fleet location.

6.3.2 Noise and Blasting

315. The EIS includes an assessment of the noise and blasting impacts of the Project by Wilkinson Murray which was peer reviewed by SLR Consulting. The noise and blasting assessment (NBA) predicted the potential worst-case noise and vibration levels at privately-owned residences and evaluated the potential health and amenity impacts of these noise levels.
316. The NBA was undertaken in accordance with the *NSW Noise Policy for Industry (NPfI)*, *Interim Construction Noise Guideline (ICNG)*, *NSW Road Noise Policy*, *Rail Infrastructure Noise Guideline* and the *Voluntary Land Acquisition and Mitigation Policy (VLAMP)*.
317. The NBA is based on a range of proposed noise mitigation measures which include:
- excluding the Blue Vale open cut from the Project. This pit was located in the south-west area of the Project mining area near off-site sensitive receivers, and was initially proposed to form part of the Project;
 - restricting certain mining activities during the night, including dumping on the exposed areas of the WEA;
 - developing acoustic bunds along the exposed sections of haul roads within the site and preferentially using more trucks on haul roads further from receivers;
 - noise attenuation of selected mobile plant items;
 - enclosing and partially cladding coal handling equipment at the CHPP;
 - minimising blast areas and delaying blasts during adverse weather conditions;
 - implementing standard best practice measures for blasting to minimise safety risks associated with fly rock; and
 - real-time monitoring of noise, blasting and meteorological conditions and adapting operations to reduce noise levels during adverse weather conditions.
318. Key issues raised in public submissions and the Commission's Issues Report that relate to noise impacts of the Project include rail noise, particularly during the night time, cumulative noise impacts, a request to consider alternate locations of the MIA and rail loop and mitigation of the CHPP, such as cladding.

Operational Noise

319. Whitehaven's assessment indicates that the worst-case noise from the mining operations, after applying the relevant noise mitigation measures discussed above, would comply with the Project Noise Trigger

Level (PNTL) criteria of 40 dBA during the daytime at all privately-owned residences surrounding the mine. During the evening and night time periods, noise from the Project would exceed the PNTL of 35 dBA at 5 privately-owned receivers on 3 properties surrounding the mine. The NBA predicts night-time noise levels at all privately-owned residences would comply with the NPfI sleep disturbance criterion of 52 dBA L_{AFmax} .

320. Worst-case noise levels are shown in **Table 10** (with exceedances of the PNTL in bold), and the relevant noise contours are shown on **Figure 29**.

Table 10 | Predicted worst-case noise impacts (exceedances in bold)

Receiver ID	LAeq,15-min dBA					
	Day		Evening		Night	
	Approved Project ^a	Project	Approved Project	Project	Approved Project	Project
127a	38(+3)	30	37(+2)	35	39(+4)	35
127b	44(+9)	36	42(+7)	40(+5)	43(+8)	40(+5)
127c	37(+2)	37	39(+4)	42(+7)	40(+5)	42(+7)
131a	35	30	35	37(+2)	35	37(+2)
131b	34	29	35	36(+1)	35	36(+1)
132	34	28	35	36(+1)	35	36(+1)
133a	35	29	35	35	35	35
All other receivers	<35	<40	<35	<35	<35	<35

Note: ^a at the time of assessing the Approved Project, under the relevant noise policy (NSW Industrial Noise Policy) the applicable daytime PNTL was 35 dBA.

321. **Table 10** also compares the results of the noise assessment for the Approved Project, noting that the NPfI was published since the assessment of the Approved Project, which changed the relevant daytime noise assessment criteria for the Project from 35 dBA to 40 dBA.

322. Of the seven receivers (located on four landholdings) predicted to experience noise at or above the PNTL, the worst-case noise levels generated during operation of the Project would be up to 3 dB greater than the Approved Project at four residences - 127c, 131a, 131b and 132.

323. One residence on the Mirrabinda property (ID 127c) is predicted to experience significant noise impacts (greater than 5 dB above the PNTL) and would be afforded acquisition rights under the VLAMP. An additional dwelling within the same landholding (property ID 127b) is predicted to have moderate impacts as the noise levels are 5 dB above the PNTL. The owners of Mirrabinda are currently entitled to acquisition rights for noise impacts under the Approved Project.

324. The Department notes that Whitehaven has been seeking a negotiated agreement with the owners of Mirrabinda. At this stage, no agreement has been reached. The Department has recommended that, subject to any successful agreement reached between Whitehaven and the owners of Mirrabinda, that the existing acquisition rights for the Approved Project be retained for the Project.

325. The Project would exceed the PNTL by 1-2 dB at three other receivers (property ID 131a, 131b and 132) which is characterised as a negligible impact under the VLAMP. In accordance with the NPfI, the Department has recommended operational noise criteria as predicted in the NBA and Whitehaven would need to apply reasonable and feasible mitigation at the Project to strictly comply with these criteria. Whitehaven has also advised the Department that it has commenced negotiations with a further 6 landowners in closer proximity to the MIA and rail spur line, associated with amenity impacts from noise, air and visual/ lighting impacts. At this stage, the Department understands no negotiated agreements have been reached.

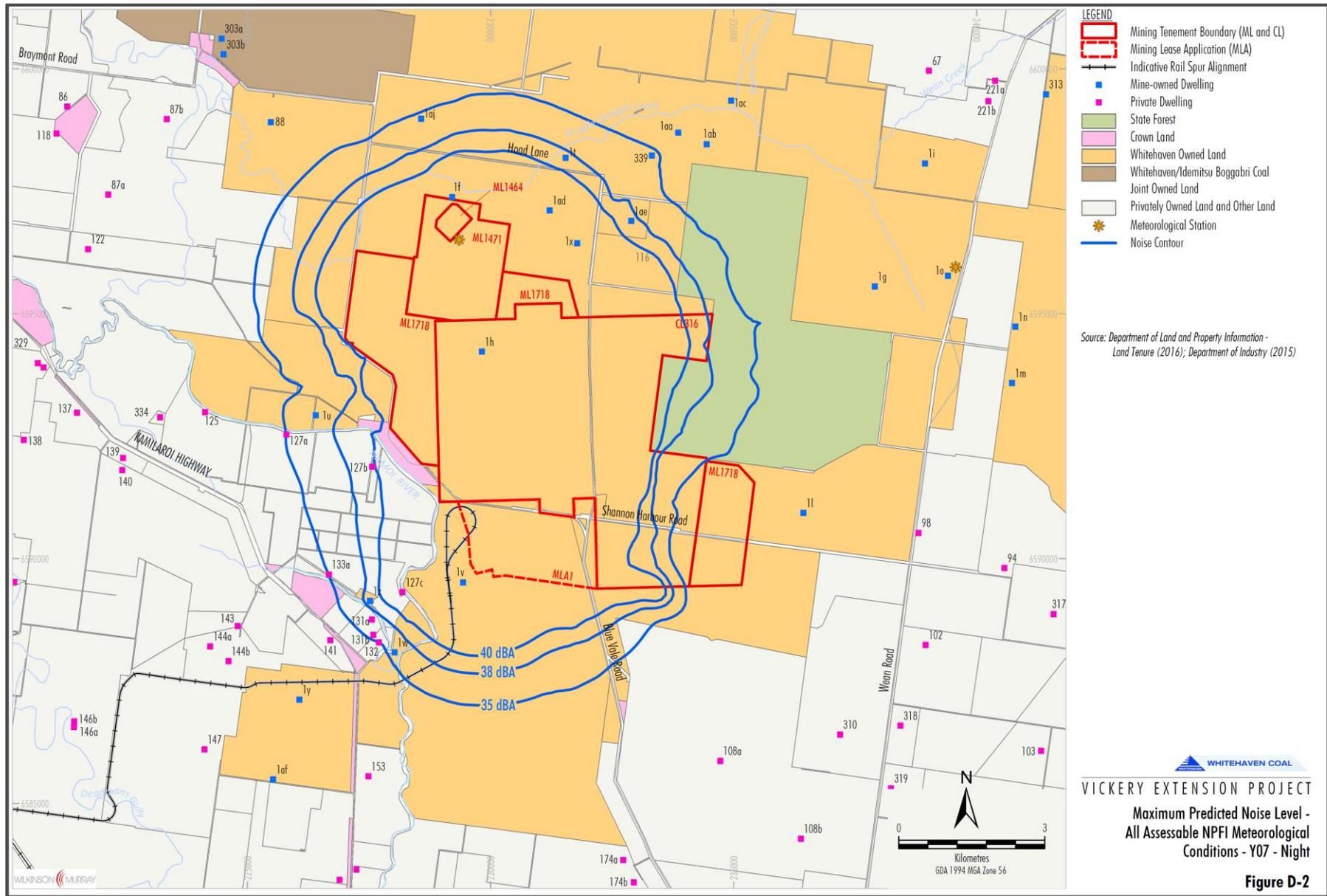


Figure 29 | Noise level predictions

326. The EPA raised concerns about the assessment of low frequency noise (LFN) for the Project, and sought clarification about the application of low frequency correction factors in the noise impact assessment. Whitehaven provided additional information in its Submissions Report to demonstrate that LFN would not be a dominant factor at surrounding receivers and therefore a modifying factor penalty under the NPfl would not apply.
327. The EPA indicated that while some residual uncertainty remains, this could be addressed through the application of modifying factors if LFN is detected during monitoring of the Project, in accordance with the NPfl.
328. In response to the Commission's Issues Report, Whitehaven's Submissions Report summarises the results of independent environmental audits of noise and vibration performance at its other mines in the region between April 2013 and February 2019. Over this period, monitoring has indicated compliance with noise and blasting criteria with isolated exceedances of noise criteria and blast overpressure and no exceedance of vibration limits.
329. Whitehaven has committed to implement the relevant recommendations from the Maules Creek Mandatory Noise Management Audit in its design of the Project, including the use of lower SWL equipment, noise attenuation at the CHPP and other design measures.

Department's Consideration

330. Based on the noise assessments and supplementary information from Whitehaven, the Department accepts that LFN is unlikely to be a significant issue for the Project, and that the Project would be unlikely to trigger the LFN criteria and application of modifying factors.
331. To ensure this occurs, the Department has recommended conditions consistent with the EPA's recommendations, requiring Whitehaven to implement all reasonable and feasible measures to minimise LFN and monitor the noise levels in accordance with the requirements of the NPfl.
332. The NBA includes a cumulative noise assessment which indicates that the combined noise from the Project and surrounding mines would not noticeably increase noise levels compared with those generated by each individual operation (i.e. the cumulative noise would be no greater than 2 dB above the noise generated by individual mining operations).
333. In response to questions raised about similar predicted noise levels generated at the Project compared with the Approved Project, despite an increase in production rate and new infrastructure (CHPP and rail load out/ loop), Whitehaven's Submissions Report notes the modelling incorporates improvements in acoustic design since the Approved Project. Stated improvements include the design of the overburden emplacement, haul roads and mining plan along with lower sound power levels of mining fleet, achieved through attenuation and testing.
334. The EPA recommended including a condition that measurements be performed on all items of plant and equipment at the premises to confirm that the SWLs can meet or better the modelled levels in the NBA, prior to operation on the site.
335. The Department's recommended conditions regulate the noise generated by the Project by setting limits at the receiver, rather than regulating or measuring noise generated by individual plant at the source. This is consistent with the assessment approach in the NPfl and through any Environment Protection Licence (EPL) that would be required for the site.
336. In recognition of Whitehaven's commitment to attenuate the mining fleet to minimise noise generated during full production, the Department has recommended conditions requiring Whitehaven to implement a program to evaluate the effectiveness of the mining fleet noise attenuation on a rolling 3 yearly basis and to maintain the attenuation to a suitable performance standard.
337. Subsequent to the Submissions Report, Whitehaven advised (see **Appendix G6-7**) that it proposes to use mining fleet from its other operations in the region during the initial years of the Project.
338. The Department notes that the initial stages of the Project development and mining operations would involve reduced fleet numbers compared with the full-scale operations assessed in the worst-case

scenarios. Therefore, the Department accepts that the use of attenuated machinery during the first few years of operation at the mine would not be essential to ensure the noise from mining operations meets the operational noise criteria.

339. Regardless of the equipment used at the mine, Whitehaven must comply with the noise criteria in the development consent and EPL at surrounding receivers.
340. The Department also notes that the noise modelling for the Approved Project predicted compliance with the noise criteria at all private receivers (except for those granted acquisition rights) and the development consent does not explicitly include the requirement to use noise attenuated fleet.
341. For these reasons, the Department considers that the use of older mining fleet during the initial years of the Project is reasonable, and it has recommended a condition requiring Whitehaven to attenuate its mining fleet once the extraction of ROM coal increases above the 3.5 Mtpa threshold (i.e. the lower limit of the Approved Project).

Construction Noise

342. Noise from construction activities at the mine site is predicted to comply with the relevant construction noise criteria (45 dBA) during standard construction hours (7 am to 6 pm Monday to Friday and 8 am to 1 pm Saturday) at all properties with the exception of receiver 127c, predicted to experience noise levels of up to 46 dBA, a 1 dB exceedance.
343. The construction of the rail spur is predicted to comply with construction noise criteria during standard hours at all receivers, except at the location of an approved (but yet to be constructed) dwelling on property 144, predicted to experience noise levels up to 47 dBA or 2 dB above the relevant criteria.
344. Whitehaven has committed to manage construction activities to ensure construction noise complies with the “Noise Affected” noise management level of 45 dBA at affected receivers, including at the site of the proposed dwelling at property 144 (if a dwelling is built prior to completion of construction).
345. The Commission’s Issues Report recommended consideration of Whitehaven’s justification to carry out construction activities outside the standard hours set out in the ICNG.
346. Whitehaven noted that construction activities would generally be undertaken between the hours of 7 am to 6 pm, Monday to Sunday, with the exception of the following:
 - activities that cause $L_{Aeq(15 \text{ minute})}$ noise levels of no more than 35 dB at any privately-owned residence, or at a higher level that has been agreed with the resident;
 - deliveries required to be undertaken outside of normal construction hours for safety reasons; and
 - emergency work to avoid loss of life, damage to property or to prevent environmental harm.
347. Whitehaven’s response indicated that construction outside standard construction hours is required to accommodate a specialist workforce for rail construction and to reduce the construction program by approximately 2-3 months. Whitehaven also proposes to schedule low intensity construction activities outside the standard construction hours where possible, to minimise noise during those periods.
348. The Department acknowledges there would generally be amenity advantages in completing construction activities sooner and the progressive nature of constructing the rail line would limit the duration of impacts at each receiver (compared with a static construction site). The Department also notes Whitehaven’s need to procure a specialist rail construction workforce is a determining factor in extending its proposed construction hours.
349. Given Whitehaven proposes to operate the mining activities on a 24/7 basis there may be justification to carry out construction outside standard hours if the construction noise is within the operational noise limits. The NBA predicts construction noise levels would comply with the recommended Project daytime operational noise criteria (40 dBA) at all but three receivers (127c, 132, 144b). The Department also notes that Mirrabinda (property 127) would be afforded acquisition rights under the VLAMP.
350. Noise generated during construction of the rail spur outside standard construction hours would potentially exceed the relevant daytime operational PNTL of 40 dBA at receivers 132 (40 dBA) and

144b (42 dBA). Given the predicted exceedance is within 1-2 dB, under the VLAMP this construction noise would be characterised as a negligible impact if it were operational noise from the mine.

351. To ensure Whitehaven minimises noise generated during construction outside the standard hours, the Department has recommended the application of mining operational noise criteria to construction activities at the mine and the rail spur.
352. Given these considerations, the Department agrees that it is reasonable for construction of the Project to occur outside the standard construction hours subject to compliance with strict operational noise criteria. Consequently, the Department considers that construction activities could be undertaken outside the standard construction hours without generating unacceptable noise impacts on potentially affected residences.

Blasting and Vibration

353. The NBA assessed potential ground vibration, airblast overpressure and flyrock impacts of the Project on surrounding sensitive receivers, which include privately-owned residences, the Kurrumbede Homestead and other mine-owned residences. The NBA predictions are based on an analysis of Hunter Valley mine blasting records and offset distances to surrounding residences and buildings
354. The blasting assessment indicates that the development would comply with the applicable amenity and structural damage criteria at all surrounding private residential receivers, consistent with the limits imposed on the Approved Project.
355. Whitehaven proposes to conduct blasts between the hours of 9 am and 5 pm Monday to Saturday and limit the frequency of blasts to five, occasionally up to six blasts per week.
356. To manage safety risks associated with fly rock and to ensure public safety, Whitehaven would close and restrict public access within 500 metres of blasting activities, including on the re-aligned Blue Vale Road.
357. The Department has recommended conditions to generally apply the blast frequency and operating hours recommended in the ANZECC blasting guidelines (i.e. 1 blast a day, 5 blasts a week).

Kurrumbede Homestead

358. The NBA has estimated that blasting at the mine would generate overpressure of approximately 120.2 dB and ground vibration of approximately 9.7 mm/s at the Kurrumbede Homestead, within the nominal criteria of 133 dB for overpressure and 10 mm/s for vibration as recommended in *Australian Standard 2187.2-2006 Explosives – Storage and Use – Part 2 Use of explosives*.
359. The Commission's Issues Report recommended that the Department's assessment consider whether the blasting criteria determined for the Kurrumbede Homestead will protect the Homestead from damage due to blasting.
360. The NBA recommends inspection of the homestead by a structural engineer to establish if the nominal 10 mm/s vibration criteria is appropriate and Whitehaven has committed to comply with the criteria established by a structural engineer. Therefore, the Department has recommended conditions requiring Whitehaven to engage a structural engineer to inspect the homestead and establish the appropriate vibration limits to protect the heritage values of the property. The Department has recommended the application of a 10 mm/s vibration limit and 133 dB overpressure limit for the Kurrumbede Homestead, unless the structural engineer's inspection recommends more appropriate limits.
361. Given the above, the Department considers that blasting operations can be readily managed to meet the applicable amenity and structural damage criteria. To ensure this occurs, and to appropriately manage blasting activities, the Department has recommended conditions requiring Whitehaven to:
 - manage blasting operations, including regular blast monitoring, to comply with all relevant criteria at privately-owned properties;
 - limit blast frequency and hours to be consistent with the ANZECC blasting guidelines;
 - keep residences notified and up to date regarding blasting operations, and facilitate feedback and complaint management;

- provide for structural property inspections and investigations on request;
- repair any structural damage to buildings or infrastructure caused by the development;
- manage blasting operations to avoid fly rock related safety risks;
- minimise blast fumes; and
- develop a comprehensive Blast Management Plan.

Rail Transport Noise

362. The NBA considers the noise generated by rail transport of coal from the Project CHPP along the rail spur to the Werris Creek Mungindi rail line and from this point to the Muswellbrook Junction, in accordance with the relevant requirements of the RING. The NBA is based on 10 train movements (passbys) per day including 6 during the day and 4 during night time.
363. The NBA predicts that noise from the rail spur between the mine and the main rail line would comply with the relevant noise criteria at all privately-owned receivers at all times during adverse weather conditions. The NBA indicates the approved, but not yet built, dwelling on property 144 may experience negligible exceedances (1-2 dB) during the night time, with the implementation of reasonable and feasible mitigation measures.
364. Whitehaven's Submissions Report includes further discussion of rail noise in response to the Commission's recommendation to analyse noise data from the existing Maules Creek Rail Spur viaduct.
365. Whitehaven carried out noise monitoring of coal trains travelling along the Maules Creek Rail Spur during November 2016. The results were incorporated into the noise model to demonstrate how this would translate to noise levels at receivers around the Project rail spur. Based on these results, the modelling predicts compliance with rail noise criteria under the RING at all privately-owned receivers, except for a negligible (1.6 dB) exceedance of the night time criteria at the approved dwelling on property 144. This is consistent with the modelling predictions in the NBA.
366. The Department notes that the Maules Creek Boggabri rail spur has been designed with minimal noise mitigation or damping and would represent a conservative and unlikely noise scenario for the Project. The Department is of the view that the Project rail spur can be designed with reasonable and feasible noise mitigation to effectively reduce the relative rail transport noise levels at the affected receivers by approximately 4 to 10 dB, compared with the noise predictions based on the Maules Creek Boggabri rail noise monitoring results.
367. Whitehaven has committed to incorporate all reasonable and feasible noise mitigation into the detailed design of the Project rail spur. Whitehaven would also commission a peer review of the design and commissioning to identify measures and controls to minimise the noise impacts associated with the operation of the rail line.
368. The Department considers this would adequately manage noise generated by rail transport operations to acceptable levels in accordance with the RING, and has recommended conditions requiring Whitehaven to:
- implement reasonable and feasible noise mitigation measure in its design of the rail spur;
 - undertake commissioning trials to determine the optimum train speeds to minimise noise;
 - comply with rail noise criteria;
 - monitor noise generated by train movements along the Project rail spur to verify predictions in the NBA, the effectiveness of mitigation measures and compliance with rail spur line noise criteria, including during adverse weather conditions (inversions); and
 - include procedures to respond to complaints.
369. The Department has also recommended a condition requiring Whitehaven to submit a report to the Department which describes the recommended measures and those to be implemented in the design of the rail spur.
370. The NBA also estimates the likely noise generated by transport of coal along the Werris Creek Mungindi Rail Line at five sections between the junction with the Project rail spur and the Muswellbrook Junction.

371. The NBA predicts the Project would increase noise levels along the WCM line by between 0.4 and 1.3 dB when the Project is compared with the Approved Project (i.e. the incremental change based on currently approved operations at the Gunnedah CHPP). Compared with the current scenario (i.e. without the Approved Project) the increase in rail noise is predicted to be 0.9 to 1.3 dB. Both scenarios are within the maximum 2 dB increase permitted under the RING.

Road Transport Noise

372. During the initial years of mining, until the Project CHPP and rail spur are operational, Whitehaven proposes to transport coal from the Vickery mine via the approved road transport route to the Gunnedah CHPP. Coal would be transported from the Project by road consistent with the restrictions placed on the Approved Project, limited to the hours of 6 am to 9:15 pm Monday to Friday, 7 am to 5:15 pm Saturday and no transport on Sundays and public holidays.

373. Whitehaven would also limit road coal transport rates (i.e. transport of Project coal combined with coal transported from the Tarrawonga mine) to 3.5 million tonnes of ROM coal per year and 4.5 million tonnes per year if the Kamillaroi highway overpass is constructed, consistent with the Approved Project.

374. The NBA predicted the maximum road traffic noise during two scenarios at the two receivers along Blue Vale Road, representing Year 1 (road transport up to 3.5 Mtpa) and Year 8 (nil coal transported by road) of mining operations.

375. The NBA compared these results with the existing road noise conditions and the predicted road noise generated by the Approved Project.

376. The NBA modelling indicates that the road noise generated by the Project would be lower than the predicted noise generated by the Approved Project, except during Year 1 daytime when noise levels would be marginally greater (by up to 0.3 dB). In all scenarios the road traffic noise is predicted to comply with the day and night time road noise criteria at the two receivers on Blue Vale Road. The relative increase in noise due to the Project compared with existing conditions is up to 4.5 dB and well below the 12 dB maximum permitted relative increase in road traffic noise under the RNP.

377. The Department notes that the NBA does not assess road noise generated by coal transport of up to 4.5 Mtpa, which is proposed once the Kamillaroi highway overpass is operational (to be built in the event combined transport on Blue Vale road exceeds 3.5 Mtpa). These impacts were assessed for the Approved Project, which found that noise levels would be less than or equivalent to the noise levels associated with the continued use of the Kamillaroi Highway. The Department recommends retaining the restrictions imposed on road transport noise under the Approved Project development consent should Whitehaven construct the highway overpass and transport in excess of 3.5 Mtpa of coal by road.

6.3.3 Air Quality

378. The EIS includes an air quality and greenhouse gas assessment report by Ramboll Environmental in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) (Approved Methods).

379. The modelling incorporates air quality mitigation measures that were considered against the Katestone best management practice measures, including:

- limiting haul truck vehicle speeds, use of larger vehicles using water carts and/or dust suppressants on haul roads, assuming a 90% control efficiency for dust suppression;
- water sprays and wind shielding on coal stockpiles and processing areas;
- stabilising disturbed surfaces and minimising stripping areas; and
- minimising drop heights for dumping of overburden.

380. The air quality assessment predicts that the 24-hour and annual average PM_{2.5}, PM₁₀, TSP and dust deposition levels from the Project would meet applicable criteria at all private receiver locations for all stages of the mine. Predictions also found that the Project would comply with the Approved Methods criteria for PM_{2.5} of 8 µg/m³ (annual average) and 25 µg/m³ (24-hour average).

381. Predictions for the Approved Project indicated that property 127 would have experienced exceedances of the cumulative 24-hour PM₁₀ criteria over more than 25% of the landholding in the early years of mining (Year 2). However, the updated assessment indicates this would no longer be the case for the Project.
382. Submissions and the Commission's Issues Report raised questions about the predicted emissions from the Project being lower than those for the Approved Project, despite factors such as an increased production rate, larger mining footprint and overburden stockpile that suggest the air quality impacts would be greater.
383. Whitehaven indicated in its Submissions Report that the improved air quality modelling results are due to the changes in operations and layout of the Project, such as no longer crushing and scraping gravel on site, operating a single open pit (opposed to two for the Approved Project) and the incorporation of improved emission control factors including a haul road dust control, enclosed ROM hopper and overburden handling in the air quality modelling.
384. The Department and EPA consider that the adoption of improved emissions control factors in the air quality modelling is appropriate given the emission reduction efficiencies are based on verified results of air quality mitigation at other operating mines in the region.
385. The Department has recommended a number of conditions to mitigate and manage air quality impacts in general, including requiring Whitehaven to comply with the applicable air quality criteria for privately-owned properties and to develop a comprehensive air quality management plan which would include real-time air quality monitoring, predictive modelling and meteorological forecasting to manage operations.
386. The modelling also indicates that cumulative dust emissions from the Project would likely affect up to five mine-owned residences and project only emissions affecting one mine-owned residence. To address potential impacts on tenants of these residences, the Department has recommended conditions ensuring that Whitehaven informs the tenants of the potential health-related impacts of dust emissions and allows them to terminate their lease agreements without penalty if they wish to do so.

6.3.4 Mine Infrastructure Area - Relocation Options

387. In its Submissions Report, Whitehaven provided a comparative analysis of relocating the MIA at three locations, two approximately 400 m to the east of the existing MIA with incorporation of a noise mitigation bund, and an option of relocating the MIA to the secondary infrastructure area to the south-east of the mine.
388. Whitehaven's analysis demonstrates that the alternate configurations of the CHPP to accommodate a noise mitigation bund would likely improve noise conditions at receivers to the south-west of the Project. This includes the two properties that are predicted to experience minor exceedances of the noise criteria in the Project scenario (see **Section 6.3.2**).
389. However, Whitehaven has discounted these options due to the additional costs compared with the Project, associated with sterilized coal resource, infrastructure costs and earthworks. Whitehaven concluded that the footprint of a 20 m high noise mitigation bund would need to be approximately 400 m wide to ensure the stability of the landform, therefore requiring a relocation of the CHPP and MIA to accommodate the bund. Whitehaven estimates the consequences of this reconfiguration would range between \$1.4 billion to \$2.1 billion in sterilised resource, plus additional costs associated with amended infrastructure and earthworks.
390. Whitehaven also analysed the potential relocation of the MIA to the secondary infrastructure area to the south-east area of the Project. This option was discounted due to significant additional infrastructure costs associated with relocation of the rail loop (approximately \$70 million) and additional earthworks (\$15 million). Whitehaven also noted the potential increased amenity impacts on receivers to the south-east and further assessment of potential biodiversity and Aboriginal heritage impacts.
391. Based on the above analysis and given the nature of the predicted amenity impacts associated with the proposed configuration of the CHPP, the Department considers the proposed layout of the Project

strikes a reasonable balance between amenity impacts and maximising the operational efficiency of the Project.

6.3.5 Conclusion

392. The key elements of the Project that differ from the Approved Project include the CHPP and rail loading facility at the mine and the Project rail spur, which would replace the transport of coal by road once constructed.
393. The Department's assessment has found that the impacts of the Project on the amenity of private residences from air, noise and blasting activities would be comparable to that of the Approved Project. However, the Department acknowledges that the Project's rail spur line introduces a new infrastructure element closer to rural residences.
394. During the worst-case noise weather conditions, the operational noise from Project is predicted to increase at four receiver locations compared with the Approved Project, one of which (Receiver 127c) is currently entitled to acquisition rights under SSD 5000 for significant noise and air quality impacts. The Department has recommended conditions which would retain the landowner's ability to request Whitehaven to purchase this property.
395. The operational noise at the three other receivers would be 1 – 2 dB above the noise limits for the Approved Project, a change which would generally be imperceptible. The Department has recommended the application of strict operational noise criteria at these receivers that would require Whitehaven to comply with the predictions in the NBA, which would also be regulated by the EPA through an EPL for the Project.
396. Subject to the adoption of design and implementation of reasonable and feasible mitigation measures, the Project would comply with the relevant rail noise, blasting and air quality criteria at all receivers.
397. Whitehaven proposes to construct the Project Rail Spur on a 7-day basis (7 am to 6 pm Monday to Sunday) due to the need to use a specialised rail construction workforce. Given the predicted noise generated by construction outside the standard hours is within the proposed operational noise criteria at surrounding receivers, the Department considers it is reasonable to allow extended construction hours, subject to the application of operational (rather than less stringent) construction noise limits.
398. Overall, the Department considers that with the implementation of a suite of mitigation and monitoring measures, the Project can be carried out in a manner that minimises its impacts on the amenity of potentially impacted receivers.

6.4 Biodiversity

399. The key biodiversity issues identified in the Commission's Issues Report are outlined in **Table 11** below and considered in detail in the following sections.

Table 11 | Commission Issues Report – Biodiversity

Issues requiring further consideration
• Commonwealth Matters
• Impacts on Koalas - mitigation and offsetting
• Rehabilitation offsets, staging and alternative offsetting mechanisms
• Agreement on offset credit calculations.

6.4.1 Biodiversity Setting

400. The development site largely comprises cleared areas associated with agricultural use and rehabilitated land from prior mining activities. Over the past 50 years the site has been used for agricultural purposes,

including grazing and some intermittent dry land cropping. Because of these historical land uses, most of the Project disturbance area is dominated by grasslands and sparse woodland regrowth.

401. The Project site is located between the Vickery State Forest and the Namoi River, with the Rocglen Coal Mine and National Park estate associated with the Nandewar Range further to the east. The Rocglen Mine has completed extraction of coal and rehabilitation and offsetting requirements/objectives for this mine includes providing connectivity across from national park estate and Whitehaven regional biodiversity offsets to the Vickery State Forest (see **Figure 31**).
402. A key rehabilitation objective for the Project is to create habitat connectivity to the Namoi River in the medium to long term.
403. The EIS includes a biodiversity assessment by Resource Strategies which was peer reviewed by Dr Colin Driscoll (Hunter Eco). A separate aquatic ecology assessment was prepared by Eco Logical Australia. The assessments were prepared in accordance with the *NSW Biodiversity Offset Policy for Major Projects* (the NSW Offset Policy) (OEH, 2014) and *NSW Framework for Biodiversity Assessment* (FBA) (OEH, 2014). The assessments draw on previous assessments and surveys in the region, including for the Approved Project and historic mining activities on the Project site, and surrounding mining operations.
404. The total footprint of the proposed Vickery Coal Mine operations comprises 2,242 ha of land within the Approved Project footprint and 776 ha of additional land within the Project footprint. The biodiversity impacts on the disturbance footprint of the Approved Project has been assessed under the Vickery Coal Project approval.
405. The 776 ha Project footprint includes around 580 ha of native vegetation (78 ha of native woodland, 502 ha of derived native grassland), and a further 196 ha of cleared/exotic grassland.
406. The Project was determined to be a controlled action under the EPBC Act (EPBC 2016/7649) due to the potentially significant impacts on MNES for listed threatened species. However, some areas within the Approved Project footprint were not included in the original 2012 referral decision (EPBC 2012/6263) to the Commonwealth and therefore these biodiversity impacts are required to be assessed. The Commonwealth assessment matters are further considered in **Section 6.4.9** below and **Appendices I and J**.

6.4.2 Vegetation Communities and Threatened Flora

The biodiversity assessment found that most of the Project footprint has been modified to some extent and most of the additional woodland to be impacted is within the Project mining area. The Project rail spur traverses mainly disturbed land, although there are some patches of native woodland near the rail loop, Namoi River crossing and Kamilaroi Highway crossing.

Vegetation mapping identified 6 distinct vegetation communities comprising 502 ha (87%) of native grassland and 78 ha of woodland (13%). A summary of the 6 native vegetation communities, classified by both biometric vegetation types (BVTs) and plant community types (PCTs), identified within the Project disturbance area is provided in **Table 12**.

Table 12 | Native Vegetation Clearing for the Project

Vegetation Community (BVT/PCT)	Mining Area (ha)		Rail Spur Area (ha)		Total
	Woodland	Grassland	Woodland	Grassland	
Poplar Box Woodland on Alluvial Clay Soils (NA185/101)	0.1	61	3.5	18.5	83.1
Pilliga Box – Poplar Box Shrubby Woodland (NA324/397)	22	263	1.2	2.8	289

Vegetation Community (BVT/PCT)	Mining Area (ha)		Rail Spur Area (ha)		Total
	Woodland	Grassland	Woodland	Grassland	
White Box – Silver-leaved Ironbark Shrubby Open Forest (NA349/594)	17	23	-	-	40
Narrow-leaved Ironbark – White Box Shrubby Forest (NA311/459)	33	130	-	-	163
Mixed Marsh Sedgeland (NA201/53)	-	2	-	-	2
River Red Gum Riparian Tall Woodland (NA193/78)	-	-	1	1.7	2.7
Total	72.1	479	5.7	23	579.8

407. Isolated areas of the White Box Grassy Woodland and Yellow Box – Blakely’s Red Gum Grassy Woodland (Box Gum Woodland), listed as an endangered ecological community (EEC) under the BC Act², were identified in the footprint of the Approved Project. Three hectares of the Box Gum Woodland EEC is located within the approved open cut and another 3 ha would be impacted by the Kamilaroi Highway overpass. Approximately 1 ha of the Weeping Myall Woodland, also listed as an EEC under the BC Act³, would be cleared for the Blue Vale Road realignment under the Approved Project.
408. No additional areas of EEC or threatened flora species were identified within the Project disturbance area. Isolated patches of Weeping Myall Woodland EEC are adjacent to the rail loop and will be avoided during construction (**Figure 30**).
409. The Project rail spur also traverses an offset area for the Approved Project (i.e. Offset Area 5) at the Kamilaroi Highway crossing (**Figure 31**). Whitehaven proposes to extend the boundary of Offset Area 5 to include further habitat to the south of the current area, resulting in a 13 ha increase in the total area of the approved Offset Area 5. The Department has increased the area of this offset area in the recommended conditions to account for this disturbance, as discussed in Section 6.4.7 below.

² Listed as White Box Yellow Box Blakely’s Red Gum Woodland

³ Listed as ‘Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions’

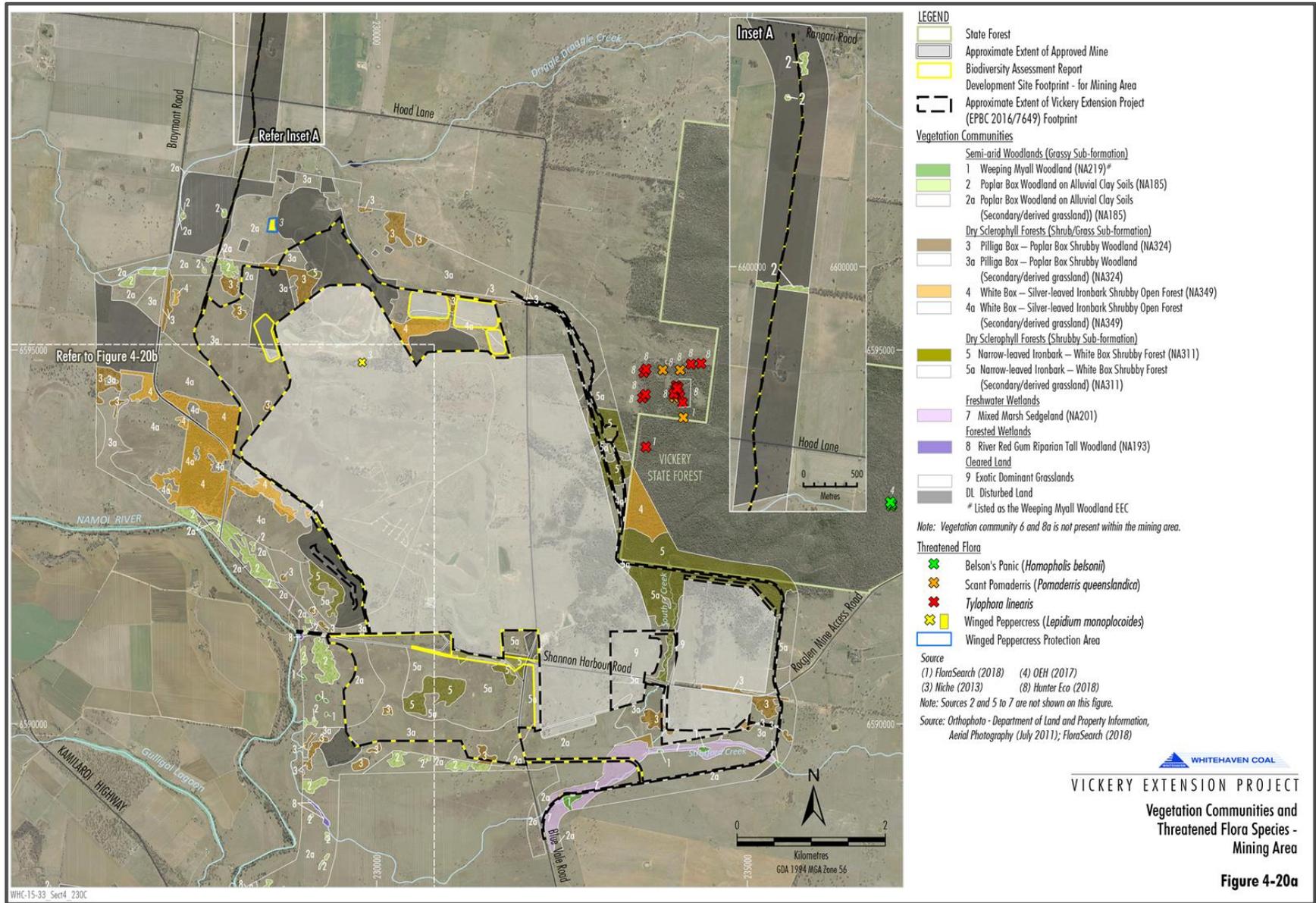


Figure 30 | Vegetation Communities and Recorded Threatened Flora – Project Mining Area



Figure 31 | Vegetation communities – Project Rail Spur

6.4.3 Threatened Fauna

410. Ecological surveys recorded 201 fauna species during surveys, including nine introduced species. 47 threatened fauna species were recorded in the locality of the Project. Of these, 11 threatened fauna species (including 6 birds, 3 bats, and the squirrel glider and Koala) have been recorded within the Project disturbance area and additional 5 in the vicinity of the Project footprint (see **Table 13**). All of these species are listed under the BC Act as ‘vulnerable’ with only the Koala listed under the EPBC Act as vulnerable.

Table 13 | Fauna species recorded within and in the vicinity of the development footprint

Group	Species (common name)	BC Act	EPBC Act	Within Footprint	Significant Impact
Birds	Grey-crowned Babbler, Hooded Robin, Little Eagle, Speckled Warbler	V	-	Yes	No
	Dusky Woodswallow, Turquoise Parrot, Spotted Harrier, Little Lorikeet	V	-	No	No
Mammals	Koala	V	V	Yes	No
	Squirrel Glider, Yellow-bellied Sheath-tail-bat, Eastern Bentwing-bat, Eastern Freetail-bat	V	-	Yes	No
	Eastern Cave Bat	V	-	No	No

Notes: V = vulnerable; E = endangered; CE- critically endangered.

411. Whitehaven’s tests of ecological significance concluded that although the development would result in the removal of habitat for the species recorded on site, the development is unlikely to cause a significant impact on any threatened species and communities, such that a local population would be lost.

Regent Honeyeater

412. The Regent Honeyeater was not recorded during surveys in the Project footprint. A single database record for this species occurs approximately 7.5 km to the south-east of the Project and the closest known breeding area is approximately 40 km north-east of the Project in the Bundarra-Barraba regions.

413. The assessment identified 49.1 ha of potential habitat, requiring 3,703 species credits under the FBA. However, under the BC Act, the Regent Honeyeater is now identified as an ecosystem credit species as “Important Habitat” mapping completed by BCD does not identify core habitat of the Regent Honeyeater within the Project boundary. In this instance, the FBA credits could be converted into reasonably equivalent credits under the provisions of the BC Act and retired as ecosystem credits. This process is undertaken at the time of retiring these credits. That is, while a species credit liability is identified and quantified, the retirement of the ecosystem credits for the relevant vegetation communities would offset the impacts to the Regent Honeyeater.

Koala

414. Whitehaven’s investigations identified 50.3 ha of total potential Koala habitat that would be impacted by the Project, approximately 1 ha of which is core Koala habitat comprised of River Red Gum Riparian Tall Woodland along the Namoi River. Koalas were recorded during surveys along the rail spur line near the Namoi River crossing and also within the rail loop adjacent to the MIA, with no individuals identified within the mining footprint. Of the SEPP 44⁴ preferred feed trees, only River Red Gum (*E. camaldulensis*), White Box (*E. albens*) and Poplar Box (*E. populnea*) were identified within the Project footprint. The biodiversity surveys also identified the secondary feed tree species Pilliga Box (*E. pilligaensis*), Yellow Box (*E. melliodora*) and Blakely’s Red Gum (*E. blakelyi*).

⁴ On 1 March 2020 SEPP 44 was replaced by the SEPP (Koala Habitat Protection) 2019. Under savings and transitional provisions, a development application made, but not finally determined, before the commencement of this Policy must be determined as if this Policy had not commenced.

415. Submissions and the Commission's Issues Report raised concerns about the presence of the Koala and impacts of the Project on Koala habitat. BCD also sought additional information about the assessment of the Project's potential impacts on Koala habitat.
416. Whitehaven's Submissions Report provides further justification for its assessment of potential Koala habitat and the impact calculations against the requirements of relevant NSW and Commonwealth policies including SEPP 44. BCD has accepted Whitehaven's response and indicated that no further assessment of Koala habitat is required. Whitehaven's calculations using the FBA Credit Calculator determined that 1,308 credits would be required to offset the impacts of the Project on Koala habitat.
417. As recommended in the Commission's Issues Report and indicated in Whitehaven's Submissions Report, Whitehaven has progressed the development of the Koala Plan of Management (KPoM) for the Project in consultation with the BCD. The draft KPoM includes measures to minimise disturbance to the core Koala habitat at the Namoi River crossing, pre-clearing surveys, weed management and rehabilitation with species representative of the River Red Gum Riparian Tall Woodland. The Department has included recommended conditions requiring Whitehaven to complete the KPoM in consultation with BCD prior to commencing construction, and to implement the plan during construction and operation of the Project.

Squirrel Glider

418. The EIS identified approximately 74.7 ha of potential squirrel glider habitat within the mine and rail spur footprint. BCD sought further review of the squirrel glider habitat to be impacted by the rail spur and calculation of any additional credit requirements due to impacts on the Poplar Box Woodland on Alluvial Clay Soils.
419. Whitehaven provided supplementary information which indicates 3 separate patches of the woodland that may form potential squirrel glider habitat would be impacted by the rail spur. The additional 1.3 ha of this woodland increases the total area of habitat impacted by the Project to 76 ha, which consequently increased the credit requirements by 77 credits to a total of 1,672 credits. BCD has reviewed Whitehaven's response and is satisfied with the revised calculations.

6.4.4 Groundwater Dependent Ecosystems and Riparian Vegetation

420. The potential for groundwater dependent ecosystems (GDEs) to be affected by the Project was considered as part of the EIS and Whitehaven's Submissions Report (see **Figure 22**). This involved the review of the relevant Water Sharing Plan, the GDE Atlas (Bureau of Meteorology, 2012) and advice from an ecological specialist. Based on this information, Whitehaven concluded that there are no GDEs within the vicinity of the Project that are predicted to be affected by groundwater drawdown, or loss in surface or base flows of watercourses.
421. The potential impacts on riparian vegetation along five waterways within the footprint were considered in the biodiversity assessment, including the impacts of the rail spur crossing the Namoi River, borefield and pipeline across Driggle Draggie Creek. Given the scale of the disturbance, measures to minimise clearing and condition of the vegetation communities in the riparian corridors affected by the Project, the assessment concluded that further changes to the Project or additional offsets would not be required.
422. See further consideration of impacts on GDE and response to the Commission's Issues Report regarding GDE mapping and risk assessments in **Section 6.2** above.

6.4.5 Aquatic Ecology

423. The Namoi River and other naturally occurring watercourses surrounding the Project form part of the Lowland Darling River Aquatic Ecological Community, listed as an EEC under the *NSW Fisheries Management Act, 1994* (FM Act)⁵. At the time of the ecological surveys the Namoi river and tributaries were in a drying phase, however there was sufficient flow in the Namoi to identify habitat for key fish species. At the two monitoring locations in Driggle Draggie Creek the assessment found conditions would be unlikely to provide suitable habitat for threatened fish species.
424. Targeted surveys for threatened aquatic fauna in the Namoi River recorded the Murray Cod (*Maccullochella peelii*), listed as vulnerable under the EPBC Act and the Eel-tailed Catfish (*Tandanus*

⁵ Listed as Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River

tandanus), an endangered population under the FM Act. The Silver Perch, listed as vulnerable under the FM Act, was not recorded, although considered likely to occur.

425. Whitehaven proposes to avoid dredging or reclamation works in the Namoi River during construction of the Project rail spur. To address potential impacts of the rail spur on the Namoi River and other flow paths such as Deadmans Gully and Thompsons Lagoon, Whitehaven proposes to design the crossings in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI Fisheries, 2013) and, if the construction of a single span crossing is not possible, install a piled foundation through the Namoi River crossing during low flow conditions, with the footing/s designed to maintain fish passage and minimise scour and erosion.
426. With the implementation of the measures in the proposed Water Management Plan, the assessment found that the potential water quality impacts and drawdown impacts of the Project would not significantly impact threatened fauna and would result in no net loss of fish habitat.
427. The assessment concluded that the Project would not have a significant impact on any threatened aquatic species listed under the FM Act, BC Act or EPBC Act. Overall, the assessment considered that the Project has a low potential to impact on aquatic biodiversity, with the Project unlikely to impede fish passage or cause water quality impacts. DPI - NSW Fisheries did not raise any concerns regarding impacts on aquatic resources.
428. The Department has recommended ongoing management and monitoring of potential impacts on aquatic ecosystems and GDEs as a component of the Water Management Plan for the Project. The Department has also recommended conditions to ensure that the project is designed to maintain or improve baseline channel stability and that the Namoi River water extraction system is designed in consultation with DPI – NSW Fisheries, to ensure it is constructed to appropriate standards to minimise impacts on native fish and their habitat.

6.4.6 Avoidance and Mitigation

429. The ecological assessments are based on a suite of avoidance and mitigation measures that Whitehaven would implement to reduce impacts on the biodiversity values of the site, including measures to be implemented as part of the Approved Project. The measures include:
 - designing the mining, overburden emplacement and infrastructure footprint (including amendments to the Approved Project layout) to reduce the overall footprint of the mine, to avoid established woodland where possible and minimise disturbance in other areas;
 - designing the rail spur and access road alignments to minimise impacts on native vegetation and habitat, including threatened ecological communities, species and fauna habitat;
 - controlling weeds, sediment and pollutant runoff during construction;
 - rehabilitation using species characteristic of native woodland, particularly at the rail spur crossing of the Namoi River;
 - planting trees around the site to provide interim habitat for threatened woodland birds;
 - implementing local biodiversity enhancement measures proposed for the Approved Project to be incorporated into the Project (see **Figure 34** below);
 - salvaging topsoil and seed;
 - undertaking weed and feral animal controls;
 - undertaking pre-clearing surveys and progressively clearing and rehabilitating the site; and
 - managing noise, dust, vibration and night lighting emissions from mining operations.
430. The Department and BCD are satisfied with the avoidance and mitigation measures proposed by Whitehaven to avoid impacts on EECs and threatened flora species, and considers that the Project is unlikely to result in any significant impacts subject to the implementation of suitable offsetting measures.

6.4.7 Biodiversity Offset Strategy

431. The EIS includes a biodiversity offset strategy that builds upon the existing strategy for the Approved Project and other mines in the region (see **Figure 32**, **Figure 32** and **Figure 34**. The proposed offsets in and around the Vickery State Forest, and rehabilitation of both the Rocglen and Vickery mines to biodiversity conservation outcomes are an important component of this strategic approach in enhancing remnant habitat corridors along the Namoi River to the Vickery State Forest and back existing offsets and national park estate in the Nandewar Range.

432. The 3,423 ha of approved existing biodiversity offsets includes 2,063 ha of offset lands and rehabilitation of 1,360 ha of land disturbed by the Approved Project and includes:

- the Willeroi East Offset Area – comprising 1,671 ha (including 1,559 ha of native woodland); and
- Offset Areas 2, 3, 4 and 5 – comprising a collective total of 391.5 ha (including 207 ha of native woodland) surrounding the development site;

433. The offsets for the Approved Project were determined prior to the implementation of the *NSW Offsets Policy* and FBA and were based on a land-based ratio approach. The Department has included recommended conditions transferring the offset requirements for the Approved Project into a consolidated development consent.

434. The Project biodiversity offset strategy is in addition to the offset strategy for the Approved Project and comprises:

- proposed additional land-based offsets, including:
 - an additional 13 ha extension of Offset Area 5 established under the Approved Project; and
 - additional 993 ha land-based offsets in the region (i.e. Offset Areas 6, 7, 8 and Mount Somner);
- mine rehabilitation in accordance with the provisions under the FBA including:
 - 482 ha of mine rehabilitation to woodland on the proposed extension area; and
 - 523 ha of additional mine rehabilitation to woodland on the Approved Project footprint that is currently required to be returned to an agricultural land use;
- retiring 869 available credits on Whitehaven’s existing Biobanking site (which totals 13,754 credits) and/or through the Biobanking Public Register; and
- supplementary measures such as contributing to regional biodiversity programs and funds.

The biodiversity assessment determined that the Project would require the retirement of 16,401 ecosystem credits (see **Table 14**) and 6,683 species credits (see **Table 15**).

Table 14 | Biodiversity offset credit requirements

Ecosystem credits	Code		Credits Required		
	BVT	PCT	Mine site	Rail spur	Total
Poplar Box Woodland on Alluvial Clay Soils	NA185	101	2,159	1,381	3,540
Pilliga Box – Poplar Box Shrubby Woodland	NA324	397	6,831	124	6,955
White Box – Silver-leaved Ironbark Shrubby Open Forest	NA349	594	1,795	-	1,795
Narrow-leaved Ironbark – White Box Shrubby Forest	NA311	459	4,025	-	4,025
Mixed Marsh Sedgeland	NA201	53	46	-	46
River Red Gum Riparian Tall Woodland	NA193	78	-	40	40
Total			14,856	1,545	16,401

Table 15 | Species credits required for the Project

Species (common name)	Mining Area	Rail Spur	Total	Credits Required
Regent Honeyeater	43.6 ha	4.5 ha	48.1 ha	3,703
Koala	44.6 ha	5.7 ha	50.3 ha	1,308
Squirrel Glider	72.5 ha	3.5 ha	76 ha	1,672
Total				6,683

435. The EIS indicates that the proposed offsetting measures can meet the ecosystem and species credit requirements for the Project under the *NSW Offsets Policy*.

Ecological Rehabilitation Offsets

436. Whitehaven proposes to rehabilitate 1,005 ha of land disturbed by Project mining activities to woodland/forest communities representative of those at the mine site and in the surrounding biodiversity sub-region. This would comprise 482 ha of land within the Project site and 523 ha of land within the Approved Project footprint (previously approved for rehabilitation to pasture/grassland).

437. Whitehaven has calculated the ecosystem credit value of the ecological rehabilitation at 3,991 credits or around 24% of the total ecosystem credit liability. Whitehaven estimates that the remaining credit liability for the Project would be 6,257 credits which it proposes to retire through additional land-based offsets, purchasing credits on the market, payment into the Biodiversity Conservation Fund (BCF) or other supplementary measures consistent with the FBA.

438. The *NSW Offsets Policy* allows the generation of biodiversity credits from mine site rehabilitation where it can be demonstrated that the rehabilitation has been successful, and the credits have been realised through a biodiversity gain in accordance with Section 12.2 of the FBA – *Generating Biodiversity Credits for Ecological Rehabilitation of Previously Mine Land*. This sets maximum allowable increases in generation of credits based on 10 site attributes, for example native plant species richness and overstorey cover. Accordingly, the ecological rehabilitation credits generated are low (less than a third) compared to credits generated from land-based offsets.

439. The Department notes that Whitehaven is seeking ecological rehabilitation credits for ecosystem credits only, not for species credit species. Whitehaven also advised in its Submissions Report that the focus of rehabilitation credits would be on rehabilitation to *Pilliga Box – Poplar Box Shrubby Woodland* (NA324), as this vegetation community requires the most ecosystem credits and there would be a shortfall in credits in the identified land-based offsets.

440. The Commission's Issues Report recommended the Department's assessment consider the feasibility of mine site rehabilitation and its application as part of the Project biodiversity offset strategy.

441. Whitehaven's Submissions Report analyses the progress of rehabilitation against FBA site attributes at the Werris Creek mine, between Year 3 and Year 8 stages of rehabilitation at five survey plots, and progressive photo points at 2 plots. While there is variation between plots, overall the results show a reasonable trend towards meeting the FBA site attribute scores for ecological rehabilitation. The Department notes that rehabilitation at Werris Creek mine is not seeking rehabilitation credits.

442. Whitehaven's Submissions Report also includes a review of the proposed biodiversity offset strategy against the provisions of the FBA, including analysis of the biodiversity credits that can be generated by mine site rehabilitation. Whitehaven proposes to specify the target woodland communities for rehabilitation, the plant species to be used in revegetation, and the completion/relinquishment criteria in its Rehabilitation Management Plan/ Mining Operations Plan (MOP).⁶

⁶ The Resources Regulator currently uses an approved Mine Operations Plan to fulfil the requirements of the Rehabilitation Management Plan under development consents.

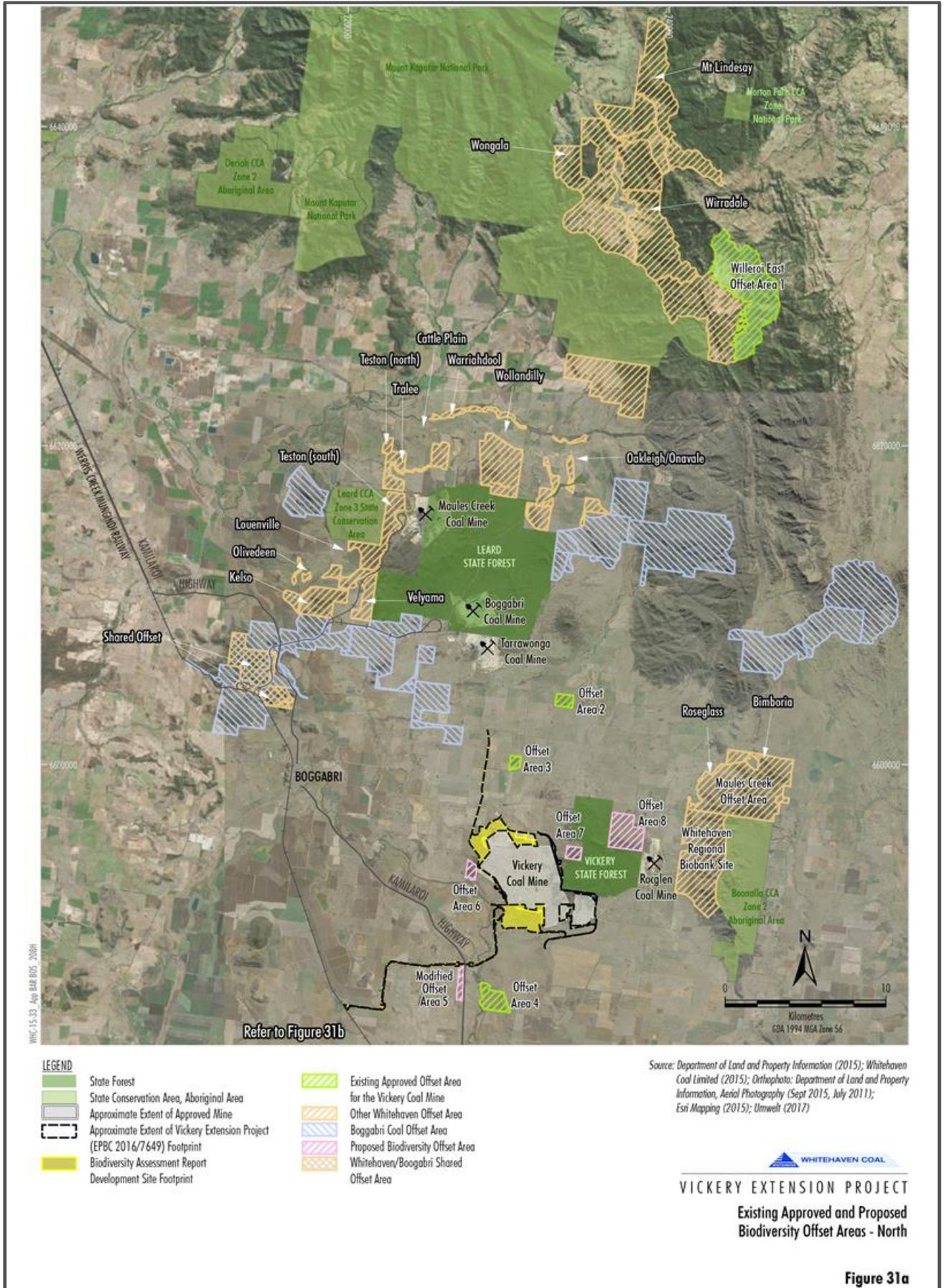


Figure 32 | Biodiversity Offset Strategy North

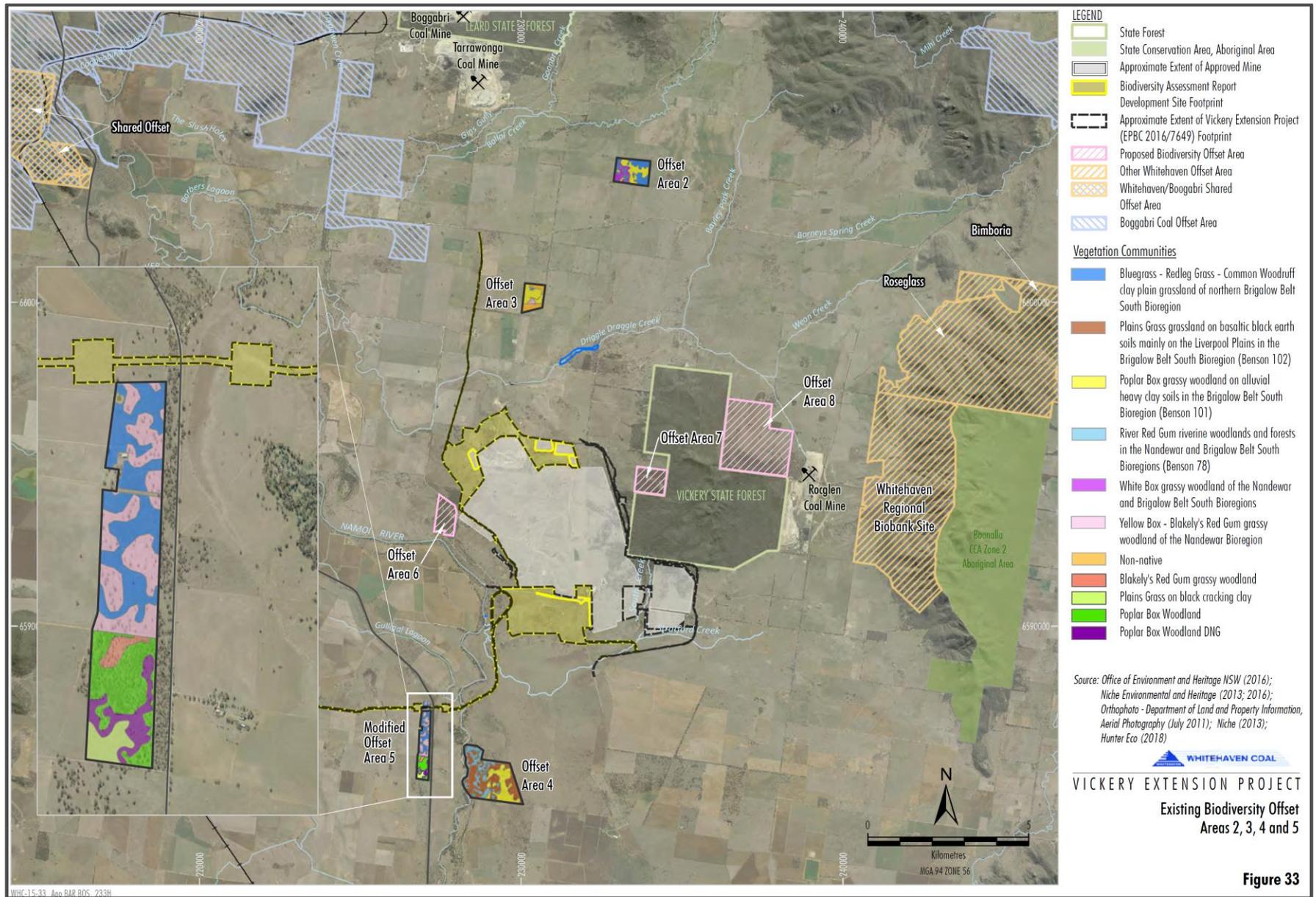


Figure 33 | Biodiversity Offset Strategy South

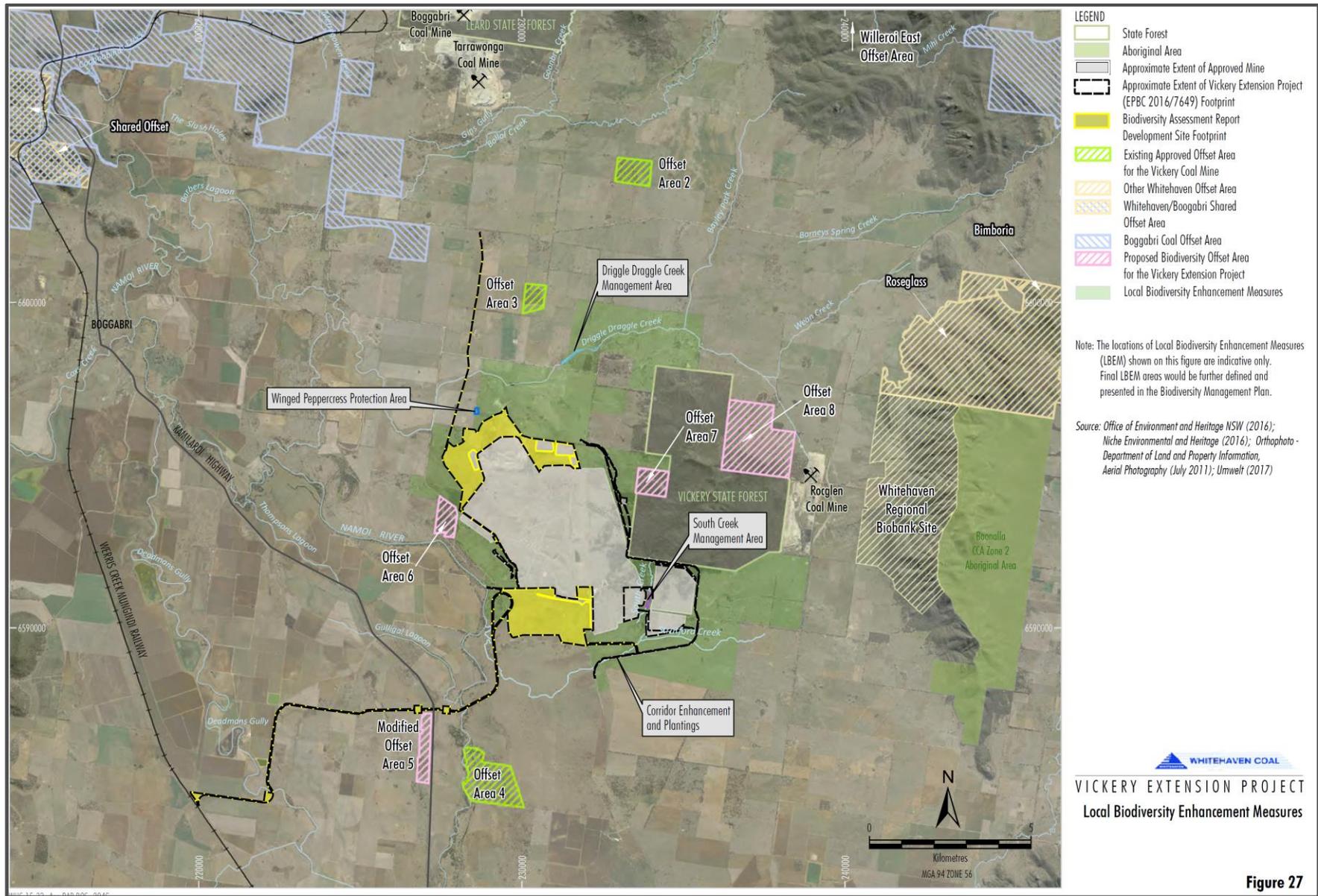


Figure 34 | Local Biodiversity Offsets and Enhancement Measures

443. BCD has advised that Whitehaven has not fully addressed all of the requirements of the FBA in its Submissions Report, including completion criteria, rehabilitation objectives and the specific area and type of vegetation community to be targeted for rehabilitation. Whitehaven has committed to address these matters in its Rehabilitation Management Plan/ Mining Operations Plan. The Department notes that a similar approach was adopted for the Wilpinjong Extension Project approved by the Commission, with ecological rehabilitation credits proposed to be retired up front subject to demonstrating successful rehabilitation against agreed performance indicators and completion criteria. Similarly, for projects now being assessed under the offsetting provisions of the BC Act, *Ancillary Rules for Use of Mine Site Ecological Rehabilitation* are being prepared to allow retirement of rehabilitation credits under the BC Act.
444. BCD and the Department consider that rehabilitation could be used to offset ecosystem credits where it can be demonstrated that the rehabilitation is trending towards a recognisable PCT, as demonstrated through monitoring of performance indicators and meeting completion criteria, in accordance with the FBA ecological rehabilitation requirements.

Land-based Offsets

445. As outlined above, the proposed land-based offsets in addition to local enhancement measures proposed to be implemented by Whitehaven around the mine, would enhance connectivity between the Nandewar Range and the Namoi River in the long term, and integrate well with existing mine offsets in the region (see Figures 31-33). Whitehaven calculated that the identified land-based offsets (Offset Areas 6, 7, 8 and Mt Sumner) would provide about 33% of the total ecosystem credits and 100% of the species credit required for the Project.
446. BCD noted that the available ecosystem and species credits on the proposed land-based offset sites (Offset Areas 6, 7 and 8 and Mt Somner) need to be reviewed to verify the available credits. Notwithstanding, BCD acknowledged that these outstanding issues can be resolved through recommended conditions requiring Whitehaven to conform to the requirements of the Biodiversity Assessment Method (BAM) under the BC Act, before retiring credits.
447. On this basis, the Department has recommended conditions requiring Whitehaven to retire the biodiversity offset credits in accordance with the requirements of the *NSW Biodiversity Offsets Policy for Major Projects* within 2 years of commencing development. The retirement of credits can be achieved by acquiring or retiring credits within the meaning of the BC Act.
448. This means that in addition to the option of retiring credits in its existing regional Biobanking Site and/or using ecological rehabilitation credits retired in accordance with the FBA, Whitehaven can:
- for land-based offsets, determine offset credits using the BAM, retire credits based on like-for-like rules and secure offsets through a Stewardship Agreement;
 - make a payment into the Biodiversity Conservation Fund (BCF); and/or
 - retire credits through Ancillary Rules for biodiversity conservation actions (similar to supplementary measures under the FBA).
449. In recognition of potential delays in processing Stewardship Agreements to validate vegetation mapping, undertake any additional surveys, finalise management actions in these agreements, the Department has allowed provision for extension to retire credits, subject to the agreement of the Secretary. A Biodiversity Stewardship site application submitted and being processed by the Biodiversity Conservation Trust which administers the process for retiring credits, would be considered a suitable reason for such an extension.
450. The Department and BCD consider that the retirement of credits for the Project can be reasonably met through the proposed biodiversity offset strategy incorporating a combination of ecological rehabilitation credits, land-based offsets and/or payment into the Biodiversity Conservation Fund.

6.4.8 Matters for Further Consideration

451. The *NSW Offsets Policy* requires that the consent authority considers matters requiring further consideration where the impacts of a development may cause the extinction of a nominated species and/or CEEC/ EEC in an IBRA sub-region or significantly reduce the viability of a species and/or EEC/ CEEC.

452. BCD identified in its advice on the SEARs that impacts on 4 threatened fauna species, 8 threatened flora species and 5 endangered ecological communities were species or communities that required further consideration.
453. The EIS assessments noted that none of the species nominated by the BCD for further consideration were confirmed within the Project footprint and none of the species are species credit species.
454. In the case of the Large-eared Pied Bat, the Department notes that while the Project would clear 77.8 ha of potential foraging habitat, no roosts (caves) or breeding habitat was identified within the Project footprint and BCD has noted that there is a greater extent of habitat in the surrounding locality known to be used by the species. The assessments did not confirm the presence of individuals in the Project footprint, although it was potentially recorded in the footprint based on call recordings, but these recordings could not be confirmed.
455. Therefore, the Department considers that no additional supplementary measures are required for these matters.

6.4.9 Commonwealth Biodiversity Matters

456. The Department notes that the Commonwealth referral decision in determining that the action was a controlled action was based on there being likely significant impacts on 3 threatened Commonwealth listed species, including Regent Honeyeater, Swift Parrot and the Koala; and that there may be significant impacts on a further three species, South-eastern Long-eared Bat (Corben's Long-eared Bat), Large-eared Pied Bat and Murray Cod.

Because part of the Approved Project was not assessed in the previous EPBC referral decision (EPBC 2012/6263) the Project footprint assessed for Commonwealth matters is 208.6 ha larger than the footprint assessed under the NSW assessment, and totals 984.4 ha (see **Figure 35**), with a larger area of native vegetation impacted compared to the NSW assessment footprint, an increase from 579.8 to 728.4 ha in total.

457. An additional 5 species or communities with the potential to occur in the Project area were considered in the ecological assessment (Weeping Myall Woodland EEC, Belson's panic, Winged peppergrass, *Tylophora linearis* and Painted honeyeater) but the assessment concluded that these species were unlikely to be significantly impacted given the absence of the species/communities in the Project footprint. The EIS significance assessments concluded that there would not be a significant impact on any threatened species listed under the EPBC Act, as the habitat being removed would not be at a scale that would isolate or fragment populations.
458. BCD's consideration of Commonwealth matters (**Appendix I**) noted concerns around the biodiversity offset strategy conforming with the FBA, however BCD noted that Whitehaven would need to comply with the relevant offset rules for EPBC Act-listed species and concluded that it is satisfied:
- with the proposed avoidance and mitigation measures; and
 - that appropriate conditions would be included in a development consent requiring Whitehaven to retire biodiversity offset credits in accordance with the relevant legislation.
459. The Department's consideration has had regard to Resource Strategies', Eco Logical's and BCD's assessments (see **Appendix I**), along with the threatened species assessment guidelines which assist in the interpretation and application of the 7 factors (or tests) of significance. This assessment has considered the direct and indirect impacts of the Project on threatened species, populations or ecological communities, or their habitats – both on the site and the broader study area, as defined under the threatened species assessment guidelines.
460. For the 3 species considered likely to be significantly impacted and 3 species that may be significantly impacted, the Department has undertaken a detailed consideration of Resource Strategies' and Eco Logical's assessments of significance, BCD's advice, relevant approved conservation advice, recovery plans and threat abatement plans (TAPs). A summary of this assessment is provided in **Appendix J**.
461. The Department has also considered the significance assessments for the remaining threatened species identified in the biodiversity assessment and accepts that there is unlikely to be a significant impact on these species. Further review of these EPBC listed threatened species is provided in **Appendix J**.

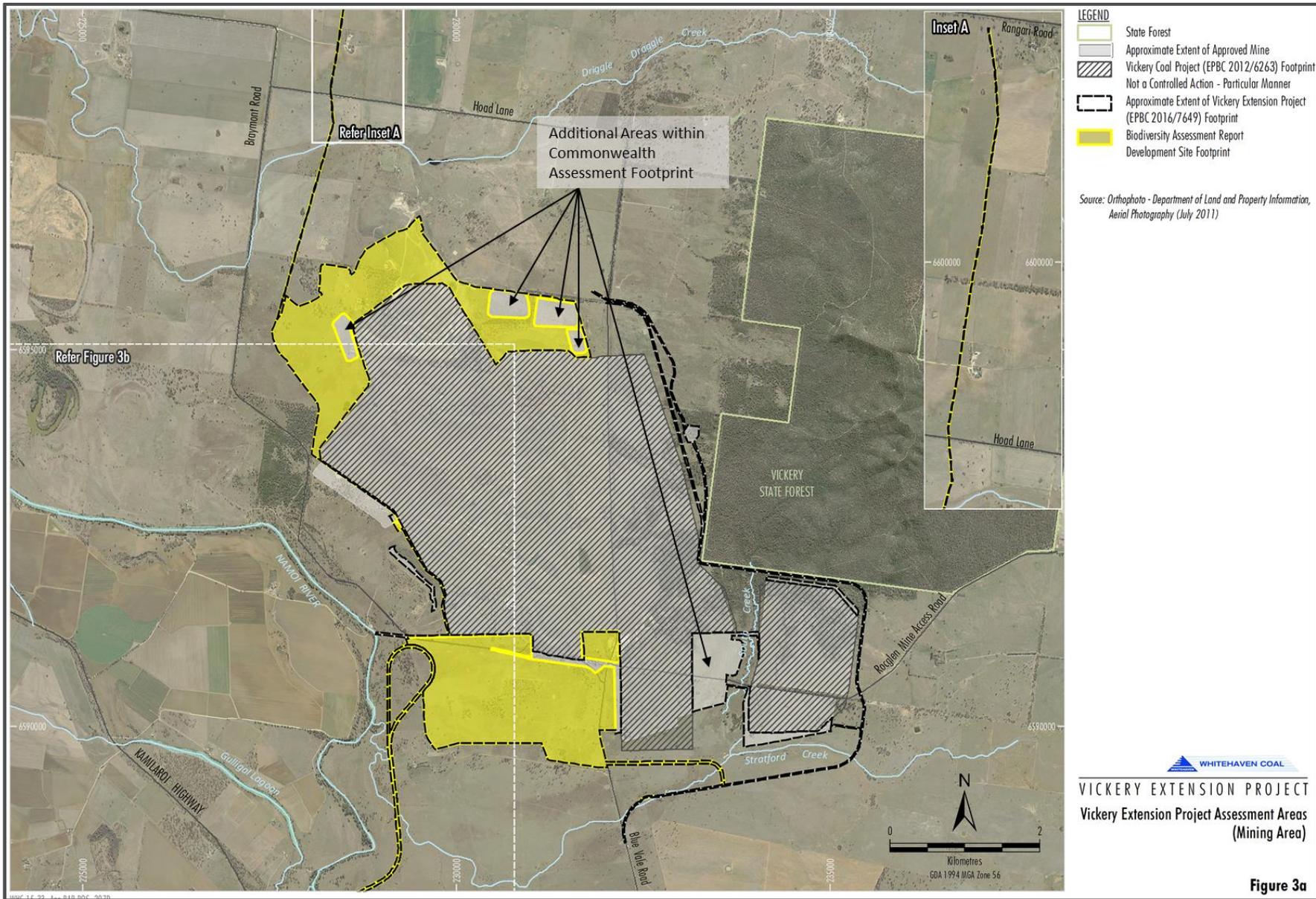


Figure 35 | Commonwealth Assessment Area

462. With the proposed avoidance and mitigation measures in place, the Department considers that, for the three species where the Project is considered likely to have a significant impact, these impacts would be acceptable with the implementation of the proposed biodiversity offset strategy

6.4.10 Conclusion

463. The Project would disturb approximately 580 ha of vegetation, of which 78 ha comprises native woodland and 502 ha of native grassland. None of the vegetation communities impacted by the Project conform to a State or Commonwealth listed EEC or CEEC. The native grasslands are currently grazed and include mine rehabilitation areas.

464. Whitehaven has sought to avoid and minimise impacts to biodiversity by excluding areas containing Weeping Myall Woodland EEC and minimising the footprint of the WEA. It has also proposed mitigation measures to minimise the impacts of clearing and to avoid unexpected impacts to fauna.

465. Whitehaven proposes to offset the residual impacts of the Project in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* and has proposed a number of options to retire the credits required for the Project, with a current preference for rehabilitation and land-based offsets.

466. Overall, the Department considers that the Project has been designed to avoid, mitigate and manage biodiversity impacts where practicable, and that the required ecosystem credits could be obtained and that the retirement of these credits would sufficiently compensate for residual biodiversity impacts. The Department considers that biodiversity impacts on the site could be effectively managed under a Biodiversity Management Plan. BCD considers that the biodiversity impacts of the Project have been adequately assessed and has advised that no further assessment is required.

467. The Department and the BCD consider that the identification and/or retirement of credits within 2 years of commencing the Project is an appropriate timeframe to retire these credits. The Department considers that, subject to conditions, the Project could be undertaken in a manner that would result in acceptable short-term impacts on biodiversity and with the offsets in accordance with the *NSW Offsets Policy* would result in improved biodiversity outcomes in the medium to long term.

6.5 Rehabilitation, Final Void and Landform

468. The key rehabilitation, final void and landform issues identified in the Commission’s Issues Report are outlined in **Table 16** below and considered the detail in the following sections.

Table 16 | Commission Issues Report – Rehabilitation and Final Void/ Landform

Issues requiring further consideration
• Use of existing rehabilitated soil resource
• Final landform integration into surrounding landscape (micro/macro relief)
• Suitability of final landform for agricultural use, Class 2 or 3 agricultural land and agricultural vs. biodiversity conservation final landuse outcome
• Discharges from sediment dams post mining and potential for sediment loads/ pollutant runoff
• Final void water levels and water quality and options for beneficial of final void water post mining
• Surface water quality impacts from rehabilitated landform – including seepage and runoff, including consideration of final landform use (biodiversity vs. agriculture)
• Spoil properties and impact on groundwater inflows
• Final void as preferred final landform versus filling the void
• Long term drawdown and inflow in the hard rock aquifer due to the final void and interaction with Rocglen drawdown.

6.5.1 Rehabilitation

469. The Approved Project was designed to reinstate disturbed areas with 1,360 ha of woodland and 780 ha of grazing land with stable landforms, compatible with the surrounding landscape. Three voids, including the existing Blue Vale void, were to be retained in the approved final landform.
470. The rehabilitation strategy for the Project proposes to retain a single void in the landscape at the conclusion of mining in addition to the Blue Vale Void and reinstate disturbed areas to woodland and grazing land, shown in **Figure 36**.
471. The Project mining area would be rehabilitated mainly to native woodland (approximately 2,385 ha), to assist with biodiversity conservation outcomes for the Project and region (see **Figure 34**) and improve habitat connectivity between the Vickery State Forest and the Namoi River. Approximately 256 ha of the Project mining area would be rehabilitated to agricultural land suitable for grazing, comprising 78 ha of Class 3 land and 178 ha of Class 4 land.
472. If successfully rehabilitated to woodland, the Project would result in a net gain in woodland of approximately 1,440 ha and a net loss of pasture/grassland of approximately 1,420 ha, the majority of which is Class 4 and/or rehabilitated mining land. Approximately 148 ha of Class 2 land and 696 ha of Class 3 land disturbed by mining operations would be rehabilitated as woodland which would form part of the rehabilitation used to offset impacts on native woodland.
473. The Project rehabilitation strategy proposes to return the Project infrastructure areas, rail spur and borefield to their pre-existing land use and agricultural suitability following mining (unless a post-mining use is identified and is otherwise agreed with the applicable stakeholders). Approximately 83 ha of the Project rail spur land would be rehabilitated to agricultural land suitability comprising 51 ha of Class 2 land and 32 ha of Class 3 land. The 3 ha of land disturbed by the Project borefield would be rehabilitated to Class 2 land.

Table 17 provides a comparison between the area of land disturbed and proposed for rehabilitation for the Approved Project and the Project.

Table 17 | Summary of proposed land disturbance and rehabilitation

Vegetation Type	Approved Project	Extension Project (increment)	Extension Project (Total)
Disturbance (ha)			
Woodland	464	77.8	541.8
Rehabilitated woodland	405	-	405
Grassland/Pasture	1,284	502	1,761 ^a
Other Areas ^c	89	196	285
Total	2,242	775.8	2,992.8^a
Rehabilitation (ha)			
Woodland	1,360	1,025 ^b	2,385
Grassland/Pasture	780	-413 ^b	342
Other Areas ^c	102	163.8 ^b	265.8
Total	2,242	775.8	2,992.8

Notes:

^a including a 25 ha reduction in area disturbed by the Approved Project footprint due to Whitehaven no longer proposing to use an area within the Approved Project footprint to stockpile soil

^b indication of difference between rehabilitation for the Approved Project and proposed extension Project, including rehabilitation of 523 ha of land to woodland within the Approved Project footprint previously approved for pasture rehabilitation

^c including final void/s and retained infrastructure

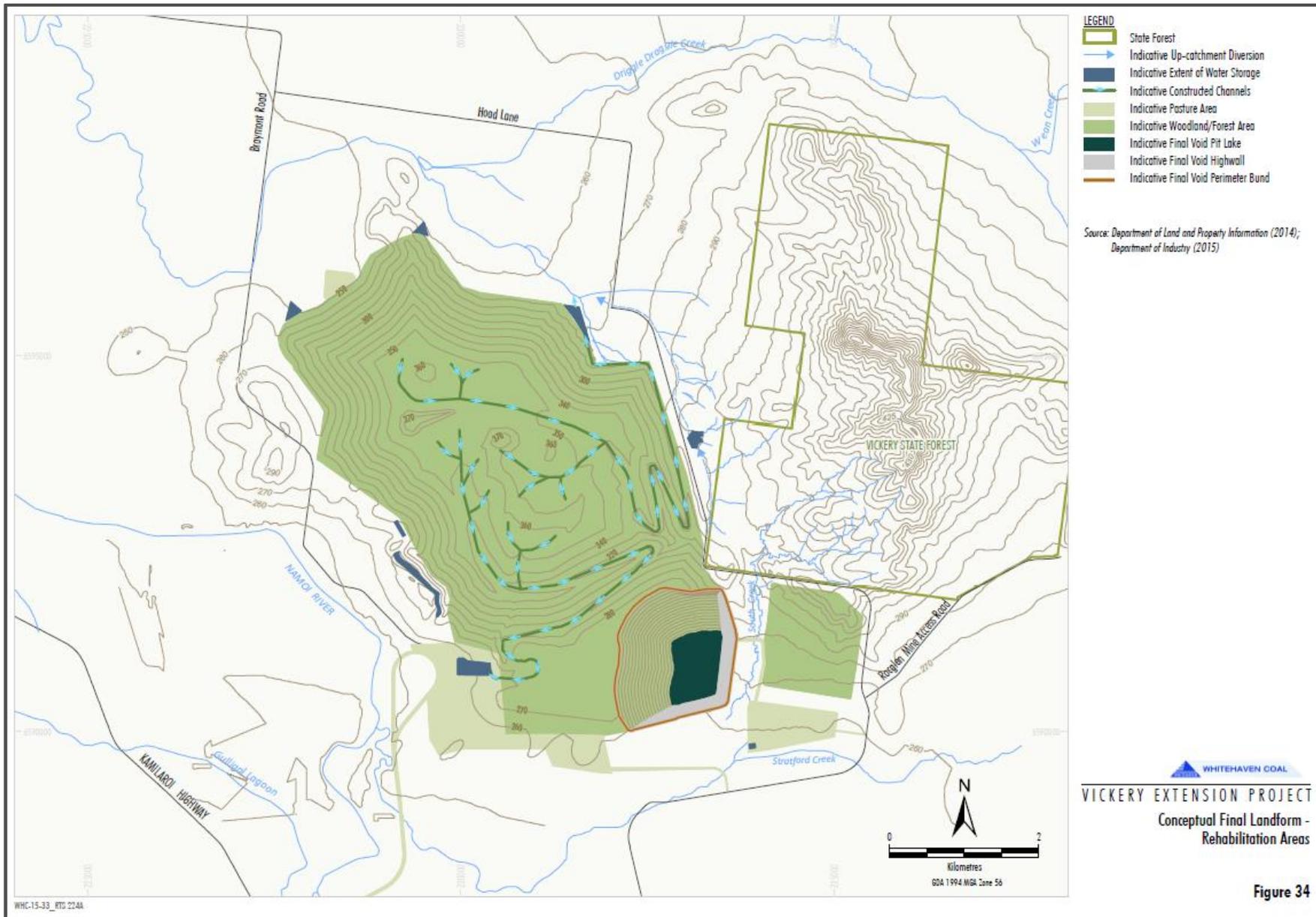


Figure 36 | Proposed final landform

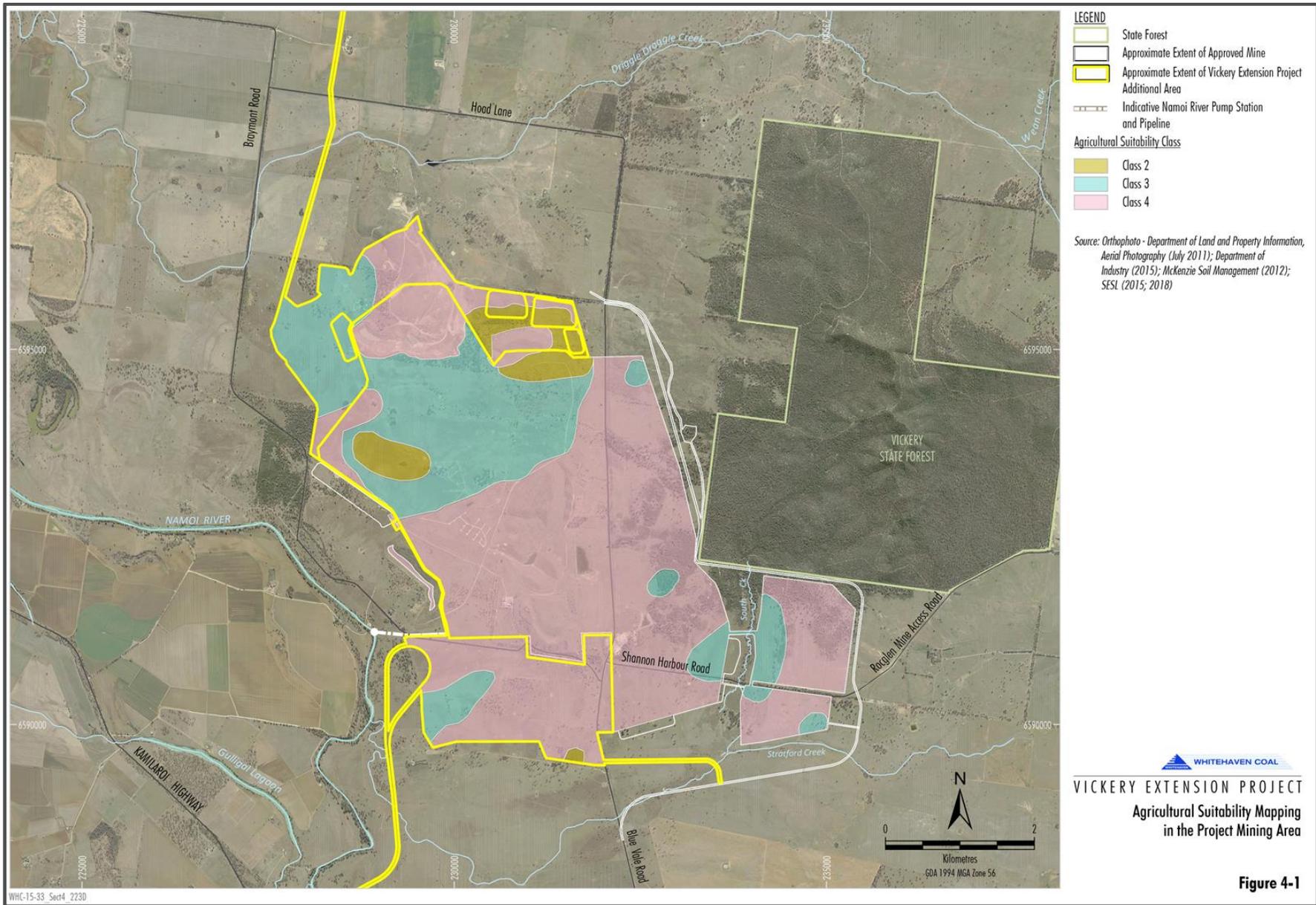


Figure 37 | Existing agricultural land capability

474. Concerns were raised in submissions about the loss of agricultural land if the bulk of the post mining landform is returned to woodland. Whitehaven's EIS (Table 4-4) estimates that approximately 2,797 ha of the total Project mining footprint currently provides land suitable for agriculture, 1,875 ha of which is Class 4 grazing capability and 922 ha suitable for cropping (148 ha Class 2 and 774 ha Class 3) (see **Figure 37**).
475. As noted above, the Project rehabilitation strategy would return the mining area to 2,385 ha of woodland and 256 ha of agricultural land (78 ha of Class 2 and 178 ha of Class 3), with the balance comprised of the final void and sediment dams.
476. The Department notes that Whitehaven needs to balance the long-term impacts of the Project on land use values for biodiversity and agricultural production and notes that the Approved Project rehabilitation strategy included woodland rehabilitation of approximately 504 ha of existing agricultural land. The Project would return to woodland another 523 ha of grazing land under the Approved Project (that was to be rehabilitated to agricultural land).
477. While there would be a residual loss of agricultural land capacity as a result of the proposed rehabilitation strategy, approximately two-thirds of the land to be impacted by the Project is lower quality grazing land on the slopes above the alluvium, including existing rehabilitated mining land.
478. The Department also notes that the Project is not located on Biophysical Strategic Agricultural Land (see **Section 4.6**) and a significant proportion of Whitehaven-owned land surrounding the Project disturbance area supports agricultural uses in the more productive Namoi alluvium.
479. The proposed rehabilitation of the Project disturbance with a focus on biodiversity values would provide an improved habitat corridor link between the Namoi River to the Vickery State Forest, and other land-based biodiversity offset sites in the region.
480. On the basis of the above, the Department and BCD consider the benefits of providing a habitat corridor between the Namoi River and the Vickery State Forest (and beyond) outweigh the loss of the agricultural land capability.
481. Concerns were also raised about the potential bushfire risks associated with woodland rehabilitation. The Department notes Whitehaven's commitment to manage bushfire risks during operations and has recommended conditions requiring the development of bushfire management measures over the long term in the Project's Biodiversity Management Plan. The Department also notes the longer term bushfire management of the land would become the responsibility of the eventual parties owners of the land, however it has included a recommended condition requiring bushfire management as part of the long term land management objectives to be established in the Rehabilitation Strategy for the Project.
482. The Commission's Issues Report recommended further consideration of the proposed use of soils from existing rehabilitated areas to rehabilitate land disturbed by the Project.
483. Whitehaven's Submissions Report noted that an appendix to the Agricultural Impact Assessment for the Approved Project included analysis of soils sampled from rehabilitated mining areas, which assessed their suitability for use in rehabilitation. This analysis concluded that the soils could be used in rehabilitation subject to appropriate management measures.
484. This was considered further in the Soil Capability Assessment in the Agricultural Impact Assessment for the Project, which concluded that adequate soil resources would be available to meet the rehabilitation objectives of the Project.
485. Concerns were also raised about the long term legacy issues around unsuccessful rehabilitation of mining landforms. The Department and the Resource Regulator regulate the rehabilitation of mining projects in NSW and note that rehabilitation techniques have improved significantly in recent years. As noted in Whitehaven's Submissions Report, recent examples demonstrate that mining rehabilitation can be successful with good management and ongoing monitoring of rehabilitation progress.
486. The Department also notes that there is a comprehensive regulatory regime for mine site rehabilitation under the *Mining Act 1992*, and the Mining Lease would incorporate enforceable rehabilitation objectives and a requirement for Whitehaven to have a rehabilitation bond for the full cost of rehabilitating the site in accordance with the Mining Lease and the development consent.

487. Given these controls, the Department considers that sufficient measures are in place to ensure the rehabilitation of the Project can be successfully undertaken to avoid any long term land use liability.

6.5.2 Final Void

488. The proposed final landform includes a large void in the south-east corner of the Project mining area, in addition to the relatively small existing Blue Vale void on the western side of the mining area, which has already been rehabilitated. The proposed new final void would have a catchment area of approximately 250 ha (approximately 8% of the disturbance area) and would act as a long-term groundwater sink, as noted in **Section 6.2.6**.

489. In comparison, the Approved Project has two final voids (in addition to the existing Blue Vale void), both of which contain a pit lake. The combined catchment area of the two approved voids is approximately 490 ha. That is, there would be a net reduction in void catchment area of 240 ha compared with the Approved Project.

490. Most of the public submissions questioned the need for final voids with the Commission's Issues Report also requesting further justification. In response, Whitehaven has mounted several arguments for maintaining the final void in the post-mining landscape.

491. In particular, Whitehaven argues that its groundwater modelling indicates that completely filling the void would result in groundwater mounding and likely result in flow of potential lower quality saline water towards the alluvium (see **Section 6.2.6**), and hence maintaining the void as a permanent groundwater sink is an environmentally superior outcome.

492. Whitehaven analysed two other options for a final void, including two voids (as per the Approved Project) and a single void along the southern extent of the open cut. Although the alternate options may have provided operational advantages, the proposed void was the preferred option based on a reduction in the number of final voids in the landscape and to avoid the risks associated with a void within the Namoi floodplain.

493. Whitehaven also argues that the cost of fully and partially backfilling the voids would be prohibitive, highlighting the cost of complete backfilling alone would cost approximately \$600 million and a partially backfilled void (to a level that would avoid the formation of a void lake) would cost approximately \$440 million and potentially result in the migration of lower quality water from the void.

494. These arguments were acknowledged by the Division of Resources & Geoscience in its submission on the EIS which advised that it does not dispute the proposed mining method or the proposed final landform.

495. As noted in **Section 6.2.6**, the Department agrees that retaining a final void as a groundwater sink is a preferred environmental outcome for long term groundwater quality impacts, consistent with the final landform of the Approved Project. The Department also notes that while the retention of a final void would reduce the area of land available for long term land use, the proportion of land lost is minimal and is an improved outcome compared with the Approved Project.

496. The final void would include highwalls on three sides (see **Figure 36**) with slopes between 30 and 50 degrees, which the preliminary geotechnical assessment for the Project concluded would be stable over the long term. Whitehaven proposes to design the highwalls to be long term stable and enclose the void with a perimeter bund and the Department notes that long term safety requirements for the final void would be addressed in the mine closure plan required under the Mining Lease.

497. The Department has also recommended rehabilitation objectives requiring the final landform to be safe and stable, with the preparation of a Rehabilitation Strategy and Rehabilitation Management Plan to describe the measures to ensure these outcomes are achieved, including a requirement to refine the mine plan every 5 years to minimise the size of the final void as discussed in **Section 6.2.6**.

6.5.3 Final Landform

498. Whitehaven proposes to incorporate macro-relief (10 – 20 m hills) on the top surface of the rehabilitated WEA to mimic the landform of the Vickery State Forest, with micro-relief (1 – 2 m undulations) to manage drainage (see **Figure 38**).

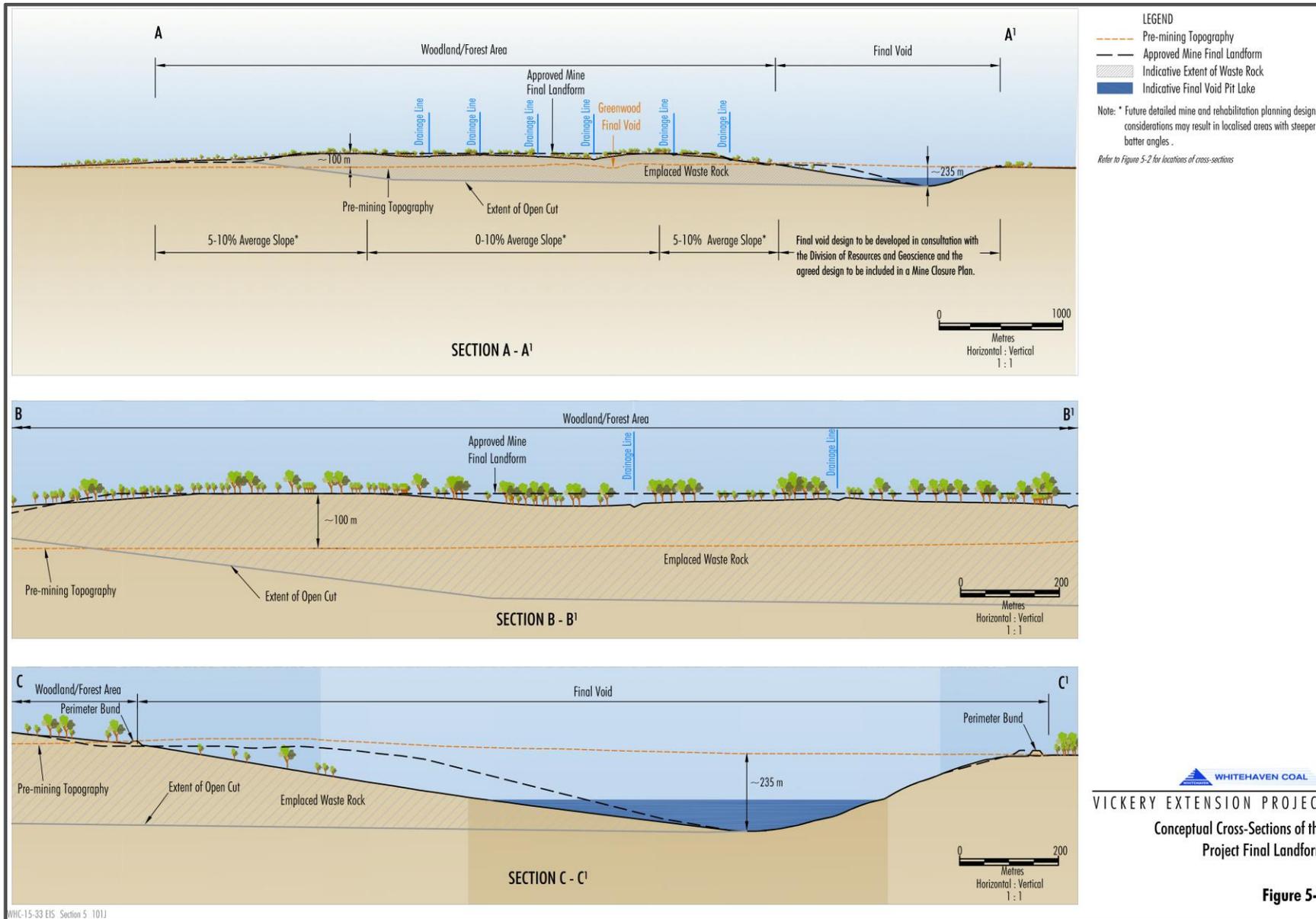


Figure 38 | Conceptual final landform cross-sections

499. The maximum height of the emplacement would be approximately 370 m AHD, 100 – 110 m above the current surface level and approximately 110 m below the highest point in the adjacent Vickery State Forest. This is similar to the Approved Project and the Department considers that this is a suitable approach to integrating the final landform into the surrounding landscape, by creating a graduated rise between the Namoi River floodplain and the Vickery State Forest.
500. Drainage lines within the emplacement are designed to convey flows to the sediment basins constructed during mining operations. Rehabilitation of the final landform to replicate native woodland with trees, shrubs and grasses is proposed to stabilise the surface of the landform and to avoid the use of rock-lined structures in the drainage lines. The progressive rehabilitation of the emplacements during mining operations would be monitored to determine the success or otherwise of rehabilitation and a key success criterion for completion of rehabilitation is to ensure the final landform is stable and non-polluting.
501. The sediment basins would be retained to perform a sediment detention function until it can be verified that the surface of the emplacements is vegetated and stabilised and water quality in sediment basins is comparable with the receiving environment. The sediment basins may be retained beyond this stage for water storage if agreed with the landowner and relevant agencies. Until such time, the sediment basins would be managed consistent with the approach used during mining operations to ensure there is sufficient capacity to capture and treat sediment laden water prior to discharge.
502. Whitehaven's strategy to minimise the potential exposure of the overburden and coal reject includes blending potential acid forming material to reduce the overall concentration of potential acid forming material (such that it would be classified as non-acid forming) and to place this material along with potentially sulphurous and saline material deeper within the emplacement to further reduce the risk of exposure.
503. With this approach the Department considers that the potential pollution risks associated with long term stability of the rehabilitated landform can be adequately managed. These measures would be described in a rehabilitation strategy for the Project, to be developed in consultation with Narrabri and Gunnedah Councils and the Department's Water Division and the Resources Regulator.

6.5.4 Conclusion

504. The Department has assessed Whitehaven's proposed rehabilitation for the Project and how it compares with the approved rehabilitation strategy under the Approved Project.
505. The Department notes that the Project would retain one less mining void than the Approved Project and rehabilitate a greater area of the disturbed land to native vegetation and woodland as opposed to land with grazing capability.
506. Both the Department and the Resources Regulator consider that the proposed final landform and rehabilitation strategy is generally consistent with best practice, provides an appropriate basis for rehabilitation of the site and would achieve a final land use that supports and enhances the conservation land uses in the area.
507. To ensure the rehabilitation of the Project is successful, the Department has recommended a broad suite of conditions, developed in consultation with the Resource Regulator, which require Whitehaven to:
- achieve certain rehabilitation objectives including ensuring that any final voids are safe, stable and non-polluting;
 - optimise the size and depth of the final void by analysing the geochemical characteristics of groundwater flows to the open cut, to inform mine planning and the progressive development of the final landform;
 - minimise the drainage catchment of the voids as far as is reasonable and feasible (whilst having regard to their role as a long term groundwater sink); and
 - prepare and implement a comprehensive rehabilitation management plan in consultation with the Resources Regulator, DPIE Water, NSC, BCD and GSC that addresses these and other best practice rehabilitation objectives.

6.6 Heritage

508. The key heritage issues identified by the Commission's Issues Report are outlined in **Table 18** below and considered the detail in the following sections.

Table 18 | Commission Issues Report – Heritage

Issues requiring further consideration

- Adequacy of engagement with Aboriginal traditional owners and surveys
- Impacts/ mitigation/ management of the Kurrumbede Homestead

6.6.1 Heritage – Setting

509. The EIS includes an Aboriginal Cultural Heritage Assessment (ACHA) undertaken by Whincop Archaeology. The ACHA was undertaken in accordance with applicable guidelines and in consultation with local Aboriginal groups, including 68 Registered Aboriginal parties (RAPs) who registered an interest in being consulted about the Project (compared with the 42 RAPs for the Approved Project).
510. An Historic Heritage Assessment for the Project was undertaken by Extent Heritage Pty Ltd in accordance with applicable guidelines.
511. Public and interest group submissions and the Commission's Issues Report raised the following concerns around heritage impacts of the Project:
- the impacts to the "Kurrumbede" homestead, surrounding landscaping and its outbuilding used by Andrew "Boy" Charlton;
 - adequacy of consultation with the Aboriginal community, including with regard to potential scarred trees; and
 - impacts to Aboriginal heritage sites, including the Wilga grinding grooves and scatter sites Top Rocks and Bottom Rocks on the Namoi River.

6.6.2 Aboriginal Cultural Heritage

512. The archaeological assessment and consultation with RAPs did not identify any locations within the Project disturbance area that are connected with places of higher cultural importance in the region.
513. The archaeological assessment identified 62 Aboriginal sites in the development area and surrounding area (see **Figure 39**), including 31 sites within the disturbance footprint of the Approved Project. Of the additional 31 sites identified by the assessment, the Project would result in a total loss of value for 24 isolated artefacts and artefact scatter sites, 23 of which are assessed as being of low significance and one artefact scatter site having low-moderate significance.
514. Surveys were not carried out in sections of the proposed rail corridor due to access constraints, however the ACHA noted the extensive disturbance due to agricultural activities in these areas and would therefore be unlikely to contain sites of high cultural significance.
515. In its submission on the Project, BCD recommended further consideration of the technical investigation of scarred trees in consultation with the RAPs. It also recommended consideration of potentially sensitive areas associated with the Namoi River.
516. Whitehaven's Submissions Report reiterated the results of assessments of the potential scarred trees and consultation with RAPs which indicates that none of the potential trees are of cultural origin, nor were comments received from the RAPs which raised concerns with the scarred tree assessment. BCD has indicated that it has no further comments regarding this issue.
517. Two sites near the Project assessed as having moderate significance include an artefact scatter near the Project borefield and several axe grinding groove sites on the Namoi River, approximately 465 m from the closest blasting operations. Neither of these sites would be directly impacted by the Project..

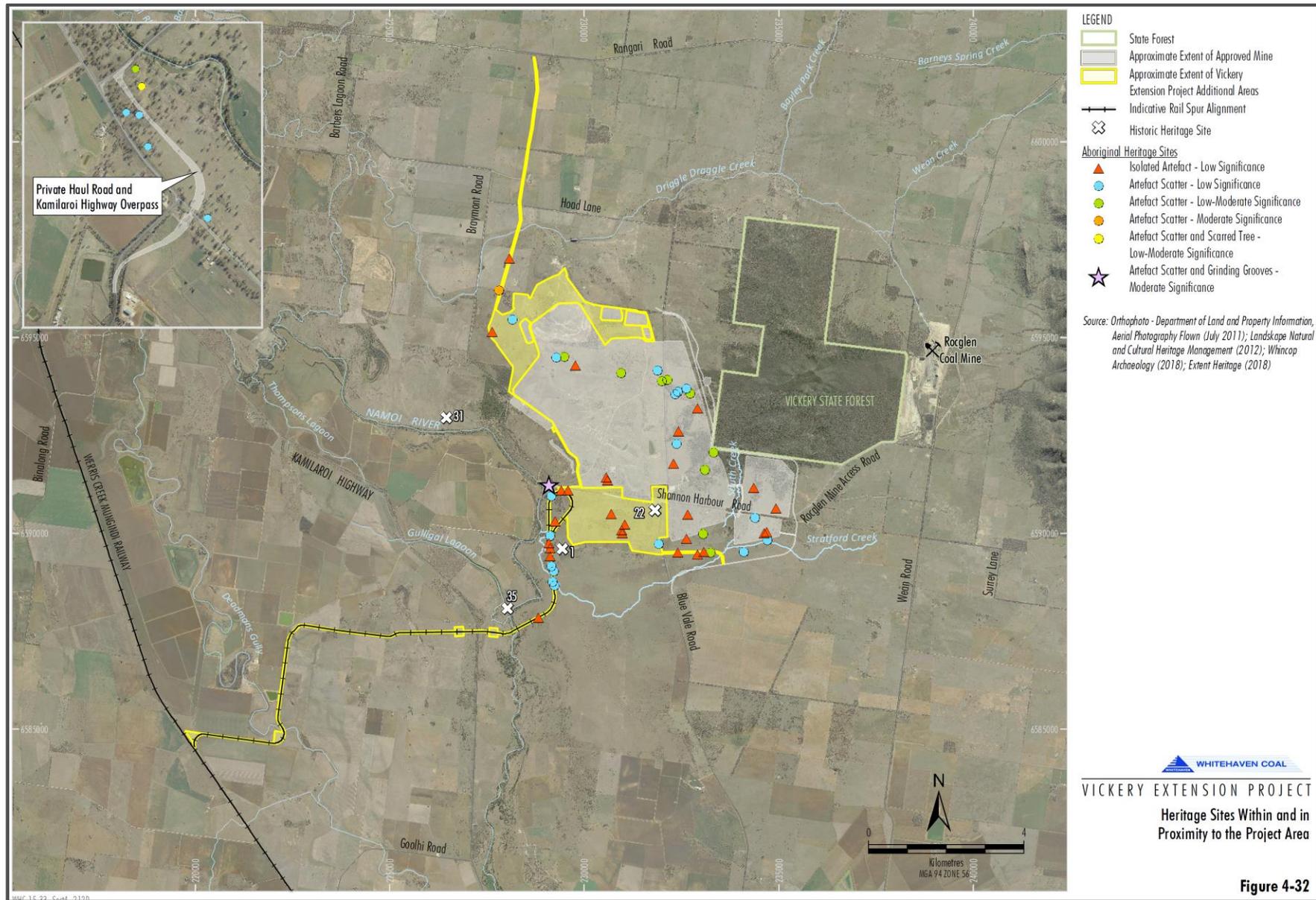


Figure 39 | Identified heritage sites

518. Based on the predicted vibration levels of approximately 6.3 mm/second at the 'Wilga' axe grinding groove site (AHIMS 20-4-0009), the NBA concluded that no vibration induced damage would occur at the grinding groove site.
519. Prior to commencing blasting for the Project, Whitehaven proposes to:
- commission a structural engineer to inspect the grinding groove site to confirm whether the nominated blasting criteria is suitable; and
 - engage a suitably qualified archaeologist to inspect the grinding groove site (including ground truthing and artefact identification) to update the site card for the site.
520. Blast vibration monitoring would be undertaken as part of the Project and would be detailed in the Blast Management Plan. Blast monitoring would be undertaken at potentially sensitive receptors located around the Project, and the grinding groove site ('Wilga' – AHIMS 20-4-0009) would be considered as a potential monitoring location. The results of the blast monitoring would be used to calibrate the blast vibration predictions at the grinding groove site
521. To mitigate and manage impacts to Aboriginal cultural heritage, Whitehaven proposes to prepare an Aboriginal Cultural Heritage Management Plan (ACHMP) in consultation with RAPs, BCD and the Department. This plan would include:
- protection and monitoring measures for the grinding groove site;
 - inspections and surveys within the rail spur corridor that could not be accessed during previous surveys;
 - measures to avoid impacting sites where feasible, including design of Project infrastructure and protection against accidental damage;
 - recording and salvage of sites to be impacted;
 - consultation protocols and access for community to identified areas;
 - training and awareness of site staff; and
 - protocols for unexpected finds including human remains.
522. The Department notes that the majority of sites to be disturbed are of low scientific significance and that the proposed ACHMP would allow for effective management of disturbed sites and mitigation of any future impacts on Aboriginal cultural heritage.
523. With the appropriate management conditions in place, the Department considers that the Project's impacts on Aboriginal cultural heritage are acceptable.

6.6.3 Historic Heritage

524. No sites listed on historic heritage registers would be impacted by the Project. The historic heritage assessment identified one item of historic heritage significance (potential local significance) within the Project extension area, and three sites within the immediate vicinity of the Project (see **Figure 39**).
525. Of these sites, two are of potential local significance and one of potential state significance (Kurrumbede Homestead associated with Australian poet Dorothea MacKellar).
526. The one site directly impacted by the Project is a weatherboard home that is of potential local significance due to its representation of the area's historical development and is a less common example of buildings in the area. The heritage assessment concludes that the loss of this item would result in a low-level heritage impact and Whitehaven proposes to carry out archival recording of the site in accordance with the relevant guidelines prior to its demolition, which is consistent with the standard approach to documenting the loss of heritage values.
527. As discussed in **Section 6.3.2**, the Kurrumbede Homestead is approximately 1.2 km from the closest blasting operations for the Project and has the potential to be indirectly impacted by ground vibration. The Department agrees with the recommendation of the Noise and Blasting Assessment for a structural engineer's assessment of the homestead to confirm if the standard 10 mm/s vibration criteria under the guidelines remains appropriate for this structure.
528. Concerns were also raised about potential impacts of the Project on the visual amenity of the curtilage around the property, associated with the Project Rail Spur and mining landforms affecting the rural vista and views from the property. Whitehaven's EIS noted that the mining infrastructure and landforms would

be concealed by existing vegetation around the Kurrumbede Homestead, however mining operations would be visible from some parts of the property.

529. To address these issues, Whitehaven proposes to maintain the existing tree screening and landscaping around the homestead and rehabilitate the mining landforms to merge with the surrounding landscape in the medium to long term.
530. Whitehaven has committed to preparing a Heritage Management Plan for the Kurrumbede Homestead which would describe the measures to be implemented prior to, during and following operation of the Project, including blast monitoring and structural inspections, maintenance of structures and enhancing significant landscaping around the site, ongoing use of the buildings to prevent deterioration and rehabilitation of the mine site and Kurrumbede property to maintain an open rural setting.
531. The NSW Heritage Council supports these measures, including the preparation of a Heritage Management Plan for the Project, in consultation with Heritage NSW and GSC.
532. Whitehaven has also committed to consult with the Dorothea Mackellar Society regarding the implementation of the proposed landscape enhancement works.

6.6.4 Conclusion

533. The Department's assessment has identified that the Project would disturb 31 Aboriginal sites in addition to the 31 sites within the disturbance footprint of the Approved Project. Of these additional sites, no sites of high cultural significance would be directly impacted by the Project.
534. The Department notes that the majority of sites to be disturbed are of low scientific significance and that the proposed ACHMP would allow for effective management of disturbed sites and mitigation of any future impacts on Aboriginal cultural heritage.
535. The most significant sites identified in the assessment are grinding grooves and associated artefact scatters, which are located adjacent to the Namoi River. With careful design and monitoring measures to be detailed in an ACHMP prepared in consultation with the relevant stakeholders and a Blast Management Plan, the Department considers that the impacts of the Project on these sites can be effectively managed to ensure minimal risk of damage.
536. The Project would require the removal of a weatherboard home of potentially local historic significance. The Department's notes that the heritage assessment concluded that the impacts on this item would result in a low adverse impact on historic heritage.
537. The Kurrumbede Homestead (associated with Australian poet Dorothea MacKellar) has the potential to be indirectly impacted by ground vibration caused by blasting for the Project and the built form of the Project may impact the visual amenity of the curtilage around the property. The Department considers that these potential impacts can be adequately managed through measures to be described in a Heritage Management Plan, developed in consultation with the Dorothea MacKellar Historical Society.
538. The Department considers that the potential impacts of the Project on heritage values are relatively low and can be adequately managed. To this end, the Department has recommended strict blast and heritage management conditions in consultation with Heritage NSW and Council to ensure the surrounding heritage sites are managed and protected over the long term. The Department has also recommended conditions requiring the development of the Heritage Management Plan in consultation with the Dorothea Mackellar Society.

6.7 Traffic and Transport

539. The key traffic and transport issues identified in the Commission's Issues Report are outlined in **Table 19** below and considered in detail in the following sections.

Table 19 | Commission Issues Report – Traffic and Transport

Issues requiring further consideration

- Require that all product coal be transported by rail once the CHPP and rail spur line is commissioned.
- Additional information on impacts at rail crossings due to the project

6.7.1 Transport Setting

540. The two main coal transport routes in the region include the Maules Creek and Boggabri shared rail spur line located north of Boggabri and an approved haulage route shared by the Tarrawonga and Rocglen coal mines, which permits the haulage of ROM coal via truck to the Gunnedah CHPP, located near Gunnedah. The Department notes that coal extraction has now ceased at the Rocglen Coal Mine.
541. The key road transport routes servicing the region include the Newell Highway, which provides access to ports in Brisbane and Melbourne, and the Kamilaroi Highway, which provides access to ports in Newcastle and Sydney.
542. The Approved Project permits the transport of ROM coal via the approved haulage route to the existing Gunnedah CHPP. The combined limit for road transport of ROM coal from the mines is 3.5 Mtpa, or 4.5 Mtpa with the construction of the Kamilaroi Highway overpass. No changes are proposed to the Blue Vale Road re-alignment (assessed under the Approved Project) to allow continued public access around the Project.
543. Access to the proposed secondary infrastructure area would initially be provided by Blue Vale Road and Braymont Road prior to the re-alignment of Blue Vale Road, and then via the Blue Vale Road and Shannon Harbour Road following re-alignment works. (see **Figure 40**).
544. To accommodate the extension of mining south of the Approved Project, the Project would require closure of approximately 3.5 km of Braymont Road (within the Gunnedah local government area) between the intersection of Blue Vale Road and to the north-west of the Project rail loop. As Whitehaven has acquired the properties along this section of the road no privately-owned land would be directly impacted from the closure of this section of road.
545. However, as highlighted in submissions, the closure of part of Braymont Road would restrict access to the Namoi River and graziers on the Travelling Stock Route (TSR) to Blue Vale Road. In response, Whitehaven advised that it would facilitate continued access between Blue Vale Road and the TSR through Whitehaven owned land, subject to operational and safety requirements. As such, the Department has recommended a condition for a protocol to be prepared in the Traffic Management Plan to facilitate grazer access to the TSR from Blue Vale Road, subject to operational and safety requirements.

6.7.2 Road Transport and Traffic

546. The EIS includes a road transport assessment undertaken by GTA Consultants (2018), developed in accordance with the *Guide to Traffic Generating Developments* (NSW Roads and Traffic Authority [RTA], 2002). The assessment considers:
- previous assessments undertaken for the Approved Project and nearby mines;
 - potential impacts of the Project on the road network in the region, including the predicted increases in traffic volumes as a result of the Project and cumulative use of the road network with nearby mines;
 - employee vehicles on the local and State road network; and
 - relevant road transport mitigation, management and monitoring measures.

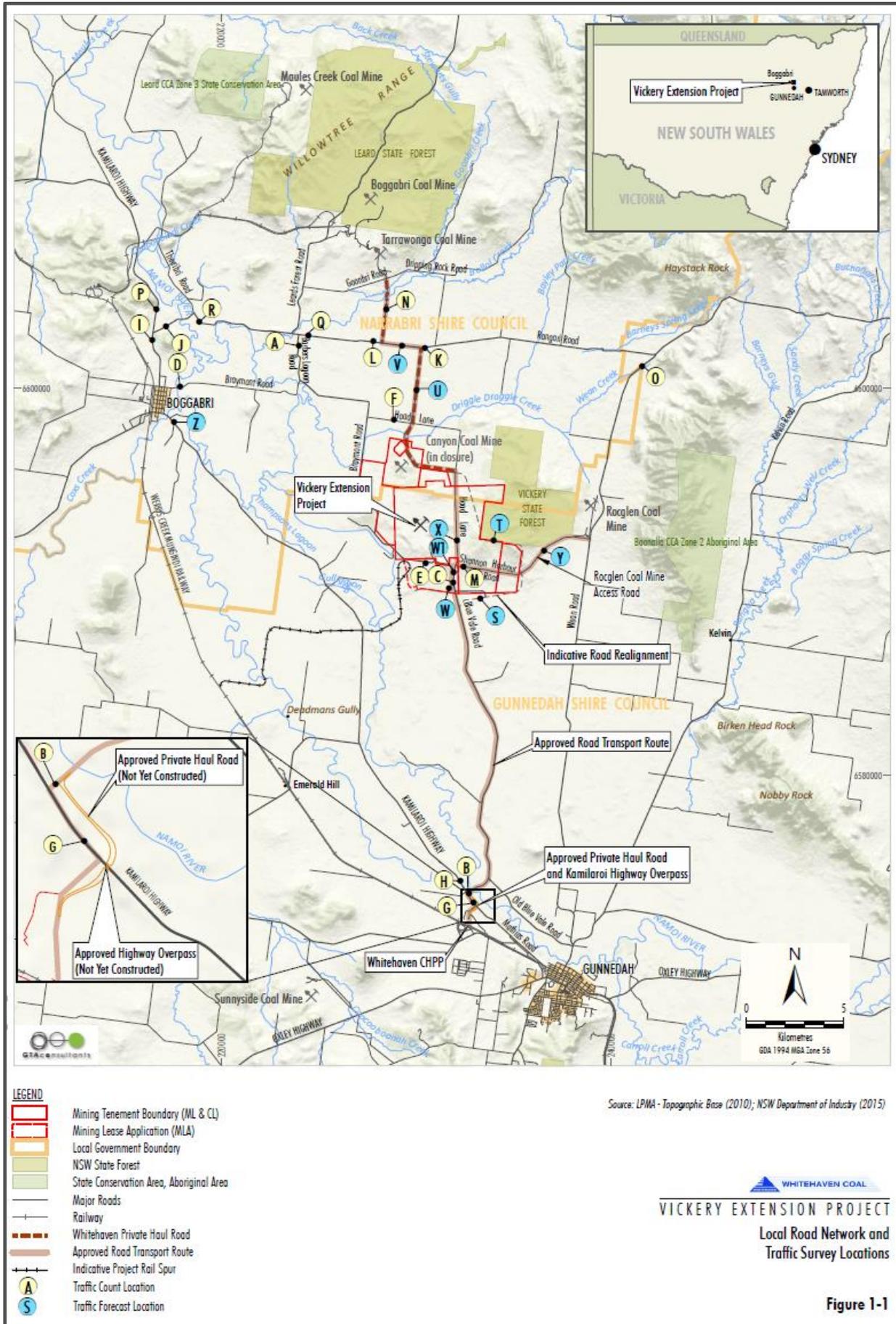


Figure 40 | Road Network, Approved Haulage Route and Traffic Survey Locations

547. The Project has been assessed against existing traffic volumes, identified through traffic counts and surveys at various locations (see **Figure 40**) around the Project.
548. Whitehaven indicated that the timing for commissioning of the Project CHPP, rail load-out facility and rail spur would occur at around 12 months following Project commencement, subject to obtaining the necessary approvals. During this period, the approved road haulage route (see **Figure 40**) would continue to be used.
549. The EIS assessment has considered three scenarios (Years 1, 2 and 12) to account for the likely future traffic conditions associated with the Project:
- Year 1 – Peak project construction related road transport up to 500 personnel, while coal is also transported from Tarrawonga and Rocglen (now ceased) coal mines along the approved haulage route;
 - Year 2 – The Project operating at a rate of about 1 Mtpa, transporting ROM coal the Gunnedah CHPP along the approved haulage route, in addition to ROM coal from Tarrawonga and Rocglen (now ceased) coal mines; and
 - Year 12 – The Project operating at maximum production and would include the extraction of around 10 Mtpa of ROM coal and cumulative rail transport of product coal at up to 11.5 Mtpa.
550. Whitehaven provided clarification in its Submissions Report to address the concerns regarding the cumulative impacts of the Project including traffic generation from other associated mines. The EIS assessment includes additional surveys, undertaken in 2015 and 2016, and assumes a conservative background daily traffic growth rate of 1% per annum to account for approved and proposed future developments in the region. The modelling shows an increase in traffic volume over the life of the Project with service conditions predicted to remain at a good level of service (LOS A) for the surrounding road network.
551. The Department therefore considers that the additional traffic volume generated by the Project would be accommodated while maintaining an acceptable level of performance for the road network. Further, the Department considers that the data used for the cumulative assessment represents an accurate baseline and that the assessment of cumulative impacts associated with the Project have been adequately addressed. RMS and GSC did not raise any concerns with the findings of the road transport assessment.
552. However, the use of the roads within surrounding local road network by Project related employees and contractor vehicles was raised as a concern by NSC and by other submitters. In particular, NSC raised concerns in relation to the use of Braymont Road as an access route for the Project.
553. In negotiating a Planning Agreement (PA) for the Project, NSC requested that Whitehaven provide funding of \$7.47 million for the upgrade of Braymont Road along with \$67,600 (subject to CPI) per year in maintenance contributions. This request was declined by Whitehaven.
554. In response, Whitehaven confirmed that employee and contractor access would be restricted to the use of Hoad Lane (sealed) from the north and Blue Vale Road (sealed) from the south (see **Error! Reference source not found.**). The Approved Project includes a condition restricting Project related vehicles, including employee and contractor vehicles, from accessing the mine from Braymont Road, except for certain circumstances including emergency situations, use by employees who reside along Braymont Road or as required for environmental monitoring or inspections.
555. The Department has recommended that this condition is retained in the Project conditions. The recommended Traffic Management Plan requires Whitehaven to implement measures to comply with its consent conditions and NSC is required to be consulted in preparing the Traffic Management Plan.
556. Given that NSC's request for upgrade and maintenance of Braymont Road does not reasonably relate to an increase in heavy vehicle or employee/ contractor traffic related to the Project on the road, the Department considers that funding for the upgrade and maintenance contributions for the upkeep of Braymont Road is not required for the Project.
557. Further, while NSC raised concerns about the use of the northern access route due to the single lane Namoi bridge crossing and road alignment issues, the Department notes that this route is fully sealed, with Rangari Road upgraded (including sealed) by Whitehaven and the route was used for construction and operational workforce access from Boggabri for the Maules and Boggabri mines.

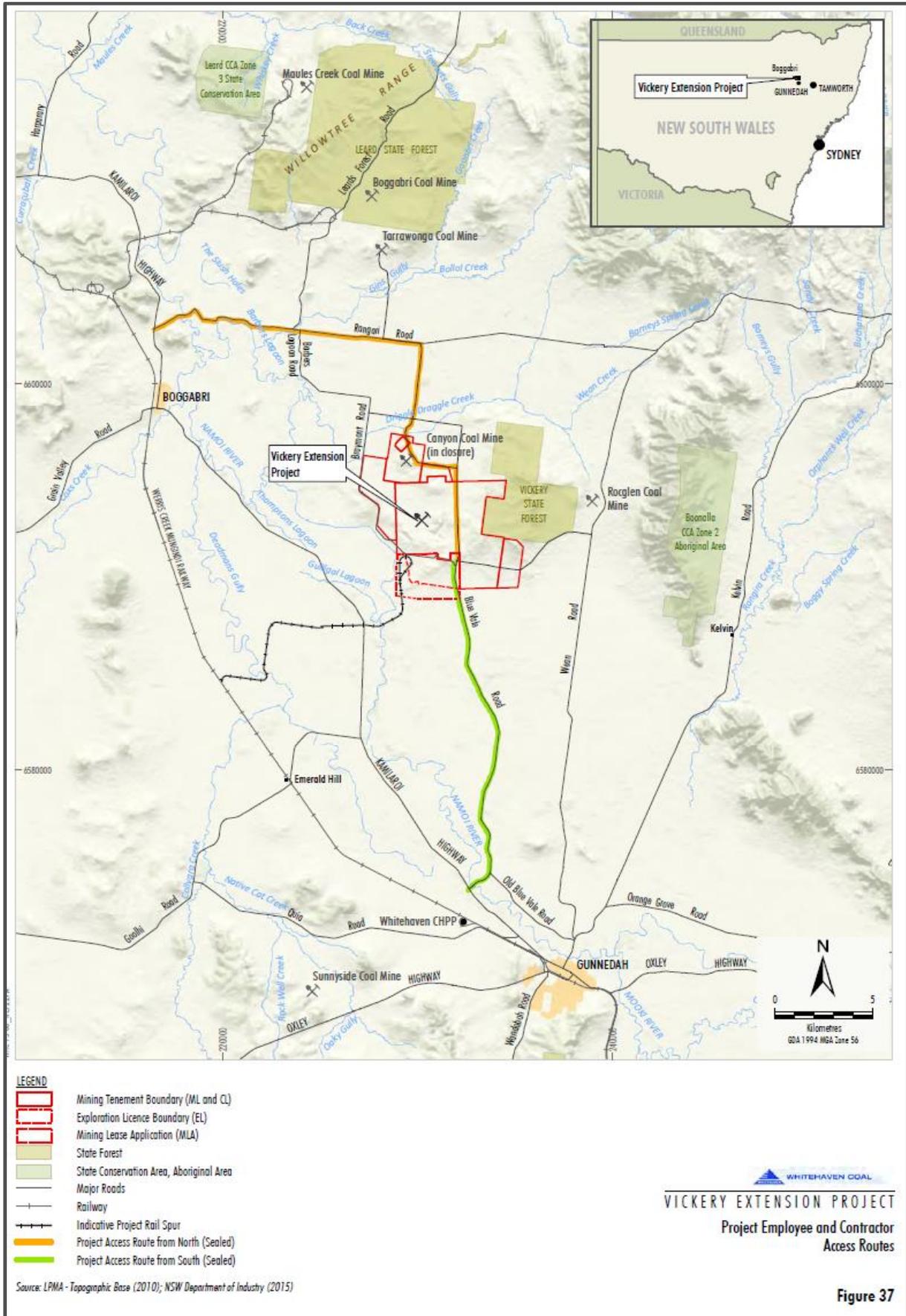


Figure 41 | Employee and Contractor Access Routes

6.7.3 Rail transport

558. Once the Project CHPP, train load-out facility and rail spur is completed, product coal would be transported via the Werris Creek Mungindi Railway, which connects to the Main Northern Railway and provides access to the Port of Newcastle for export. On average, the Project would generate between 10 to 16 train movements (up to eight arrivals and eight departures) each day.
559. In response to the Commissions Issues Report, Whitehaven provided clarification to address concerns about Project related impacts at level railway crossings, particularly between Gunnedah township and the Project rail spur which includes the areas surrounding Emerald Hill.
560. The EIS assessment includes an analysis of the potential increase in road traffic delays as a result of Project related rail traffic experienced at level crossings. The results indicate that the probability of a vehicle being delayed by a train on the level crossings outside Gunnedah is expected to remain low and additional rail traffic from the Project is predicted to increase waiting times to between 1 minute 30 seconds per hour (average rail traffic) and 2 minutes 6 seconds per hour (peak rail traffic) (see **Table 20**).
561. However, the increased total delay per hour is not expected to change the length of time that any one vehicle would be required to wait at a level rail crossing or the queues formed, but more likely, the delay would be associated with the increased number of train movements and train frequency on the rail network resulting in a greater chance of a vehicle being stopped at any given time.

Table 20 | Rail Traffic Impact on Road Capacity at Level Crossings

Level Crossing	Average Number of Trains (trains/hour)		Level Crossing Closure Time (minutes/hour)	
	No Project	Project	No Project	Project
Average Day				
526 "Rothsay" Access Emerald Hill (passive)	1.4	1.9	4:12	5:42
527 Gunnedah Road Emerald Hill (active)	1.4	1.9	4:12	5:42
Peak Day				
526 "Rothsay" Access Emerald Hill (passive)	2.2	2.9	6:36	8:42
527 Gunnedah Road Emerald Hill (active)	2.2	2.9	6:36	8:42

After GTA Consultants (2018).

562. The rail network in the region is currently owned and managed by Australian Rail Track Corporation (ARTC). In its submission, ARTC confirmed the available capacity of the rail network in providing an adequate level of service for the Project. ARTC has also provided Whitehaven with information in relation to incidents at level rail crossings in the region since January 2014. Review of this information identifies the majority of incidents to be driver related, which is unrelated to the design or function of the level crossing. Whitehaven also notes that a new rail overpass is currently being constructed in Gunnedah, which would enable vehicles to avoid level rail crossings when travelling through Gunnedah township.
563. The Department considers that the additional information provided by Whitehaven is sufficient for its assessment of Project related impacts on level rail crossings, road/rail capacities and to address the issues raised by the Commission. Further, that any road safety impacts associated with rail crossings could be managed through the commercial arrangements with ARTC and utilising its mechanisms within the Hunter Valley Access Undertaking to identify, plan and increase capacity as and when required.
564. Once fully operational, the Project rail spur would remove the need for ongoing use of the approved road haulage route and subsequently reduce the number of coal haul trucks using public roads. This is in line with NSW Government preference to remove heavy vehicle mine haulage from public roads.
565. The Commission's Issues Report raised the question of whether or not it would be appropriate to restrict the movement of coal to only permit its transport from the Project via rail following the commissioning of the Project CHPP, rail load-out facility and rail spur.

566. In its response, Whitehaven advised that except for the currently approved road transport of coal to domestic markets (up to 150,000 tpa), it has no objection to a condition limiting the transport of coal to only occur via rail, following commissioning of the Project rail spur.
567. The Department considers that the replacement of road haulage with rail transport would provide significant safety improvements to the surrounding road network. As such, the Department has recommended a condition restricting the road transport of coal from the Project following completion of the Project CHPP, rail load-out facility and rail spur, apart from the ongoing road haulage of up to 150,000 tonnes of coal to domestic customers in any financial year, as currently allowed by the Approved Project.

6.7.1 Road safety

568. Public and interest group submissions raised concerns in relation to impacts on road safety and the efficiency of the road network. In response, Whitehaven provided additional information in its Submissions Report and clarification of the findings from the EIS assessment.
569. The EIS assessment provides a review of relevant road safety data and analysis of the potential impacts of the Project on road safety and efficiency of the road network. Noting the reduction in heavy vehicle movements following the commissioning of the Project rail spur and the proposed road maintenance agreements with Gunnedah Shire and Narrabri Shire Councils (see **Section 6.8.1 – Planning Agreements**), the assessment considers that road safety would improve compared to the Approved Project.
570. Whitehaven has prepared a Traffic Management Plan for the Approved Project. The EIS proposes additional management and mitigation measures to ensure that if approved, the Project would continue to ensure ongoing road safety. Additional measures include:
- traffic control plans as part of the Traffic Management Plan;
 - a protocol to be prepared in the Traffic Management Plan to facilitate grazier access to the TSR from Blue Vale Road, subject to operational and safety requirements;
 - drivers code of conduct as part of the Traffic Management plan; and
 - management of construction traffic on local roads and the Kamilaroi Highway.
571. Both RMS and GSC accept that the local and regional road network would support the Project, with ongoing road maintenance agreements with GSC providing improvements to road safety. The Department considers that the additional measures would be adequate in ensuring the ongoing safety for road users in the region and has therefore recommended relevant conditions of consent to address this.

6.7.2 Conclusion

572. The Department considers the transport, road and traffic assessments undertaken for the Project to be adequate and that proposed management and mitigation measures would ensure the ongoing road safety and road network efficiency in the areas surrounding the Project.
573. RMS did not raise any significant issues but noted Whitehaven's requirement to obtain a Works Authorisation Deed (WAD) for any works on classified roads such as the Kamilaroi Highway and recommended that should the Project be approved, a Traffic Management Plan (to include traffic control plans and a drivers code of conduct) be required as a condition of consent. The Department has included this requirement in its recommended conditions.
574. The Department's assessment has found that the road transport and traffic impacts of the Project would be comparable to the Approved Project, particularly in the first years of development when Project construction is occurring simultaneously with road transport of coal. Following this, the Department considers that road and traffic impacts would be expected to reduce (when compared against the Approved Project) as a result of coal being transported via rail instead of road.
575. The Department has recommended conditions to manage the traffic and transport impacts of the Project, including requiring Whitehaven to:

- restrict road and rail haulage consistent with tonnages proposed in the EIS, including an allowance for road transport of 150,000 tonnes of coal for domestic markets only once the CHPP, consistent with the Approved Project;
- maintain its existing road maintenance agreement with Gunnedah Shire Council, subject to review once heavy road haulage ceases to the Gunnedah CHPP;
- ensure that all over-dimensional vehicle access and heavy vehicle access to the mine site is via the Blue Vale Road and Hoard Lane;
- ensure that no development-related traffic uses Braymont Road, except in emergency or infrequent use such as for monitoring;
- undertake design and construction of proposed road re-alignments and the Kamilaroi Highway rail spur line overpass to the satisfaction of the appropriate roads authorities (Transport for NSW and GSC); and
- prepare and implement a Traffic Management Plan for the Project.

6.8 Social and Economic

576. The key social impact and economic evaluation issues identified in the Commission's Issues Report are outlined in **Table 21** below and considered in detail in the following sections.

Table 21 | Commission Issues Report – Social and Economic

Issues requiring further consideration
<p>Social</p> <ul style="list-style-type: none"> • Impacts on the elements of the community that do not receive mining income. • Expand the SIA risk assessment for post mining impacts focusing on impacted communities such as Boggabri.
<p>Economic</p> <ul style="list-style-type: none"> • CBA assumptions related to incremental benefits compared to the Approved Project and limitations on Gunnedah CHPP/ road transport restrictions. • Comparative economic assessment of relocation of the CHPP/ rail loop further to the east.

6.8.1 Social Impacts

577. The EIS includes a Social Impact Assessment (SIA) of the Project undertaken by Elliott Whiteing. The SIA was undertaken generally in accordance with the Department's *Social Impact Assessment Guideline for State Significant Mining, Petroleum Production and Extractive Industry Development* (SIA Guideline).
578. The Project would generate a range of social benefits for the local and regional community through additional jobs and economic growth in the regional economy. It would also generate benefits for the State through royalties and tax revenues. The social benefits of the Project are mainly through the direct and indirect employment opportunities that arise in the region and the associated flow on effects into the regional economy. In addition, there are the broader benefits to NSW through payment of royalties to the State.
579. However, there are potential adverse social impacts in the local community, particularly to rural residential receivers closer to the mine where there would be an increase in amenity impacts. The Department acknowledges that even where noise and dust limits are considered acceptable under NSW Government policy and guidelines, they may not be acceptable to the residents and community living near the mine.
580. Nonetheless, the NSW Government has set cumulative and project specific criteria for assessing noise and dust impacts based on current scientific knowledge such that there is a reasonable balance between development and protecting the amenity of people in the community.
581. A summary of the social impact assessment and the Department's consideration of the social impacts is provided below.

Infrastructure, Services and Facilities

582. A key social impact change compared to the Approved Mine is the additional construction workforce likely to be accommodated in Boggabri over an approximate 12-month period. The Approved Mine required a peak construction workforce of 60 full-time equivalent persons, with the Project requiring a significant increase to as many as 500 FTE.
583. The social impact assessment identified the potential for impacts on accommodation availability in the region as a result of peaks in the construction workforce, particularly for the resources and energy sector where there may also be cumulative impacts in demand for available short term and rental accommodation. This has the potential to impact on rental prices and impact non-mining sector and lower socio-economic members of the community with lower socio-economic status.
584. It is proposed that the construction workforce would use the existing Civeo Boggabri Village facility which currently has 500 beds. This facility was approved (for 850 beds) by the Northern Joint Regional Planning Panel in 2012, following an assessment of the development by NSC, to cater for large construction projects in the region, and initially targeted the construction workforce required for the Maules Creek and Boggabri Coal Mine Projects, including the construction workforce required for the rail spur line supporting these mines.
585. The Northern JRPP approved the Boggabri Village subject to conditions following an assessment of the merits of the development, including social impacts on Boggabri.
586. Concerns were raised in consultation on the SIA, submissions and also by NSC about social cohesion between the construction workforce residing at the Village and the town, including that there would be a high population of predominantly male construction workers. The Department notes that that Whitehaven has developed a Workforce Diversity Policy and has established a workforce Code of Conduct regarding personal behaviour.
587. The Department considers that the approved Boggabri Village provides suitable accommodation for the construction workforce as contemplated in the Northern JRPP approval. Larger construction peaks associated with other resource projects in the area have used this accommodation and the ongoing use of the facility would also support business opportunities in the town, as also identified in the JRPP approval. The use of the facility would alleviate pressure on rental prices in Boggabri during the construction peak.
588. During operations, Whitehaven estimates that the peak workforce would increase from 250 FTE to 450 FTE, with the average workforce over the Project's operations to increase from 213 to 344 FTE. Based on its experience at its existing mines and its employment strategy to target a local workforce, Whitehaven anticipates that 70% of the workforce would be from the local area and 30% would be non-local hires.
589. The non-local employees would be encouraged to move to the area, but it is expected that there would be a small component of Drive in Drive Out (DIDO) or Fly in Fly Out (FIFO) workforce where Whitehaven would encourage these workers to use the Boggabri Village for accommodation to reduce impacts on short term rental accommodation.
590. Whitehaven also has a goal that that Indigenous persons would make up 10% of its operational workforce. Whitehaven has been successful in this regard with 13% of its workforce at the Maules Creek Coal Mine identifying as Indigenous persons, with 9% across its broader operational workforce. Whitehaven has implemented an Indigenous Employment Strategy for its operations.
591. For the purposes of assessing the social impacts on infrastructure and services, Whitehaven assumed that its operational workforce would reside in towns as summarised in **Table 22** below.

Table 22 | Operational Workforce

Area	% workforce	Total (peak)	Recruited locally (70%)	Move into area (30%)	New residents ¹	% 2016 population
Gunnedah	54	243	170	73	182	2.28
Boggabri	21	95	66	28	71	8.28
Narrabri	13	59	41	18	44	0.74
Manilla	9	41	28	12	30	1.44
Other	3	14	9	4	10	N/A
Total	100	450	315	135	338	

Note 1- Based on average household size of 2.5 persons across Gunnedah and Narrabri LGAs, from ABS 2016 Census data (Table 3-7 SIA Appendix of the EIS)

592. NSC in its letter of objection in late February 2020 (see **Appendix G3-3**) considered there was insufficient evidence to support the stated operational and construction workforce numbers citing that the Project, based on a metric of workers/ Mt of ROM coal, was inconsistent with that of the Approved Project, with 0.44 FTE construction employees/ Mt of coal compared to 2.79 FTE for the Project, and 55 FTE operational workers / Mt coal compared to 45 FTE for the Project.
593. On this basis, NSC questioned whether the predicted benefits to the local regional economy would occur and consider that they may be overstated. NSC also queried whether increasing level of automation within the resources sector would further reduce employment benefits. This issue has been raised in community submissions during both the exhibition period and to the IPC public hearing, with the EDO's SIA expert Dr Alison Ziller also raising this in a briefing with the Department.
594. Whitehaven provided a response to Narrabri's Feb 2020 letter (see **Appendix G6-2**) noting that there are key differences, namely the Approved Project does not include the construction of the CHPP and rail spur line which are significant new infrastructure components of the Project. Further, that the workforce employment numbers are based on extensive operational experience in the area, and that workforce numbers at other operations, such as Maules Creek, have exceeded feasibility study estimates, such as that used for the Project.
595. On the issue of automation, Whitehaven maintains that it has no plans to introduce an automated mining fleet into the Project. It acknowledges that it is undertaking automation trials at the Maules Creek mine involving some haul trucks only, however the productivity gains from this trial are still being assessed. Further, Whitehaven advises that the trial is limited to haul trucks and that all other mining fleet, CHPP operations, rail load out and other ancillary activities are not being considered for automation trials.
596. The Department also notes that the economic evaluation includes a sensitivity analysis of the employment benefits (disposable income) of the Project in determining the net benefits to NSW. Depending upon assumptions about re-employment opportunities and alternative wages without the Project, the net employment benefits range from \$249-\$293 Million incorporating the Approved Project, and \$105-\$122 Million as an incremental increase compared to the Approved Project. There would also be flow on benefits through indirect employment opportunities created outside direct mining related workforce, for example in services industries.
597. The economic assessment shows that even without the inclusion of employment benefits (and associated personal income taxes and Medicare payments to NSW) the Project would accrue a net benefit of \$880 Million (incorporating the Approved Project) or \$360 Million incremental to the Approved Project.
598. The Department therefore considers that the employment projections are reasonable and provide an adequate basis for the assessment of the merits of the project.

599. In regards operational workforce accommodation requirements, at peak workforce of 450 FTE, Whitehaven estimates that there would be up to 135 workers migrating into the region (approximately 338 additional people). The Department notes that the average workforce is 344 FTE so there is likely to be variable demand over the life of the Project and short to medium term rental options may be more suitable for some of the additional in-migration workforce during peak operations.
600. In its analysis, Whitehaven predicted that at peak demand, 9 new rental and 19 new purchased properties may be required in Boggabri with the SIA identifying that rental availability and housing stock was low in Boggabri. However, there is sufficient capacity across Gunnedah and Narrabri local government areas to cater for the estimated increase in the regional population.
601. Consultation during the preparation of the SIA included feedback that the attraction of new people to Boggabri was vital for the town's growth and that a promotional campaign was needed to attract new residents to compete with workers choosing to reside in the larger towns of Gunnedah and Narrabri.

Social Impacts on Landowners

602. While there are benefits to the regional community and to NSW, the benefits and impacts of the Project would not necessarily be distributed equitably, and some groups within the community may be disproportionately impacted.
603. Submitters on the Project raised concerns about social impacts on the local farming community around the mine site, particularly on social cohesion due to ongoing acquisitions by mining companies, and that benefits are not accruing to Boggabri and the local community, rather to the larger regional centres of Narrabri and Gunnedah.
604. The Department acknowledges that the Project would result in amenity impacts on landholders around the mine site and along the rail spur line. In particular, to the south west of the mine there is a close-knit farming community which will be directly impacted by the mine.
605. The Department notes that the noise and dust emission impacts from the mining operations are similar to that of the Approved Project, with only one receiver predicted to have a significant noise impact such that acquisition rights are afforded under the VLAMP. However, the key changes affecting this community are the introduction of the rail spur line and the CHPP and rail load out which would change the character of the area.
606. The Department has met with the local landholders on a number of occasions during the assessment and recognises that the Project is causing significant stress and uncertainty to these landholders. This has also been exacerbated by the recent drought conditions in the area.
607. Due to noise impacts, and in accordance with the recommended approach in the VLAMP, Whitehaven has been seeking a negotiated agreement with the landowner of the Mirrabinda property (see **Figure 29** property ID 127) for some time. In recognition of impacts to these rural residential receivers, Whitehaven has more recently been seeking negotiated agreements with a further 6 landholders closer to the mine and along the rail spur line. All these negotiations are ongoing.

Mitigation

608. Whitehaven's SIA proposes the following strategies:
- stakeholder and community engagement strategies, including complaints handling procedures;
 - neighbour amenity and quality of life, including maintaining engagement and property specific management plans to build good relations, minimising amenity impacts including potential landscape screening;
 - community infrastructure to manage the demand on services;
 - housing and workforce management;
 - encouraging local business opportunities to become involved in contributing to the Project; and
 - developing a transition strategy for mine closure and decommissioning.

Planning Agreements

609. Whitehaven has offered to enter into Voluntary Planning Agreements (VPAs) with GSC and NSC for the Project. Whitehaven's offer is consistent with that of the Approved Project which proposed a total contribution of \$7.5 M split between the two councils with 70% (\$5.25 M) to GSC and 30% (\$2.25 M) to

NSC, in recognition that the Approved Project site is mainly located in the Gunnedah LGA with the majority of the workforce sourced from GSC.

610. The VPA offers for the Approved Project were accepted by both councils and the development consent conditions require these VPAs to be executed.
611. For the Project, Whitehaven has increased its VPA offer to a total of \$10.7 M again with a 70:30 split consistent with the existing VPA, with \$7.4 M to GSC and \$3.2 M to NSC. The increase in the total contribution was based on a pro-rata increase on the tonnage of coal extracted for the Project.
612. GSC has accepted the VPA offer from Whitehaven (see **Appendix G3-1**) with the monetary contributions linked to a \$0.075/ tonne of product coal, based on production of 143 Mt over the life of the Project, with two up-front payments of \$500,000, and ongoing payment at \$0.065/ tonne of product coal. GSC and Whitehaven are currently in the process of executing the VPA in accordance with the requirements of the EP&A Act. The Department has recommended a condition that the VPA offer be executed within 6 months of the commencement of the Project.
613. The metric of \$0.075/ tonne of product coal has been used in a number of Gunnedah basin coal mines, most recently for the Watermark Coal Project.
614. NSC did not accept Whitehaven's VPA offer (see **Appendix G3-2**) and consulted with the Boggabri community about suitable projects to fund in Boggabri. Following this consultation NSC requested that Whitehaven provide the following monetary contributions:
- \$14.9 Million to be spent on projects in Boggabri; and
 - \$7.5 Million on road upgrades along Braymont Road and additional maintenance funding.
615. Whitehaven made a revised offer that provided targeted funding of projects in Boggabri that resulted largely from the community consultation undertaken by NSC to the value of \$3.2 Million (see **Appendix G6-1**) including:
- upgrade to the Boggabri Pool - \$500,000;
 - community meeting space - \$500,000;
 - retirement units in Boggabri - \$850,000;
 - Merton Street Streetscape Project - \$500,000;
 - showground improvements - \$750,000; and
 - contribution to a community development role for Boggabri - \$100,000
616. In instances where a development occurs across two local government areas, or where there are some infrastructure/ service demands in local government areas adjoining a development there is no specific formula for how overall contributions should be divided. The Department notes that under the EP&A Act contributions towards public infrastructure and services related to a development can be provided through a Planning Agreement under Section 7.1 of the Act and/or through Section 7.11/ 7.12 developer contributions in accordance with a contributions plan in accordance with Section 7.13 of the Act.
617. Both NSC and GSC have prepared contributions plans which require that for developments with a cost of development exceeding \$200,000 that a levy of 1.0% of the cost of development would apply. Using the capital investment value (CIV) of the Project as a proxy for the cost of development, this would equate to a total contribution of approximately \$6.1 million. The NSC or GSC contributions plans do not include any formula or provisions for local government area cross boundary apportionment of contributions.
618. The Department also notes that NSC recently accepted a VPA with Santos for the Narrabri Gas Project for approximately \$14.5 M including \$13 M towards contributions and \$1.5 million towards road maintenance. The Narrabri Gas Project is located entirely within the Narrabri local government area and has a CIV of \$3,600 Million. The VPA for the Narrabri Gas Project is therefore equivalent to 0.4% of the capital investment value of the Project, rather than the maximum of 1% contemplated in the contributions plan.
619. Under Section 7.13 of the Act, a consent authority other than Council, can impose a condition under Section 7.12 even though it is not authorised (or of a kind allowed) by, or is not determined in accordance with, a contributions plan, but the consent authority must have regard to any contributions plan that applies to the whole or any part of the area in which the development is being carried out.

620. The Department recommends that, if the VPA offered by Whitehaven is not accepted by NSC and therefore unable to be executed, it is reasonable to include a condition that Whitehaven make a monetary contribution of \$3.2 million to NSC for infrastructure, services and community projects in Boggabri prior to the commencement of construction. In consideration of NSC's contributions plan the Department notes the following:

- the development is a type that is contemplated by the plan and is not of a type exempted under the plan;
- the capital investment value of \$607 million is a reasonable approximation of the cost of development under the contributions plan;
- the contributions plan contemplates that in the case where a planning agreement cannot be reached, that a condition requiring a levy under the contributions plan would apply;
- a 1% levy for the development equates to around \$6.1 million, noting that Whitehaven has offered a total contribution of \$10.2 million across both local government areas;
- while Whitehaven has divided the total \$10.2 offer 70:30 between GSC and NSC, the \$3.2 million offer equates to around half of the 1% levy of the cost of development (rather than the 30% proportion payable to NSC under the VPA for the Approved Project); and
- the contribution should be indexed annually pending the timeframe for providing the funds.

621. The Department also notes that the contributions plan includes a schedule of works where contributions would be directed, including a small number in Boggabri. However, in line with the Council's consultation with the Boggabri community, the recommended condition includes a requirement to direct the contribution to projects in Boggabri.

622. The inclusion of this recommended condition would allow funds to be directed to NSC in the event that a VPA could not be executed.

Mine Closure

623. The IPC requested that the SIA risk assessment be expanded for the mine closure stage and on transitional strategies for impacted communities such as Boggabri.

624. In the SIA, Whitehaven identified mine closure as a key social impact with loss of employment in the local area. Some submitters and the EDO's Dr Ziller raised concerns about inter-generational equity associated with the final landform, particularly that rehabilitation may not be completed, as has been the case historically with derelict mines in NSW. As discussed in **Section 6.5.1** above, Whitehaven is required to lodge a security deposit under its Mining Lease to ensure there are sufficient funds for the NSW Government to undertake rehabilitation of the mine, if required. This security deposit is progressively reviewed such that the funds are refined to account for the level of disturbance.

625. Whitehaven is also required to prepare a closure plan under the provisions of its Mining Lease and the Department has recommended conditions for the preparation of a Rehabilitation Strategy and Rehabilitation Management Plan that incorporates ongoing planning for mine closure. These documents are required to be prepared in consultation with NSC and GSC.

626. The Rehabilitation Strategy is required to include a post-mining land use strategy to investigate and facilitate post-mining beneficial land uses for the site (including the final void) that includes a stakeholder engagement plan to guide rehabilitation and mine closure planning processes and outcomes. The strategy is also required to investigate ways to minimise adverse socio-economic effects associated with rehabilitation and mine closure.

627. Whitehaven in its Submissions Report reiterated its commitment to prepare a Mine Closure Plan 3 to 5 years in advance of mine closure

Social Impact Management Plan

628. The Department has recommended conditions requiring Whitehaven to prepare and implement a comprehensive and adaptive Social Impact Management Plan (SIMP) for the Project, in consultation with GSC, NSC, the Community Consultative Committee (CCC), the local affected community and other relevant stakeholders. The plan would:

- identify positive and negative social impacts resulting from the project during construction, operations and following closure in both a local and regional context;

- include an adaptive management and mitigation program to minimise and/or mitigate negative social impacts during the life of and following the cessation of the project;
- include a detailed description of the measures that would be implemented to:
 - assist in maintaining services for the local community;
 - minimise the adverse social impacts associated with the cessation of the project; and
- include a program to monitor, review and report on the effectiveness of these measures.

6.8.2 Economic Evaluation

629. An Economic Assessment for the Project was undertaken by AnalytEcon (2018) which was peer reviewed by Dr Brian Fisher (BAEconomics).
630. The Department commissioned Mr Gavan Dwyer of Marsden Jacobs Associates to independently review the economic evaluation. The independent expert's initial review was provided with the Departments Preliminary Issues Report, with updated advice based on the review of Whitehaven's Submissions Report and response to issues raised by Mr Dwyer in his initial review (see **Appendix G4-1**).
631. Whitehaven's economic assessment predicted that the Project would generate significant benefits for NSW and the region, including:
- up to 450 full time equivalent (FTE) direct jobs at the mine (average 344 FTE jobs) and up to 500 construction jobs;
 - approximately 181 FTE indirect jobs in the region;
 - increased disposable income of \$316 million (Net Present Value (NPV)) associated with the direct and indirect jobs;
 - value added benefits of approximately \$322 million NPV in other industries in NSW; and
 - a net economic benefit of \$1.16 billion NPV from generation of additional tax revenue and royalties.
632. The Economic Assessment predicted the Project would generate the following indirect regional economic impacts:
- an additional 181 full-time equivalent jobs over the Project life associated with related upstream or downstream industries; and
 - an additional \$92 million in NPV terms (or \$8 million per annum) in disposal income associated with the additional indirect employment.
633. The Economic Assessment includes a sensitivity analysis to account for changing trends in coal pricing and demand, which indicates that the project would still provide net benefit to NSW in less favourable economic conditions, ranging between \$174 million to \$794 million in addition to the benefits of the Approved Project.
634. The independent economic expert concluded that Whitehaven's economic assessment is robust, aligns with the applicable guidelines, and the results are consistent with his expectations. Mr Dwyer noted that some aspects of the assessment warranted further clarification and consideration, specifically around the implications of transport restrictions which were also raised by the Commission in its review (discussed in Section 6.1.1). However, the economic review concluded that these aspects would not significantly alter the key outcomes of the assessment.
635. The Department has considered Whitehaven's analysis of the constraints imposed by the Approved Project and road transport limits on production at the Tarrawonga in Section 6.1.1. The Department considers that Whitehaven has demonstrated the potential economic benefits of the Project, compared with the Approved Project scenario, as it would enable increased production from the Tarrawonga and Vickery projects, because of higher transport rates facilitated by the CHPP and rail spur at the Project site.
636. As identified above, concerns were raised by Narrabri Council and public submissions around an overestimation by Whitehaven of the potential flow-on economic impacts/benefits of the Project to the region. The independent economics expert also noted that the input-output analysis adopted in the EIS

is likely to overstate the flow-on benefits of the Project, although Mr Dwyer considered these issues were of lesser significance given the State-level focus of the EIS analysis.

637. In relation to the potential costs of relocating the Project infrastructure (CHPP, MIA and rail spur) to address potential amenity impacts, Whitehaven concluded that the footprint of a 20 m high noise mitigation bund would need to be approximately 400 m wide to ensure the stability of the landform, therefore requiring a relocation of the CHPP and MIA to accommodate the bund. Whitehaven estimates the consequences of this reconfiguration would range between \$1.4 billion to \$2.1 billion in sterilised resource, plus additional costs associated with amended infrastructure and earthworks.
638. Whitehaven also analysed the potential relocation of the MIA to the secondary infrastructure area to the south-east area of the Project (see **Figure 3**). This option was discounted due to significant additional infrastructure costs associated with relocation of the rail loop (approximately \$70 million) and additional earthworks (\$15 million).
639. In response to concerns about the Project drawing skilled labour from other sectors, Whitehaven noted the recent decline in employment in the region, particularly in the agricultural sector, and argues that the Project would provide additional employment opportunities that may reduce population decline. However, Whitehaven also acknowledged that the Project may temporarily create shortages in tradespeople in the local construction and manufacturing industries. Whitehaven has committed to develop strategies for preferentially employing local residents and the Department has recommended a condition requiring Whitehaven to develop a Social Impact Management Plan for the Project to describe these strategies.

6.8.3 Conclusion

640. The Department's consideration of the range of issues through Section 6 of this report, including amenity and health impacts, impacts on water and agriculture, biodiversity and heritage, traffic and visual impacts are associated with the social impacts of the Project.
641. While the project would largely meet relevant criteria and acceptable impact levels set under NSW Government policy and guidelines, the Department acknowledges the project has already led to increased stress and anxiety for some members of the community, particularly for landowners near the mine and the rail spur line.
642. The Department has recommended a number of conditions for mitigating and managing these residual social impacts, including requiring Whitehaven to:
- comply with strict noise, blasting and air criteria and operating conditions, and prepare noise, blasting and air quality management plans;
 - comply with water quality objectives, discharge requirements and compensatory water requirements for any loss of water supply as a result of mining operations;
 - independent review of potential exceedances of applicable environmental criteria, at the request of landowners;
 - maintain complaints and incident management and reporting systems; and
 - make a range of project-related information publicly available, including:
 - the EIS and related information;
 - management plans;
 - monitoring results;
 - minutes of CCC and advisory group meetings;
 - annual reviews and audit reports; and
 - complaints and incidents.
643. Further, the Department has recommended conditions requiring Whitehaven to prepare and implement a detailed Social Impact Management Plan for the project in consultation with NSC, GSC, the CCC and the locally affected community and other affected stakeholders.

6.9 Visual Amenity and Lighting

644. The key visual amenity and lighting issues identified in the Commission's Issues Report are outlined in **Table 23** below and considered in detail in the following sections.

Issues requiring further consideration

- Mitigation options for residences with high visual impact
- Additional photomontages to assess visual impacts
- Consultation with Siding Spring Observatory and assessment of impacts on lighting impacts on the observatory

6.9.1 Visual Amenity Impacts

645. The Project is surrounded by land that is used predominantly for agriculture and mining, in an area consisting of undulating hills and slopes, adjoining the more dissected and steeper slopes of the Vickery State Forest (located east of the Project).
646. The EIS includes an assessment of the visual impacts of the Project, particularly in relation to changes in landforms and topography of the WEA, MIA and rail spur, and the potential cumulative visual impacts associated with the existing Rocglen Coal Mine. Proposed visual mitigation and management measures are also provided to minimise any visual impacts.
647. The visual impact assessment uses a visual impact matrix, which integrates the degree of visual modification to the landscape from the Project with the level of sensitivity as viewed from different land use areas. Together with the various viewpoint simulations positioned around the Project, the assessment evaluates and determines the overall visual impact for receivers, including privately-owned residences and public roads in the surrounding area (see **Figure 42**).
648. The assessment demonstrates that the most impacted receivers would be private residences and dwellings located within 1 to 5 km of the Project mining area (primarily west and south-west of the Project), which would have a moderate to high visual impact. In comparison, private residences and dwellings located in close proximity (within 1 km) to the Project rail spur and/or rail overpass are assessed as having a moderate level of visual impact while residences and dwellings located from 1 to 5 km from the rail spur and rail overpass are assessed as having a low to moderate visual impact.
649. Views of the Project mining area from nearby (within 1 km) public roads including Blue Vale Road and Braymont Road are considered to have a low to moderate visual impact, while views of the mining area from the Kamilaroi Highway (within 1 to 5 km) are considered to have a low visual impact. Views of the mining area from a greater distance (5 km or more) on these roads are considered to have a low visual impact.
650. The key concerns raised in submissions and in the Commission's Issues Report relate to the visual amenity impacts of the Project landforms at privately-owned residences, loss of scenic value of the region and potential night lighting impacts to sensitive receivers, including the Siding Springs Observatory (SSO).
651. In response to these concerns, Whitehaven provided additional information in its Submissions Report to further explain and clarify the findings of the EIS visual impact assessment. In particular, Whitehaven notes that the visual simulations (or photomontages) used in the assessment for the Project include views from the closest publicly accessible location (see VP8 in **Figure 42**) to the Project mining area, WEA, infrastructure and coal handling areas. Whitehaven argues that additional simulations are not required as the Project is not considered to greatly increase visual impacts when compared to the Approved Project, particularly for the overburden emplacement, which would be similar in height.
652. The Department acknowledges that the residences and dwellings located closest to the Project mining area would have a high visual impact including properties 127, 131, 132 and 133 (see **Figure 42** – VP9, VP10, VP11, VP12, VP16 & VP17). However, it accepts that the level of visual impact on these properties would not materially change when compared with the Approved Project.

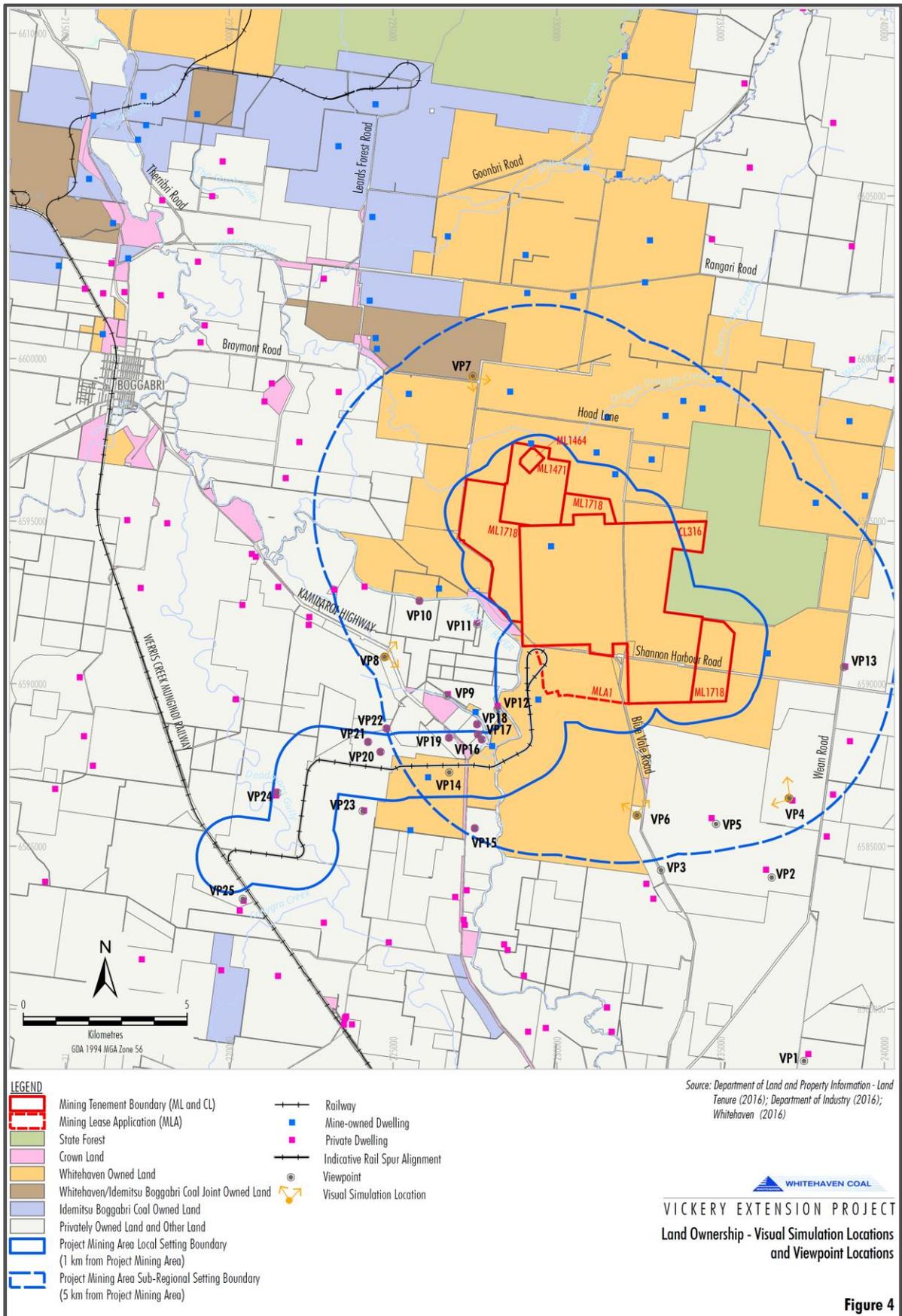


Figure 42 | Visual simulation and viewpoint locations

653. The key project landform and most visible aspect of the Project mining area would be the WEA, visible from some nearby residences and along sections of public roads up to 5 km away. At its maximum height, the WEA would be about 110 m above the Namoi River floodplain and about 110 m below the ridgeline of the Vickery State Forest. For comparison, the WEA of the Project would be about 5 m lower than the WEA of the Approved Project (see also **Section 6.5 – Rehabilitation**).
654. Project landforms would be progressively rehabilitated over the life of the mine with re-vegetation works on the WEA predicted to commence in Year 7 and established rehabilitation expected by Year 13. The Project would also benefit from improved rehabilitation methods incorporating macro-relief on the top surface levels of the WEA to mimic the landform of the Vickery State Forest.
655. The Department acknowledges that the Project rail spur introduces a new infrastructure element and would be visible to several residences in the vicinity and intermittently along public roads where vegetation and topography allow. The visual impact assessment has found that receivers and dwellings located approximately 1.5 km from the rail spur would have a moderate level of visual impact, which would reduce as the distance increases.
656. Direct views of project lighting sources, particularly from the MIA, would be most likely to occur for receivers and residences located immediately west of the Project. Once completed (around Year 13), the WEA would provide a barrier to protect receivers from the Project light sources. The visual impact assessment considers the direct and indirect night lighting impacts to be similar to the that of the Approved Project. Nevertheless, Whitehaven has committed to implementing specific night lighting measures to mitigate any potential lighting impacts and the Department has incorporated this in its recommended conditions (see **Section 6.9.2 – Lighting**)
657. The Department recognises that the Project would result in some considerable changes to the visual landscape, particularly for the closest receivers during the early stages of the Project and development of the WEA, prior to the establishment of vegetation. The Department acknowledges Whitehaven's commitment to minimise visual impacts and notes that these impacts would reduce over time, particularly as rehabilitation of the WEA progresses and vegetation is established (from about year 7).
658. Whitehaven advised that it has individually consulted with visually affected properties to advise of the expected level of visual impact (over the various stages of the Project) and explain the management and mitigation options available. Further, the established riparian corridor located between the Project mining area and residences with high visual impact (west and south-west of the Project) would assist in providing additional screening.
659. To mitigate and manage visual impacts, Whitehaven has committed to implementing a range of on-site and off-site measures that include:
- vegetation screens and bunds to limits visual impacts from public roads;
 - introduction of macro-relief to the top surface of the emplacement area to improve the integration of the surrounding environment;
 - progressive rehabilitation over the life of the Project;
 - decommissioning of Project infrastructure post-mining;
 - measures to retain and enhance existing coverage and connectivity of vegetation; and
 - consultation procedures for landowners to identify localised mitigation options including the application of vegetation screens, artificial screens, landscape treatment (ie bunds) and installation of curtains or cladding at or within the residence.
660. The Department has incorporated these measures into its recommended conditions of consent for the Project.

6.9.2 Lighting – Dark Sky Region

661. The Commission's Issues Report raised concerns over the potential lighting impacts on the Siding Spring Observatory (SSO) and consideration of the *NSW Dark Sky Planning Guideline* (Dark Sky Guideline).
662. Under Clause 92 of the EP&A Regulation, the consent authority must consider the Dark Sky Guideline for State significant development where a project is located less than 200km from the SSO. The Project

is located approximately 120 km north east of the SSO and therefore, the Dark Sky Guideline must be considered by the consent authority.

663. In response to submissions and the Commission's request, Whitehaven provided additional information including a light impact assessment, prepared by Light Naturally in consultation with the SSO (see **Appendix G6-17**). The light impact assessment considers the predicted impact of light emissions from the Project on the night sky above SSO, in accordance with the Dark Sky Guideline.
664. The light impact assessment provides an analysis of predicted sky glow or luminance levels likely to occur as a result of the Project together with light from existing anthropogenic sources in the region (including nearby towns and mines) and with regard to other environmental factors including atmospheric conditions and surrounding geographical features. The findings of the assessment conclude that the estimated luminance from the Project would not exceed threshold requirements of the Dark Sky Guideline.
665. In accordance with the consultation requirements of the Dark Sky Guideline, the SSO has reviewed the light impact assessment and has not raised any further concerns. The SSO provided minor comments which have been addressed in the final version of the light impact assessment (see **Appendix G6-16**).
666. The Department has recommended conditions requiring the implementation of reasonable and feasible measures to ensure that all visual and off-site lighting impacts from the Project (including the SSO) are minimised, including:
- the use of external lighting that complies with the *Australian Standard AS 4282 (INT) 1997 – control of Obtrusive Effects of Outdoor Lighting*;
 - minimising lighting impacts of the Project on the SSO;
 - ensuring in pit mobile lighting is contained below the pit wall and the horizontal; and
 - ensuring fixed outdoor lighting is not directed above the horizontal or building line.

6.9.3 Conclusion

667. The Department considers the visual and light impact assessments undertaken for the Project to be adequate and that proposed management and mitigation measures would ensure that impacts are minimised as far as practicable.
668. The Department's assessment has found that the visual and light impacts of the Project would be comparable to the Approved Project, particularly for the WEA which would be similar in height and that the Project would not greatly increase the visual impacts for surrounding receivers.
669. However, the Department recognises that some visual impacts would be unavoidable for various stages of the Project (particularly during construction and early development stages) but considers that any significant change would be reasonably mitigated through progressive rehabilitation of the mine landscape and vegetation screening to acceptable levels over the life of the Project.

6.10 Public Interest

670. The key public interest issues identified in the Commission's Issues Report are outlined in **Table 24** below and considered in detail in the following sections.

Table 24 | Commission Issues Report – Public Interest

Issues requiring further consideration

- Consideration of the objects of the EP&A Act including the principles of ESD
- Greenhouse gas emissions having regard to relevant climate change policy frameworks
- Demand for product coal and whether its sale would be to a country that is a signatory of the Paris Agreement

6.10.1 Greenhouse Gas Emissions

671. The EIS includes a greenhouse gas assessment prepared by Ramboll Environmental, developed in accordance with the Commonwealth Government’s *National Greenhouse and Accounts Factors* (NGAF).

672. Greenhouse gas (GHG) emissions are categorised into three different types including:

- Scope 1: direct emissions from owned or controlled sources of an organisation/ development;
- Scope 2: indirect emissions from the generation of purchased energy electricity, heat and steam used by an organisation/ development; and
- Scope 3: all other upstream and downstream emissions related to an organisation/ development.

673. Under GHG emissions reporting and accounting frameworks⁷, the Scope 2 and 3 emissions estimated for the Project are the Scope 1 emissions of other organisations/ developments. For example, the Scope 3 emissions from combustion of coal in an overseas country would form part of the Scope 1 emissions of the organisation / development using the coal (eg. for metallurgical use or for power generation) and would also be the Scope 1 emissions of the country where the coal is combusted under applicable national accounting frameworks.

674. The main sources of Scope 1, Scope 2 and Scope 3 GHG emissions from the Project are from electricity consumption, fugitive emissions of carbon dioxide (CO₂) and methane (CH₄), diesel usage, and the transport and end use of product coal, with the estimated contributions shown in **Table 25** below.

Table 25 | GHG emissions for the Project (as amended)

GHG emissions Scope and description of key sources	Million tonnes (Mt) CO ₂ -e over project life
Scope 1	
<ul style="list-style-type: none"> • Diesel consumption • Use of explosives • Fugitive emissions 	3.1
Scope 2	
<ul style="list-style-type: none"> • Emissions from the consumption of purchased electricity 	0.8
Scope 3	
<ul style="list-style-type: none"> • Upstream emissions – from the diesel and electricity supply used for the Project • Downstream emissions from the transport of coal product from the Project • Downstream emissions from the combustion of coal product from the Project 	366

675. The Project would generate approximately 3.1 Mt carbon dioxide equivalent (CO₂-e) of Scope 1 emissions, 0.8 Mt Scope 2 and 366 Mt CO₂-e Scope 3 emissions. Whitehaven’s air quality peer reviewer Aleks Todoroski undertook a review of the Scope 3 emissions from the downstream burning of coal confirming that the calculations are consistent with the emission factors set out in Commonwealth Government’s *National Greenhouse Energy and Reporting Scheme* (NGERS) (see **Appendix G6-18**). Due to the reduction in coal resource now proposed to be extracted, compared to the EIS GHG emission calculations there is a reduction of 0.1 Mt for Scope 1 emissions, 0.1 Mt for Scope 2 emissions and 23 Mt reduction for Scope 3 emissions.

⁷ The *Greenhouse Gas Protocol* (GHG Protocol) (World Business Council for Sustainable Development [WBCSD] and World Resources Institute [WRI], 2004) was applied for the Project.

676. Annually, the Project would contribute an average of approximately 0.12 Mt CO₂-e of Scope 1 GHG emissions, and approximately 14.7 Mt CO₂-e of Scope 2 and Scope 3 GHG emissions, over the life of the Project.
677. The predicted GHG emissions intensity for the Project would be about 0.02 tonnes of CO₂-e per tonne of ROM coal (including all Scope 1 and Scope 2 emissions) and is comparable or better to other similar coal mining projects in the region, which range from 0.02 to 0.07 tonnes of CO₂-e per tonne of ROM coal.
678. In comparison to the Approved Project, there would be a reduction of about 1 Mt CO₂-e of Scope 1 emissions, increase of about 0.15 Mt CO₂-e Scope 2 emissions and an increase of about 100 Mt CO₂-e of Scope 3 emissions over the life of the Project. The reduction in Scope 1 GHG emissions can be partially attributed to the inclusion of the Project CHPP, rail loop and rail spur, and the associated reduction in the consumption of diesel fuel associated with ROM coal haulage by truck to the Gunnedah CHPP.
679. Based on the Commonwealth Government's *Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2019*, Australia's annual emissions equate to about 532 Mt CO₂-e. As such, the Project's Scope 1 emissions would contribute to about 0.028% of Australia's annual GHG emissions.

Minimising Scope 1 and Scope 2 Emissions

680. The EIS proposes a range of management and mitigation measures for Scope 1 and Scope 2 GHG emissions to be minimised as far as possible. Diesel consumption is by far the largest Scope 1 contributor (at around 90%) and therefore reduction in diesel use is a high priority for the Project, noting that it is in Whitehaven's financial interest to minimise the use of diesel.
681. Minimisation strategies include:
- maximising efficiencies of the mining fleet – related to maintenance, higher efficiency engines, idle times;
 - optimising mine scheduling to reduce haul lengths and grades;
 - revegetation in addition to rehabilitation and offsetting requirements, for example the proposed local enhancement plantings on Whitehaven properties;
 - energy efficiency initiatives to reduce indirect electricity consumption Scope 2 emissions; and
 - participation, monitoring and reporting within the NGRS, which includes ongoing review of technologies / measures to further minimise GHG emissions.
682. While Whitehaven it is has identified reasonable and feasible measures to reduce its Scope 1 and 2 emissions, the Department has recommended conditions that:
- all reasonable steps are taken to improve energy efficiency and reduce greenhouse gas emissions of the development; and
 - that an Air Quality and Greenhouse Gas Management Plan is prepared describing the measures to be implemented and that best management practice is employed to minimise the Project's Scope 1 and 2 GHG emissions and to improve the energy efficiency.

Climate Change Policy Consideration

683. Under Clause 14(1) of the Mining SEPP, the consent authority is required to consider whether conditions should be attached to consents to ensure that the development is undertaken in an environmentally responsible manner, including conditions to ensure that GHG emissions are minimised to the greatest extent possible.
684. Under Clause 14(2), the consent authority, in determining a development application, must also consider an assessment of GHG emissions (including downstream emissions) from the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning GHG emissions.
685. There are two key documents of relevance for the assessment of the Project:
- the NSW Government's *NSW Climate Change Policy Framework (CCPF)*; and
 - The Commonwealth Government's commitments to the *United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement 2015 (Paris Agreement)*.

686. It is noted that more recently (i.e. March 2020), the Government announced a new 10-year plan to put the State on track to achieve net-zero emissions by 2050, the *Net Zero Plan Stage 1: 2020-2030*. The Plan builds on the CCPF and sets out a number of initiatives to deliver a 35% cut in emissions by 2030, compared to 2005 levels.
687. Whitehaven in Section 6.15 of its Submissions Report provided further advice on the application of the CCPF and the Paris Agreement commitments to the Project.
688. The Department has considered the CCPF, which outlines the State's long-term aspirational objectives of achieving net-zero emissions by 2050 and making NSW more resilient to a changing climate. The CCPF does not set prescriptive emission reduction targets and sets policy directions for government action, for example, to improve opportunities for private sector investment in low emissions technology in the energy industry, which is needed for a transition to a net-zero emissions inventory.
689. On this basis, the Department considers that the Project is not inconsistent with the CCPF and notes that Whitehaven has committed to minimising its Scope 1 emissions over which it has direct control. The Department has recommended conditions in this regard to ensure that the Project's emissions are minimised to the greatest extent possible by applying best practice in GHG emissions reductions for Scope 1 and 2 emissions.
690. Under the Paris Agreement, the Australian Government committed to a nationally determined contribution (NDC) to reduce national GHGs by between 26 and 28 percent from 2005 levels by 2030. Australia has committed to meeting this target through initiatives that focus on expanding renewable energy sources, supporting low emissions technologies, improving energy efficiencies and incentivising companies to reduce their emissions without compromising economic growth and driving up energy prices.
691. According to Whitehaven, the Project's Scope 1 emissions would contribute less than 0.03% of Australia's 2030 commitment under the Paris Agreement (based on a 28% reduction of GHG emissions compared to 2005 levels or about 440 Mt CO₂-e).
692. The Department acknowledges that the Scope 3 emissions from the combustion of product coal is a significant contributor to anthropological climate change and the contribution of the Project to the potential impacts of climate change in NSW must be considered in assessing the overall merits of the development application.
693. Importantly, the Project's Scope 3 emissions would not contribute to Australia's NDC, as product coal would be exported for combustion overseas. These Scope 3 emissions become the consumer countries Scope 1 and 2 emissions and would be accounted for in their respective national inventories.
694. A regular 5-yearly review of NDCs is required under the Paris Agreement with the next review to be submitted by signatories in 2020. The Department acknowledges that ongoing review to meet emission targets by signatories may affect export markets for coal and that the UNFCCC global approach to nationally determined emission reduction targets is the appropriate mechanism for managing Australia's Scope 3 emissions, rather than regulating Scope 3 emissions on a project by project basis in Australia.
695. The Department also notes that the Department's '*Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals*' and the associated 2018 technical notes do not require the social cost of Scope 3 emissions to be incorporated into the economic evaluation when determining the net benefits to NSW or Australia of the development. This approach, where both the costs and benefits of consumption and use of the coal is considered by the country/ development where the coal is being used, is consistent with the global accounting framework for GHG emissions under the UNFCCC.
696. Importantly, the NSW or Commonwealth Government's current policy frameworks do not promote restricting private development as a means for Australia to meet its commitments under the Paris Agreement or the long-term aspirational objective of the CCPF guidelines. Neither do they require any action to be taken by the private sector in Australia to minimise or offset the GHG emissions of any parties outside of Australia, including the emissions that may be generated in transporting or using goods that are produced in Australia.
697. In November 2019, the Commonwealth Government wrote to Minister Stokes (see **Appendix G2-3**) about the consideration of GHG emissions advising that "*any requirement to consider scope three*

emissions within a sub-national or state jurisdiction is inconsistent with long accepted international carbon accounting principles and Australia's international commitments."

698. The Department also notes that it is not the NSW Government's policy that planning conditions should seek to regulate directly or indirectly matters of international trade which are appropriately regulated by the Commonwealth Government.
699. On this basis, the Department does not consider the Project is inconsistent with Australia's commitments to the Paris Agreement.
700. In regard to Clause 14(1) of the Mining SEPP, the focus should be on the impacts that can be reasonably controlled by the applicant of a development (such as the Scope 1 and relevant Scope 2 emissions) and not Scope 3 or downstream emissions, as these would be the Scope 1 or 2 emissions of another development. Again, this is consistent with the global accounting framework for GHG emissions under the UNFCCC.
701. There is no NSW or Commonwealth policy that supports placing conditions on an applicant to minimise the Scope 3 emissions of its development. Any such policy is likely to result in significant implications for the NSW and Australian economy and it is not clear it would have any effect on reducing GHG emissions generated by parties in other jurisdictions outside Australia. Further, conditions must be for a proper planning purpose, must fairly and reasonably relate to the subject development, and must not be manifestly unreasonable.
702. On this basis the Department has recommended conditions requiring Whitehaven to take all reasonable steps to improve energy efficiency and reduce Scope 1 and Scope 2 GHG emissions for the Project and to prepare and implement an Air Quality and Greenhouse Gas Management Plan, including a requirement to apply best practice to minimise the Scope 1 and 2 emissions of the Project.
703. The Department also acknowledges that GHG emissions have attracted additional attention following a February 2019 judgement in the Land and Environment Court (Rocky Hill appeal – [*Gloucester Resources Limited vs Minister for Planning*] (2019 NSWLEC 7) and the Commission's subsequent decisions relating to GHG emissions in coal mining projects, including the refusal of Bylong Coal Project and inclusion of conditions relating to Scope 3 GHG emissions for the United Wambo Open Cut Coal Mine.
704. In its Statement of Reasons for Decision for the Rixs Creek Continuation of Mining Project (SSD 6300), the Commission noted that the Applicant for the Rixs Creek Project does not have direct control over Scope 3 emissions and accepted that Scope 3 emissions were the responsibility of the end customer for coal export. The Commission also noted that coal consumption in countries which are signatories to the Paris Agreement, or have enforced GHG reduction targets (such as Taiwan) would lead buyers to seek coal products which meet their product requirements and would also minimise GHG emissions to achieve domestic emission reduction targets.
705. The NSW Government has since introduced a Bill into Parliament (*Environmental Planning and Assessment Amendment (Territorial Limits) Bill 2019*). The Bill was introduced in response to recent planning decisions and seeks to clarify that conditions under EP&A Act can only be imposed if they relate to impacts occurring within Australia or its external territories.
706. This aligns with the intent that development consent conditions set and enforced in the NSW planning system are not an appropriate mechanism to control the impacts resulting from the activities of third parties in other countries.

6.10.2 Demand for Coal

707. The Project would produce metallurgical coal (around 70% of the product coal) including semi-soft coking coal, pulverised coal injection (PCI) coal and thermal coal (around 30% of the product coal) to supply Whitehaven's main export market customers in Japan, the Republic of Korea (South Korea) and the Republic of China (Taiwan).
708. Japan and South Korea are signatories to the Paris Agreement and have developed GHG emission reduction targets, which would be managed under the NDCs of these countries. Taiwan is not a signatory to the Paris Agreement but has developed its own GHG emission reduction targets (enforced

under its *Greenhouse Gas Reduction and Management Act*) that are comparable to those of countries who are signatories.

709. Whitehaven recognises that global coal demands are shifting and has provided an economic sensitivity analysis (see **Section 6.8 – Economic Evaluation**) to account for changing trends in forecast coal pricing and demand. The sensitivity analysis shows that significant net benefits would accrue to NSW over a range of assumptions for coal prices, discount rates, exchange rates and employment related benefits.
710. The Department notes that the majority of the coal is of metallurgical quality and that the thermal coal quality is a high calorific/ low ash/ low sulphur coal which is in stronger demand globally compared to lower quality (high ash/ high sulphur) coal. Whitehaven provided the Department with further information (see **Appendix G6-10**) on the Project's coal quality relative to anticipated demand based on the three climate changes scenarios contemplated by the International Energy Agency (IEA) in its *World Energy Outlook 2019*. Under the Sustainable Development Scenario there would continue to be demand for high quality (low ash/ low sulphur/ high calorific energy) thermal and metallurgical coal, particularly in the Asia Pacific region, as provided by the Vickery coal resource.

6.10.3 Conclusion

711. The assessments undertaken by Whitehaven for the Project have indicated that the potential GHG emissions (total and annual average forecast) generated over the life of the Project would be small in comparison to Australia's current total contribution and its NDC target for 2030, under the Paris Agreement. Further compared to the Approved Mine there is a reduction in Scope 1 emissions due to the reduction in truck haulage by road replaced by trains once the rail spur line is commissioned.
712. The Department notes that Scope 3 emissions for the Project have been adequately accounted for in the assessment, considering that these indirect emissions would occur at sources not owned or controlled by Whitehaven. Further, the Department recognises that the agreed accounting framework for measuring GHG emissions (as also adopted by the Paris Agreement) is focused on a production-based methodology (ie. Scope 1 and Scope 2 emissions) and as such, Scope 3 emissions from the Project would be accounted for by the consuming country's NDCs.
713. The Department considers that the Project has been adequately assessed against the relevant State or national policies, programs or guidelines concerning GHG emissions and would be measured and reported as required under the Commonwealth Government's *National Greenhouse and Energy Report Scheme* (NGERS) requirements. Importantly, neither the NSW or Commonwealth policy frameworks require the private sector in Australia to minimise or offset the GHG emissions of any parties outside of Australia.
714. Whitehaven has committed to using an adaptive management regime to incorporate continual improvements to its GHG emissions management and mitigation measures over the life of the Project. As such, the Department has recommended a condition requiring the applicant to take all reasonable steps to improve energy efficiency and reduce GHG emissions for the Project and to prepare and implement an Air Quality and Greenhouse Gas Management Plan, including a requirement to apply best practice to minimise the Scope 1 and 2 emissions of the Project.
715. Overall, the Department considers that the GHG emissions for the Project have been adequately considered and that, with the Department's recommended conditions, are acceptable when weighed against the relevant climate change policy framework, objects of the EP&A Act (including the principles of ESD) and socio-economic benefits of the Project.

6.11 Other Issues

716. The Commissioner's Issues Report identified most key issues of concern related to the Project. **Table 26** below includes a summary of the Department's consideration of a number of residual issues.

Table 26 | Summary of other issues

Issue	Potential Impacts	Department's Consideration
<p>Waste Management</p>	<ul style="list-style-type: none"> • The EIS indicates that the key wastes generated by the Project would include <ul style="list-style-type: none"> – overburden material; – coal rejects; – recyclable and non-recyclable general wastes; – sewage and wastewater; and – other wastes from mining and workshop related activities (e.g. used tyres and waste hydrocarbons). • Whitehaven proposes to implement the standard waste minimisation principles (i.e. reduce, re-use and recycle) to minimise the quantity of wastes that require off-site disposal. • Disposal of waste would be in accordance with the EPA's <i>Waste Classification Guidelines Part 1: Classifying Waste</i> • The EPA raised concerns with disposal of waste tyres in mining operations across NSW and sought the preparation of a Waste Management Plan to describe how Whitehaven proposes to manage waste generated by the Project. 	<ul style="list-style-type: none"> • The Department considers that Whitehaven's proposal to adopt the waste hierarchy and to minimise the generation of waste to landfill is reasonable and consistent with applicable guidelines and regulatory requirements. • The Department notes that waste disposal is regulated under the POEO Act and if Whitehaven proposes to dispose quantities of waste greater than the maximum permitted under the POEO Act it would need to be permitted under an EPL. • The Department considers that waste can be minimised during the life of the Project and has recommended conditions requiring Whitehaven to minimise waste generated by the Project and manage on-site sewage disposal in consultation with GSC and NSC. • The Department has also recommended conditions requiring Whitehaven to prepare a Waste Management Plan in consultation with the EPA and Councils, to describe how it will implement the waste measures in the EIS.
<p>Land Contamination</p>	<ul style="list-style-type: none"> • The EIS includes an assessment of existing land contamination in accordance with the requirements of <i>Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land</i> • The Contamination Assessment identified potential land contamination associated with previous farming and mining uses of the site including asbestos, lead paint, pesticides and hydrocarbons. • The Contamination Assessment concluded that the site is suitable for the Project subject to the implementation of soil management measures, inspection of areas identified in the assessment prior to excavation and hazardous materials surveys prior to demolition of existing buildings. 	<ul style="list-style-type: none"> • The Department considers that the potential impacts associated with land contamination can be adequately managed to an acceptable level of risk, and that the land is suitable for the proposed development, subject to the implementation of the recommendations in the contamination assessment.
<p>Hazards and Risks</p>	<ul style="list-style-type: none"> • The EIS includes a Preliminary Hazard Analysis (PHA) in accordance with the Department's guidelines under SEPP 33 • The PHA considered the potential hazards and risks associated with the Project, including the storage of hazardous goods, potential for fire and/or explosion and contamination of land, water and air. • The PHA concluded that with the implementation of the recommended risk treatment measures, the risk profile of the Project would be low and therefore acceptable. 	<ul style="list-style-type: none"> • The Department considers that suitable mitigation measures could be incorporated into the design of the Project to ensure that it would meet relevant standards and be compatible with the existing or likely future use of land surrounding the Project. • The Department considers that the Project would not increase risks to public safety and would not alter the consequences or likelihood of a hazardous event on the site or during materials transport. As such, the Department considers that the Project is consistent with the provisions of SEPP 33.

7 Recommended Conditions

717. In making its recommendations to the Commission, the Department has drafted recommended conditions of consent (see **Appendix L**) that reflect the Commission's Issues Report, the Applicant's Submissions Report, the Department's Preliminary Issues Report, public submissions, advice from Government agencies and comments received from the Applicant.
718. The recommended conditions are consistent with contemporary practice in regulating open cut mining projects in NSW, and the Department's indicative standard administrative and reporting conditions for State Significant Development. The Department considers the conditions provide a sound basis for preventing, minimising and/or offsetting the impacts of the Project.
719. The recommended conditions of consent for SSD 7480 include five key parts:
- Part A – Administrative Conditions: including conditions that set out the key obligations, terms and limits of the consent;
 - Part B – Specific Environmental Conditions: including strict performance measures and standards, operating and/or management conditions for noise, blasting, air quality, water, biodiversity, historic heritage, Aboriginal cultural heritage, visual amenity, waste, dangerous goods, bushfire management, rehabilitation, social impacts and transportation;
 - Part C – Construction Specific Conditions: including setting defined construction hours and requiring a construction traffic management plan for the Kamilaroi Highway overpass;
 - Part D – Additional Procedures: including additional procedures for notifying and engaging with landowners/tenants potentially impacted by the Project, such as procedures for acquisition and mitigation upon request; and
 - Part E – Environmental Management, Reporting and Auditing: including generic guidance on environmental management, incident and non-compliance notifications, annual reporting, independent audits, monitoring and public access to information.

8 Evaluation

720. The Department has assessed the development application, EIS, submissions, the Commission's Issues Report, Whitehaven's responses to submissions, the independent expert reports, and a range of additional information provided by Whitehaven, relevant government agencies and other stakeholders. The Department has also considered the objectives and relevant considerations under Section 4.15 of the EP&A Act.
721. Based on this assessment, the Department considers that Whitehaven has designed the project in a manner that achieves a reasonable balance between maximising the recovery of a high quality coal resource of State significance and minimising the potential impacts on surrounding land users and the environment as far as is practicable, particularly through:
- restricting the open cut within the hard rock aquifer, to avoid extraction within the Namoi Alluvium and minimise drawdown in the highly productive aquifer;
 - designing its water management system to maximise the reuse of mine water, minimise reliance on external supplies of water and minimise the risk of water pollution impacts;
 - constructing the rail infrastructure across the floodplain on raised pylons to comply with the FMP and minimise flooding impacts on private property and riverbank stability;
 - implementing noise, air and visual mitigation and monitoring measures to minimise the amenity impacts of the Project on surrounding private landowners;
 - minimising disturbance to native vegetation as far as practicable and rehabilitating the disturbed landform to primarily native woodland;
 - ongoing mine planning to optimise the final void, to retain a final landform that is stable and non-polluting, and designing the final landform to provide macro- and micro-relief to integrate with the landform of the Vickery State Forest; and
 - avoiding impacts to Aboriginal and non-Aboriginal heritage items, and any additional items of significance discovered during the project.
722. The Department has recommended a comprehensive and precautionary suite of conditions to ensure that the project complies with relevant criteria and standards, that the impacts are consistent with those predicted in the EIS, and that residual impacts are effectively minimised, managed and/or at least compensated for.
723. The recommended conditions have been reviewed and accepted by the key NSW Government authorities, and the Department believes that the conditions reflect current best practice for the regulation of open cut coal mining projects.
724. The Department recognises that the project would provide major economic and social benefits for Gunnedah, Boggabri, Narrabri, the North West region and to NSW, including:
- a direct capital investment in the project of \$607 million;
 - up to 450 full time equivalent (FTE) direct jobs at the mine (average 344 FTE jobs) and up to 500 construction jobs;
 - approximately 181 FTE indirect jobs in the region;
 - increased disposable income of \$316 million (Net Present Value (NPV)) associated with the direct and indirect jobs;
 - value added benefits of approximately \$322 million NPV in other industries in NSW; and
 - a net economic benefit of \$1.16 billion NPV from generation of additional tax revenue and royalties.
725. Overall, the Department considers that the GHG emissions for the Project have been adequately considered and that, with the Department's recommended conditions, are acceptable when weighed against the relevant climate change policy framework, objects of the EP&A Act (including the principles of ESD) and socio-economic benefits of the Project.
726. The Department has carefully weighed the impacts of the project against the significance of the resource and the socio-economic impacts benefits. On balance, the Department believes that the project's benefits outweigh its residual costs, and that is in the public interest and is approvable, subject to stringent conditions.

727. This assessment report is hereby presented to the Independent Planning Commission to determine the application.



19/5/20

Philip Nevill
Senior Environmental Assessment Officer
Resource Assessments



19/5/20

Stephen O'Donoghue
Director
Resource Assessments



19/5/20

Mike Young
Executive Director
Energy, Resources and Compliance

Appendices

Appendix A – Environmental Impact Statement

See the Department's website at <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix B – Submissions

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix C – Preliminary Issues Report

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix D – IPC Issues Report

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix E – Submissions Report

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix F – Amendment Report

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix G – Additional Information

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Table G – Additional Information

G1 - Agency advice on Submissions Report			
G1-1	Biodiversity Conservation Division	G1-7	NSW Heritage Council
G1-2	Department of Primary Industries	G1-8	NSW Health
G1-3	DPIE Crown Lands	G1-9	Resources Regulator
G1-4	DPIE Water group	G1-10	Rural Fire Service
G1-5	DPIE Division of Resources and Geoscience	G1-11	Roads and Maritime Services
G1-6	Environment Protection Authority		
G2 – Additional Agency Advice / Information			
G2-1	DPIE Water Group		
G2-2	Resources Regulator		
G2-3	Letter from the Commonwealth Government – Consideration of Scope 3 GHGEs		
G3 – Council Advice			
G3-1	Letter from Gunnedah Shire Council – VPA offer		
G3-2	Letter from Narrabri Shire Council – request for revision of VPA		
G3-3	Letter from Narrabri Shire Council - Objection		
G4 – Independent Expert Advice			
G4-1	Economic expert advice Nov 2019		
G4-2	Groundwater expert advice Sep 2019		
G4-3	Surface water expert advice Jan 2020		
G4-4	Groundwater expert advice – Western Emplacement Area - March 2020		
G4-5	Flood expert advice Feb 2020		
G5 - Additional Community & Special Interest Group Information / Advice			
G5-1	Letter from Property Owner D. Watt to DPIE		
G5-2	Letter from K. Crawford – Review of Submissions Report (Flooding)		

G5-3 Letter from K. Crawford – Submission (late) on flooding

G6 – Whitehaven Supplementary Advice

G6-1 Whitehaven letter to Narrabri Shire Council – VPA offer

G6-2 Whitehaven letter to Narrabri Shire Council – Response to objection

G6-3 Whitehaven letter to DPIE – Response to BCD and Addendum to BAR and BOS (Squirrel Glider)

G6-4 Advice from Whitehaven (Hydro Simulations) - Groundwater sensitivity analysis

G6-5 Whitehaven letter in response to DPIE Water advice

G6-6 Whitehaven letter – Existing ground water bore

G6-7 Whitehaven email – Justification for use of mining fleet from other operations in early stage of Project

G6-8 Whitehaven email – Additional information on Project water balance

G6-9 Whitehaven email – Response to economic independent expert advice

G6-10 Advice from Whitehaven – Additional information on Coal quality and Greenhouse Gas Emissions

G6-11 Whitehaven email – Additional information on rail spur and impacts to regional groundwater flow

G6-12 Whitehaven – Draft Koala Plan of Management

G6-13 Whitehaven email – Response to DPIE Water – additional information on aquifer and overburden emplacement, Rail spur and Collygra flooding

G6-14 Whitehaven email – Additional information on production constraints

G6-15 Whitehaven email – Additional information on Koala SEPP and tree species

G6-16 Whitehaven email – Light Impact Assessment and response from Siding Spring Observatory

G6-17 Whitehaven – Light Impact Assessment Report

G6-18 Whitehaven – Scope 3 GHGE peer review

Appendix H – Consideration of Community Views and Commissions Issues Report

The Department exhibited the EIS for the project from 13 September 2018 until 25 October 2018 until (42 days). During the exhibition period, the Department received 540 submissions from the general public, of which, 345 (62%) submissions were in support, 201 (36%) submissions objected and 14 (2%) submissions provided comments on the Project.

The Department held a community information session in Boggabri on 26 September 2018 to inform the community about the planning assessment process and to hear their views on the project. The information session was attended by around 70 community members. A supplementary meeting was held on 11 December 2019 between the Department, landholders located in the vicinity of the Project, key government agencies and independent experts. The Department also met with representatives of the Environment Defenders Office NSW (representing Lock the Gate) on 25 and 26 of February 2020.

The Department notes that the key issues raised by the community (including in submissions) and considered in the Department’s Assessment Report include potential impacts on water resources, amenity, biodiversity and heritage, final landform, social considerations, planning process and climate change. These key issues have also been raised in the Commissions Issues Report and considered by the Department and summarised in **Table H-1** below.

Table H-1 | Reconciliation Table - Commission’s Issues Report - Key Issues

Issues requiring further consideration	Additional information/ Consideration
Project Justification	
Limitations and economic impacts on the Project due to conditions of the Approved Project, Tarrawonga and Rocglen Mines and the Gunnedah CHPP.	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.1.3 of its Submissions Report. See the Department’s consideration in Section 6.1.1
Need for the CHPP and the rail load out facility at the Project site.	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.1.3 of its Submissions Report. See the Department’s consideration in Section 6.1.2
Annual production threshold to support a new CHPP and rail loop at the Project site.	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.1.3 of its Submissions Report. See the Department’s consideration in Section 6.1.2
Additional coal resources to the south and north of the mine and why these are not included in the Project application.	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.1.3 of its Submissions Report. See the Department’s consideration in Section 6.1.3
Water	
<p>Modelling</p> <p>Groundwater and surface water assessments – response to IESC and agencies and relative impacts of the Approved Project compared with the Project.</p> <p>A more extensive sensitivity analysis in the groundwater model.</p> <p>Post-mining studies, which should provide details of the groundwater flows to the east of the site.</p>	<ul style="list-style-type: none"> Whitehaven provided additional information/ clarification in Section 6.2.3 of its Submissions Report, including input variations into a sensitivity analysis. Whitehaven also provided a technical memorandum on the sensitivity analysis (see Appendix G6-4) which was reviewed by the independent groundwater expert (see Appendix G4-2). See Department’s consideration and recommendations in Sections 6.2.1, 6.2.4 and 6.2.6.
<p>Final void</p> <p>Justification and costing for a “no void” option.</p>	<ul style="list-style-type: none"> Whitehaven provided additional information/ clarification in Section 6.2.3 of its Submissions Report including cost estimates and additional final void modelling.

Issues requiring further consideration	Additional information/ Consideration
<p>Long-term groundwater and water quality modelling for a “no void” option.</p> <p>Final void water balance modelling.</p>	<ul style="list-style-type: none"> • See Department’s consideration and recommendations in Section 6.2.2 and 6.5.2, including review by the independent groundwater expert (see Appendix G4-2).
<p>GDE Provision of maps that illustrate the potential distribution of GDEs.</p> <p>A GDE risk analysis as requested by the IESC.</p>	<ul style="list-style-type: none"> • Whitehaven provided map of GDE and risk analysis in Section 6.2.3 of its Submissions Report. • See Department’s consideration and recommendations in Section 6.2.6 and Figure 22. • The independent groundwater expert is satisfied with the risk analysis of GDE impacts.
<p>Sediment dams and storage Permeability of sediment dams.</p> <p>Water quality monitoring of sediment dams and mine water storages, discharge standards and triggers.</p>	<ul style="list-style-type: none"> • Whitehaven has committed to design storages to comply with relevant standards and conditions imposed on a development consent or EPL. • See Department’s consideration and recommendations in Section 6.2.4. • Additional water quality monitoring was recommended by the EPA and has been incorporated into recommended conditions.
<p>Flooding Further flood modelling of tributary creeks and alternative infrastructure options.</p> <p>Flood studies around mine infrastructure using alternative method to determine the probable maximum flood.</p> <p>A Quantitative Risk Analysis of the off-site water quality consequences of flood exceedances of the on-site infrastructure.</p>	<ul style="list-style-type: none"> • Assessed in Whitehaven’s Submissions Report. • Alternative PMF modelling demonstrates the maximum flood depth would be approximately 1.3 m and would be prevented from entering the mining operations by flood bunds/levees. • Whitehaven has committed to install flood protection bunds to ensure flood levels up to and including the 1% AEP event do not inundate the site infrastructure area. • See Department’s consideration and recommendations in Section 6.2.5.
<p>Water Supply Reliability of water supply during dry periods.</p>	<ul style="list-style-type: none"> • Whitehaven provided additional information/ clarification in Section 6.5.3 of its Submissions Report. Dry climate sequence modelling and proposed water management measures indicates water supply would be adequate during prolonged dry periods. • See Department’s consideration and recommendations in Section 6.2.3.
<p>Amenity Impacts</p>	
<p>Air and Noise Modelling Justification for worst-case years used for the noise and air assessments and whether modelling should be undertaken for every year of the mine life.</p>	<ul style="list-style-type: none"> • Whitehaven provided additional information in Section 6.6.3 of its Submissions Report providing further justification for worst-case years adopted for noise and air models. • Refer to the Department’s consideration in Section 6.3.1 below.
<p>Noise Construction hours outside standard hours of the Interim Construction Noise Guideline.</p> <p>Rail noise impacts – monitoring of noise levels from the existing rail viaduct at Leard Forest mines and increased noise from rail viaduct superstructure.</p> <p>Consideration of noise and blast exceedances at other Whitehaven mines and implementation of recommendations from Noise Audit at Maules Creek Coal Mine.</p>	<ul style="list-style-type: none"> • Whitehaven provided additional information in Section 6.6.3 of its Submissions Report including further justification for construction hours outside of standard hours; noise monitoring results of the existing rail spur viaduct, information on noise and blast performance at existing mining operations and implementation/ relevance of the Maules Creek noise audit. • Refer to the Department’s consideration in Section 6.3.2 below. • The Department has recommended the adoption of operational noise criteria to construction activities outside the standard construction hours.

Issues requiring further consideration	Additional information/ Consideration
<p>Blasting</p> <p>Blast criteria for Kurrumbede homestead.</p>	<ul style="list-style-type: none"> Whitehaven proposes to engage a structural engineer to establish the appropriate blast criteria to protect the homestead.
<p>Air Quality</p> <p>Clarification of why dust levels are lower for the Project compared to the Approved Project, including comparison of modelling assumptions.</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.7.3 of its Submissions Report including clarification on emission inventories, improved controls and mining sequences. Refer to the Department's consideration in Section 6.3.3 below.
<p>Mine infrastructure Area</p> <p>Acoustic cladding of the CHPP.</p> <p>Modelling an option of relocating CHPP and rail spur 400 m to the east of the proposed MIA location and within secondary infrastructure area to the south-east – quantifying costs and benefits.</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.8.3 of its Submissions Report including commitment to acoustic cladding of the CHPP and assessment of costs and benefits of relocating the CHPP. Refer to the Department's consideration in Section 6.3.4 below.
<p>Biodiversity</p>	
<p>Commonwealth Matters</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.9.3 of its Submissions Report confirming habitat areas for relevant Commonwealth species. The Department has undertaken an assessment of Commonwealth matters in accordance with the Commonwealth/ NSW assessment bilateral. Refer to the Department's consideration through Section 6.3 and Appendices I and J.
<p>Impacts on Koalas - mitigation and offsetting</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.9.3 of its Submissions Report including justification for Koala species polygons and habitat area and proposed offsetting. Whitehaven has prepared a Draft Koala Plan of Management (KPoM) (see Appendix G6-12) BCD provided further advice providing confirmation of Koala habitat and credit calculations, and comments on the draft KPoM (refer Appendix G6-15) Refer to the Department's consideration in Section 6.4.3 below.
<p>Rehabilitation offsets, staging and alternative offsetting mechanisms</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.9.3 of its Submissions Report including target vegetation communities proposed for rehabilitation, maximum credits achievable based on FBA rehabilitation credit framework, examples of progress towards rehabilitation completion criteria based on Werris Creek mine rehabilitation, and options for alternative retirement of ecosystem credits pending success of rehabilitation. BCD provided further advice on rehabilitation credits and suitable rehabilitation offset conditions. Refer to the Department's consideration in Section 6.4.7 below.
<p>Agreement on offset credit calculations.</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.9.3 of its Submissions Report and additional information in response to BCD (see Appendix G6-3) including updated credits for the squirrel glider, additional advice on determining ecosystem and species offset credit calculations for its proposed offset properties, or through alternative retirement mechanisms available, such as payment into the approved Biodiversity Conservation Fund (BCF). BCD has provided further advice on squirrel glider credits and offset credits using the Biodiversity Assessment Method (BAM)

Issues requiring further consideration	Additional information/ Consideration
	<p>under the BC Act and suitable timing to retire credits (see Appendix G6-3).</p> <ul style="list-style-type: none"> Refer Department's consideration in Section 6.4.7 below.
Rehabilitation, Final Void and Landform	
Use of existing rehabilitated soil resource	<ul style="list-style-type: none"> Whitehaven has provided additional analysis of the proposed use of soils from existing rehabilitated areas in Section 6.10.3 of the Submissions Report See the Departments discussion in Section 6.5.1
Final landform integration into surrounding landscape (micro/macro relief)	<ul style="list-style-type: none"> Whitehaven proposes the use of a combination of macro and micro relief to replicate the landform of the Vickery State Forest as discussed in Section 6.10.3 of the Submissions Report. See the Departments consideration in Section 6.5.3
Suitability of final landform for agricultural use, Class 2 or 3 agricultural land and agricultural vs. biodiversity conservation final landform outcome	<ul style="list-style-type: none"> Whitehaven has provided further discussion of this in its Submissions Report, indicating that the primary objective is rehabilitation focused on biodiversity conservation. Other areas would be rehabilitated for agricultural purposes where appropriate. See the Department's consideration in Section 6.5.1.
Discharges from sediment dams post mining and potential for sediment loads/ pollutant runoff	<ul style="list-style-type: none"> Whitehaven proposes to retain the function of sediment basins until rehabilitation of the landform demonstrates the use is no longer required See the Department's consideration in Section 6.5.3
Final void water levels and water quality and options for beneficial of final void water post mining	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report See the Departments consideration and recommendations in Section 6.14.6 and 6.5.2
Surface water quality impacts from rehabilitated landform – including seepage and runoff, including consideration of final landform use (biodiversity vs. agriculture)	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report See the Departments consideration and recommendations in Section 6.2.6 and 6.5.2
Spoil properties and impact on groundwater inflows	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report at Section 6.10.3 See the Departments consideration and recommendations in Section 6.2.4 and 6.2.6
Final void as preferred final landform versus filling the void	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report See the Departments consideration and recommendations in Section 6.2.6 and 6.5.2
Long term drawdown and inflow in the hard rock aquifer due to the final void and interaction with Rocglen drawdown.	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report See the Departments consideration and recommendations in Section 6.2.6 and 6.5.2
Heritage	
Deficiencies in engagement with Aboriginal traditional owners and surveys	<ul style="list-style-type: none"> Whitehaven has provided further information in its Submissions Report to describe consultation with the relevant people BCD has advised that it has no further comments on this issue See the Department's discussion in Section 6.6.2

Issues requiring further consideration	Additional information/ Consideration
<p>Impacts/ mitigation on Kurrumbede Homestead, details in Kurrumbede Homestead Management Plan including timing and funding.</p>	<ul style="list-style-type: none"> Whitehaven has provided further discussion in its Submissions Report at Section 6.11.3 See the Department's discussion in Section 6.3.2 and 6.6.3
<p>Traffic and Transport</p>	
<p>Require that all product coal be transported by rail once the CHPP and rail spur line is commissioned.</p>	<ul style="list-style-type: none"> The Department has recommended a condition restricting the road transport of coal from the Project following completion of the Project CHPP, rail load-out facility and rail spur. Whitehaven would still be permitted to transport up to 150,000 tpa of ROM to domestic markets, as per the Approved Project. See the Department's recommendation in Section 6.7.3.
<p>Additional information on impacts at rail crossings due to the project</p>	<ul style="list-style-type: none"> Whitehaven provided further discussion and analysis in Section 6.14.3 of the Submissions Report See the Department's consideration in Section 6.7.3.
<p>Social and Economic</p>	
<p>Social Impacts on the community that does not receive mining income. Expand the SIA risk assessment for post mining impacts with focus on impacted communities such as Boggabri.</p>	<ul style="list-style-type: none"> Whitehaven provided further information and outlined its commitments in Section 6.12.3 of its Submissions Report. The Department has considered social impacts on the non-mining community and post mining phase of the project in Section 6.8.1.
<p>Economic contribution of the Project including: CBA assumptions related to incremental benefits compared to the Approved Project and limitations on Gunnedah CHPP/ road transport restrictions; and Comparative economic assessment of relocation of the CHPP/ rail loop further to the east.</p>	<ul style="list-style-type: none"> Whitehaven provide further information on the relocation of the crusher in Section and the limitations on production due to road transport restrictions in Sections 6.1.3 and 6.12.3. The Department has considered the relocation of the CHPP/ rail loop in Section 6.3.4 and the limitations on consents for other Whitehaven mines and the CHPP in Section 6.1.
<p>Visual</p>	
<p>Mitigation options for residences with high visual impact</p>	<ul style="list-style-type: none"> Whitehaven provided further discussion in Section 6.13.3 of the Submissions Report See the Department's discussion in Section 6.9.1.
<p>Additional photomontages to assess visual impacts</p>	<ul style="list-style-type: none"> Whitehaven provided further discussion in Section 6.13.3 of the Submissions Report See the Department's discussion in Section 6.9.1.
<p>Consultation with Siding Spring Observatory and assessment of impacts on lighting impacts on the observatory</p>	<ul style="list-style-type: none"> Whitehaven provided additional information, including a light impact assessment, in Section 6.13.3 of the Submissions Report See the Department's discussion in Section 6.9.2.
<p>Public Interest</p>	
<p>Consideration of the objects of the EP&A Act including the principles of ESD</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.15.3 of its Submissions Report on the public interest consideration for the Project. See the Department's consideration in Section 4.3 and Appendix K Statutory Considerations.
<p>Greenhouse gas emissions having regard to relevant climate change policy frameworks</p>	<ul style="list-style-type: none"> Whitehaven provided additional information in Section 6.15.3 of its Submissions Report on the climate change policy frameworks relevant to the Project. Refer to the Department's consideration in Section 6.10.1.

Issues requiring further consideration**Additional information/ Consideration**

Demand for product coal and whether its sale would be to a country that is a signatory of the Paris Agreement

- Whitehaven provided additional information in Section 6.15.3 of its Submissions Report with further clarification on the demand for product coal, customer countries and their ties to the Paris Agreement.
- Refer to the Department's consideration in **Section 6.10.2**.

Appendix I – BCD Advice on Commonwealth Matters

See the Department's website at <https://www.planningportal.nsw.gov.au/major-projects/project/9621>

Appendix J – Consideration of Commonwealth Matters

In accordance with the bilateral agreement between the Commonwealth and NSW Governments, the Department provides the following additional information required by the Commonwealth Minister, in deciding whether or not to approve a proposal under *the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Department’s assessment has been prepared based on the assessment contained in the Vickery Extension Project Environmental Impact Statement (EIS), Whitehaven’s Submissions Report, and supplementary information provided during the assessment process, as well as public submissions, advice provided by the BCD), (formerly the NSW Office of Environment and Heritage) and other NSW agencies, and the Commonwealth’s Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC).

This Appendix is supplementary to, and should be read in conjunction with, the main volume of the Department’s assessment which includes the Department’s consideration of impacts to listed threatened species and communities, impacts to water resources and avoidance, mitigation and offsetting measures for threatened species, including for Matters of National Environmental Significance (MNES).

The Department has also considered the advice provided by BCD on MNES which is provided in Appendix I.

J.1 Impacts on EPBC Listed Species and Communities

Table J1 below summarises the vegetation communities required to be cleared for the Commonwealth assessment footprint. The native vegetation area of 728.4 ha identified in the table is less than the original 2016 referral estimate due to changes in the project design, namely the relocation of the rail spur line from a western and northern option to a south western option. This was reflected in a variation to the referral in 2018. The total assessment footprint is 984.4 ha, including 256 ha of disturbed land.

As outlined in Section 6.4, the project was determined by DoEE (now the Department of Agriculture, Water and Environment) to likely to have a significant impact on three threatened species listed under the EPBC Act, including Regent Honeyeater, Swift Parrot and Koala. The habitat areas proposed to be cleared within the Commonwealth assessment footprint for these species are also summarised in **Table J1**.

Table J1 | Native Vegetation Clearing and Habitat Areas for the Project - Commonwealth

Vegetation Community (BVT/PCT)	Area (ha)			Habitat Area – Threatened Species likely to be significantly impacted		
	Woodland	Grassland	Total	Swift Parrot	Regent Honeyeater	Koala
Poplar Box Woodland on Alluvial Clay Soils (NA185/101)	3.7	88.5	92.2	0	3.7	3.7
Pilliga Box – Poplar Box Shrubby Woodland (NA324/397)	26.7	339.3	366	26.7	0	22.7
White Box – Silver-leaved Ironbark Shrubby Open Forest (NA349/594)	17	38	55	17	17	0.5
Narrow-leaved Ironbark – White Box Shrubby Forest (NA311/459)	60	148.5	208.5	60	53	53
Mixed Marsh Sedgeland (NA201/53)	-	4	4	0	0	0

Vegetation Community (BVT/PCT)	Area (ha)			Habitat Area – Threatened Species likely to be significantly impacted		
	Woodland	Grassland	Total	Swift Parrot	Regent Honeyeater	Koala
River Red Gum Riparian Tall Woodland (NA193/78)	1	1.7	2.7	1	1	1
Native Vegetation Total	108.4	620	728.4	104.7	75.2¹	80.9

Note 1: includes an additional 0.5 ha for habitat from scattered paddock trees in secondary derived native grassland

Further, DoEE identified that there may be a significant impact on three additional species, South-eastern Long-eared Bat (Corben's Long-eared Bat), the Large-eared Pied Bat and the Murray Cod.

Resource Strategies assessed the significance of the impacts on terrestrial species using the methodology outlined in *Matters of National Environmental Significance Significant Impact Guidelines 1.1 (2013)* (MNES Impact Guidelines), as documented in Attachment B of Appendix F of the EIS. The assessment of aquatic threatened species including the Murray Cod was undertaken by Eco Logical in accordance with the MNES Impact Guidelines, as documented in Appendix B of Appendix N of the EIS.

The Department notes that Whitehaven concluded that there would not be a significant impact on any threatened species listed under the EPBC Act. BCD in its advice undertook a detailed review of the Commonwealth listed species with detailed analysis of the three terrestrial species determined likely to be significantly impacted by DoEE.

Further detailed consideration of the impact on these species is provided below.

EPBC listed species considered to be significantly impacted

Swift Parrot

The Swift Parrot was not recorded within the project disturbance boundary or surrounding area and no breeding habitat was identified within the disturbance footprint. However, 104.7 ha of potential foraging habitat would be cleared.

The Swift Parrot is an ecosystem credit species under the FBA and would generate 5,387 ecosystem impact credits based on the area impacted within the Commonwealth assessment footprint. The ecosystem credits required for the project under the NSW Assessment would provide 12,815 ecosystem credits, in excess of the Commonwealth requirements under the FBA. (see summary of EPBC offsets in **Table J2** below). The excess ecosystem credit liability generated for the NSW assessment footprint were generated from derived native grassland credits.

Regent Honeyeater

The Regent Honeyeater was not recorded in the project disturbance area. A single database record for this species occurs approximately 7.5 km to the south-east of the project and the closest known breeding area is approximately 40 km north-east of the project in the Bundarra-Barraba regions.

The project would clear 75.2 ha of potential habitat for the Regent Honeyeater within the Commonwealth assessment footprint, with a calculated species credit requirement of 5,790 credits. The proposed offsets for the 48.1 ha of habitat impacted by the NSW assessment footprint would require the retirement of 3,703 credits, which would leave a deficit of 2,087 credits for the residual 27.1 ha of impact.

This additional disturbance area forms part of the Approved Project disturbance area where a land-based offset is already required under the Approved Project consent. This existing offset liability is recommended to be transferred into the offset requirements for the Project.

This species credit liability is equivalent to around 293.9 ha of land-based offsets, based on an offset credit generation of 7.1 credits/ha (determine from the FBA credit calculator). This residual credit requirement would be met by the existing land-based offset areas, which would provide around 1,256 ha of Regent Honeyeater habitat.

The BCD noted that while Whitehaven has not demonstrated that the land-based offset sites would generate the necessary credits for this species, Whitehaven has committed to fulfilling the offset obligation in full and in accordance with relevant legislation. BCD has advised that it is satisfied that the recommended development consent contains conditions requiring the biodiversity obligation to be retired, and the options are available to retire the credits.

As there is no Important Habitat identified for the Regent Honeyeater within the project area, Regent Honeyeater species credits would be required to be converted to reasonably equivalent “biodiversity credits” credits within the meaning of the BC Act.

The Department recommends that any Commonwealth approval includes an additional requirement to validate that the 2,087 species credits (or equivalent ecosystem credits) are available within the Approved Project land-based offset area.

Koala

An additional 1,224 ha of Koala habitat is within the offset for the Approved Project, well in excess of the 112 ha required to achieve the residual credits for the 30.6 ha of additional habitat impacted by the residual impacts of the project in the Commonwealth assessment footprint.

The project would clear 80.9 ha of potential habitat for the Koala within the Commonwealth assessment footprint, with a calculated species credit requirement of 2,103 credits. The proposed offsets for the 50.3 ha of habitat impacted by the NSW assessment footprint would require the retirement of 1,308 credits, which would leave a deficit of 795 credits for the residual 30.6 ha of impact.

This additional disturbance area forms part of the Approved Project disturbance area where a land-based offset is already required under the Approved Project consent. This existing offset liability is recommended to be transferred into the offset requirements for the Project.

This species credit liability is equivalent to around 112 ha of land-based offsets, based on an offset credit generation of 7.1 credits/ha (determine from the FBA credit calculator). This residual credit requirement would be met by the existing land-based offset areas, which would provide around 1,224 ha of Koala habitat.

The BCD noted that while Whitehaven has not demonstrated that the land-based offset sites would generate the necessary credits for this species, Whitehaven has committed to fulfilling the offset obligation in full and in accordance with relevant legislation. BCD has advised that it is satisfied that the development consent contains relevant conditions stating the biodiversity obligation to be retired, and the options available to retire the credits.

The Department also notes that Whitehaven will be required to implement a Koala Plan of Management for the project to minimise impacts to the Koala, including measures to minimise disturbance to the core Koala habitat at the Namoi River crossing, pre-clearing surveys, weed management and rehabilitation with species representative of important Koala habitat, the River Red Gum Riparian Tall Woodland.

The Department recommends that any Commonwealth approval includes an additional requirement to validate that the additional 795 species credits are available within the Approved Project land-based offset area.

EPBC listed species not considered to be significantly impacted

Large-eared Pied Bat

While the project would clear 108.4 ha of potential foraging habitat for the Large-eared Pied Bat, no roosts (caves) or breeding habitat was identified within the project footprint. The assessments did not confirm the presence of individuals in the project footprint, although it was potentially recorded in the footprint based on call recordings.

The assessment of significance undertaken for the EIS concluded that the Large-eared Pied Bat is unlikely to be significantly impacted as there is no breeding habitat in the footprint, and there is a greater extent of habitat in the locality known to be used by the species. In its review, BCD did not raise any concerns with the significance assessment completed by Resource Strategies.

Following consideration of impacts and assessment of significance on the Large-eared Bat in section B.3.10 of Attachment B - Appendix F of the EIS and BCD's review, the Department accepts that impacts to this community would not be significant and would not require further mitigation or offsetting.

South-eastern Long-eared Bat (Corben's Long-eared Bat)

While the project would clear approximately 728.4 ha of potential habitat for the Corben's Long-eared Bat, no roosting or breeding habitat was identified in surveys, although it was potentially recorded in the footprint based on call recordings, but these recordings could not be confirmed.

The assessment of significance undertaken for the EIS concluded that Corben's Long-eared Bat is unlikely to be significantly impacted as there is no breeding habitat in the footprint, and there is a greater extent of habitat in the locality known to be used by the species. In its review, BCD did not raise any concerns with the significance assessment completed by Resource Strategies.

Following consideration of impacts and assessment of significance on the Large-eared Bat in section B.3.9 of Attachment B - Appendix F of the EIS and BCD's review, the Department accepts that impacts to this community would not be significant and would not require further mitigation or offsetting.

Murray Cod

The aquatic ecology assessment recorded a single Murray cod in the Namoi River downstream of the project and considers that the species is likely to occur along the Namoi River, including at the rail crossing site.

The assessment concluded that there would be no direct impact to this species from the project as there would be little impact to existing cod habitat in the Namoi River at the crossing site.

With the implementation of water quality management measures and habitat impact minimisation during construction of the rail crossing of the river, the assessment found there would be limited indirect impacts (e.g. to baseflow and water flow/quality) associated with the project

Following consideration of impacts and assessment of significance on this species in Appendix B - Appendix N of the EIS, the Department accepts that impacts to this species would not be significant and would not require further mitigation or offsetting.

Other Species

The Department has also considered the impacts of the action on the following EPBC listed species:

- Communities: Weeping Myall Woodland, Box Gum Woodland;
- Flora species: Belson's Panic (*Homopholis belsonii*), Winged Peppergrass (*Lepidium monoplacoides*), *Tylophora linearis*; and
- Fauna species: Painted Honeyeater and the Silver Perch.

The Approved Project was to clear approximately 1 ha of the Weeping Myall Woodland EEC. However, Whitehaven has amended its proposal to avoid this area of the woodland for the project. The EIS assessment concluded that the Weeping Myall Woodland EEC outside of the project footprint is not likely to be indirectly impacted by factors such as fragmentation, edge effects, increases in dust or introduced flora and fauna.

Following consideration of impacts and assessment of significance on Weeping Myall Woodland EEC in section B.3.1 of Attachment B - Appendix F of the EIS, the Department accepts that impacts to this community would not be significant and would not require further mitigation or offsetting.

In relation to Box Gum Woodland, the community was not recorded in the project disturbance area with the nearest located within the Approved Project footprint. The Department accepts that impacts to this community would not be significant and would not require further mitigation or offsetting.

In relation to Belson's panic, no individuals were recorded in the disturbance area with the nearest population recorded approximately 5 km from the project in the Vickery State Forest. Following consideration of impacts and assessment of significance on Belson's panic in section B.3.2 of Attachment B - Appendix F of the EIS, the Department accepts that impacts to this species would not

be significant and would not require further mitigation or offsetting. Further, the FBA assessment did not identify the species as requiring species credits.

In relation to Winged peppercress, no individuals were recorded in the project disturbance area with individuals identified within the Approved Project footprint and a larger patch to the north of the site which is no subject to grazing and has been fenced to prevent accidental disturbance. Following consideration of impacts and assessment of significance on this species in section B.3.3 of Attachment B - Appendix F of the EIS, the Department accepts that impacts to this species would not be significant and would not require further mitigation or offsetting.

In relation to *Tylophora linearis*, no individuals were recorded in the disturbance area, with individuals identified to the east of the project site. Following consideration of impacts and assessment of significance on *Tylophora linearis* in section B.3.4 of Attachment B - Appendix F of the EIS, the Department accepts that impacts to this species would not be significant and would not require further mitigation or offsetting. Further, the FBA assessment did not identify the species as requiring species credits.

In relation to the Painted Honeyeater, the project would directly impact on 108.4 ha of potential foraging habitat. Surveys undertaken for the project identified one individual of the species within the study area. Following consideration of impacts and assessment of significance on this species in section B.3.4 of Attachment B - Appendix F of the EIS, the Department accepts that impacts to this species would not be significant and would not require further mitigation or offsetting. Notwithstanding, the Department also notes that while there is unlikely to be a significant impact on this species, under the FBA the Painted Honeyeater is an ecosystem credit species and the proposed offsets would provide sufficient credits to offset the impact of the project.

In relation to the Silver Perch, surveys did not identify individuals within the study area, although the aquatic assessment notes they are regularly stocked in the Namoi River. The assessment noted the possibility that silver perch would occur in the Namoi at the rail crossing site, but the rail bridge would have negligible impact on the long-term population. Following consideration of impacts and assessment of significance on this species in Appendix B - Appendix N of the EIS, the Department accepts that impacts to this species would not be significant and would not require further mitigation or offsetting.

Other species listed under the EPBC Act were considered by Resource Strategies, including:

- Flora species: Cadellia pentastylis, Euphrasia arguta, Bluegrass (*Dichanthium setosum*), Philotheca ericifolia, Prasophyllum sp. Wybong, Tarengo Leek Orchid (*Prasophyllum petilum*), Slender Darling Pea (*Swainsona murrayana*), Austral Toadflax (*Thesium australe*) and; and
- Fauna species: Booroolong Frog (*Litoria booroolongensis*), Border Thick-tailed Gecko, Pink-tailed legless-lizard, Malleefowl, Australian Painted Snipe, Brush-tailed Rock-wallaby and Grey-headed Flying-fox.

The assessment of these species found no records or suitable habitat within the project area, therefore finding the project would pose a nil to negligible risk of impact.

J.2 Offsetting impacts to EPBC listed species

Whitehaven proposed an offset strategy to retire impact credits including land-based offsets, use of ecological rehabilitation for mining areas, and option for residual credits to be retired by payment into the Biodiversity Conservation Fund, or through supplementary measures. **Table J2** below summarises the proposed offset mechanisms for the three EPBC listed species identified by DoEE to likely to be significantly impacted.

Table J2 | Summary of Offset Mechanisms - EPBC Listed Species

Species	Credits	Offsetting Approach
Swift Parrot	5,387 ecosystem credits	Retirement of <u>ecosystem</u> credits within 2 years of commencement of construction by: <ul style="list-style-type: none"> - retiring up to 3,991 ecological rehabilitation credits; and/ or - retiring credits in Offset Areas 6,7 and 8 and the Mount Somner property (subject to further validation required under recommended consent conditions); and/or

Species	Credits	Offsetting Approach
		<ul style="list-style-type: none"> - retiring credits into alternative like for like land-based offsets; and/or - payment into Biodiversity Conservation Fund (BCF) for any residual credits.
Regent Honeyeater ¹	3,703 species credits within NSW footprint	<p>For the 48.1 ha area within the NSW footprint, retirement of <u>species</u> credits (or equivalent ecosystem credits following reasonably equivalent conversion process) within 2 years of commencement of construction by:</p> <ul style="list-style-type: none"> - retiring up to 2,051 species credits (or equivalent ecosystem credits) available in Offset Areas 6,7 and 8 (subject to further validation required under recommended consent conditions); and/or; - retiring up to 1,652 credits available in Mount Somner Property (subject to further validation required under recommended consent conditions); and/or - retiring credits into alternative like for like land-based offsets; and/or - payment into Biodiversity Conservation Fund (BCF).
	2,087 species credits outside the NSW assessment footprint	<p>For the 27.1 ha area outside the NSW assessment footprint within the disturbance area offset under the Approved Project approval, the existing land-based offset area provides approximately 1,256 ha of Regent Honeyeater habitat which would be sufficient to meet the credit liability.</p> <p>The Department recommends that any Commonwealth approval includes an additional requirement to validate that the 2,087 species credits (or equivalent ecosystem) are available within the existing land-based offset area.</p>
Koala	1,308 species credits within NSW footprint	<p>For the 50. ha within the NSW assessment footprint, retirement of <u>species</u> credits within 2 years of commencement of construction by:</p> <ul style="list-style-type: none"> - retiring up to 1,308 species credits available in offset areas 6, 7 and 8 (subject to further validation required under recommended consent conditions); and/or - payment into Biodiversity Conservation Fund (BCF) for any residual credits.
	795 species credits outside the NSW footprint	<p>For the 30.6 ha area outside the NSW assessment footprint but within the disturbance areas already offset under the Approved Project approval, the existing land-based offset area provides approximately 1,224 ha of Koala habitat which would be sufficient to meet the credit liability.</p> <p>The Department recommends that any Commonwealth approval includes an additional requirement to validate that the 795 species credits are available within the existing land-based offset area.</p>

Note 1: With the introduction of the BC Act and mapping of important habitat areas by the BCD, Regent Honeyeater species credits would be converted to ecosystem credits through a reasonably equivalent credit conversion process at the time of seeking to retire the credit obligation.

J.3 Requirements for decisions about threatened species and endangered ecological communities

In accordance with Section 139 of the EPBC Act, in deciding whether or not to approve, for the purposes of a subsection of Section 18 or Section 18A of the Act, the taking of an action and what conditions to attach to such an approval, the Commonwealth Minister must not act inconsistently with certain international environmental obligations, Recovery Plans, or Threat Abatement Plans. The Commonwealth Minister must also have regard to relevant approved conservation advices.

Australia's international obligations

Australia's obligations under the *Convention on Biological Diversity* (Biodiversity Convention) include the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

The recommendations of this assessment report are not inconsistent with the Biodiversity Convention, which promotes environmental impact assessment (such as this process) to avoid and minimise adverse impacts on biological diversity. Accordingly, the recommended development consent requires avoidance, mitigation and management measures for listed threatened species and communities and all information related to the proposed action is required to be publicly available to ensure equitable sharing of information and improved knowledge relating to biodiversity.

Australia's obligations under the *Convention on Conservation of Nature in the South Pacific* (Apia Convention) include encouraging the creation of protected areas which together with existing protected areas would safeguard representative samples of the natural ecosystems occurring therein (particular attention being given to endangered species), as well as superlative scenery, striking geological formations and regions. Additional obligations include using their best endeavours to protect such fauna and flora (special attention being given to migratory species) so as to safeguard them from unwise exploitation and other threats that may lead to their extinction. The Apia Convention was suspended on 13 September 2006.

Recovery plans and approved conservation advice

Approved conservation advice under the EPBC Act for threatened species that are likely to be significantly impacted is available for the Regent Honeyeater, Koala, Corben's Bat, and Belson's Panic.

Approved recovery plans under the EPBC Act for threatened species that are likely to be significantly impacted is available for the Regent Honeyeater, Swift Parrot, the Large-eared Pied Bat, and Murray Cod.

Resource Strategies, Eco Logical and BCD (Appendix I) considered relevant recovery plans and approved conservation advice in their assessment of impacts on MNES. The Department has considered this advice in its assessment.

- **Swift Parrot**

The Department has considered the Conservation Advice and Recovery Plan under the EPBC Act in assessing the impacts of the project on the Swift Parrot.

The Department considers that with the proposed site mitigation, rehabilitation and offset measures (see Section 6.4 of the assessment report), the action would not be inconsistent with the Conservation Advice or Recovery Plan for the Swift Parrot.

- **Regent Honeyeater**

The Department has considered the approved conservation advice and National Recovery Plan for the Regent Honeyeater under the EPBC Act in assessing the impacts of the project on the species and notes that the main threats and causes for decline in population are clearing, fragmentation and degradation of its habitat.

The recovery plan includes a number of objectives, recommendations and actions relevant to the project including maintaining and enhancing the value of regent honeyeater habitat and monitoring trends in regent honeyeater population size and dispersion.

One relevant strategy to achieve the plans' objectives is to improve the extent and quality of regent honeyeater habitat.

The Department considers that with the proposed site mitigation, rehabilitation and offset measures (see Section 6.4 of the assessment report), the action would not be inconsistent with the objectives of the Recovery Plan. The Department has recommended conditions to formalise these measures (refer to Part B of Appendix L). Key actions of the Recovery Plan including monitoring would also be implemented as part of the Biodiversity Management Plan for the site and offset areas.

- **Koala**

The Department has considered the approved conservation advice under the EPBC Act in assessing the impacts of the project on Koala and notes that the main identified threats to this species are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs. Drought and incidences of

extreme heat are also known to cause very significant mortality, and post-drought recovery may be substantially impaired by the range of other threatening factors.

The conservation advice identifies a range of research priorities that would contribute to effective conservation management of the species and inform future regional and local priority actions.

Priority management actions identified in the conservation advice for the Koala includes identifying populations of high conservation priority and investigating formal conservation arrangements, management agreements and covenants on private land, and for Crown and private land investigating and/or secure inclusion in reserve tenure if possible.

The Department considers that with the proposed site mitigation and offset measures (see above and Section 6.4 of the assessment report), the action would not be inconsistent with the objectives of the Recovery Plan. The Department has recommended conditions to formalise these measures (refer to Part B of Appendix L).

There is no adopted recovery plan for the Koala.

Threat abatement plans (TAPs)

The threat abatement plans relevant to this action are discussed below and are available at <http://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved>.

- **Threat abatement plan for competition and land degradation by rabbits (relevant to Regent Honeyeater)**

Rabbits have direct impacts on native flora and fauna, for example, by grazing on native vegetation and thus preventing regeneration and by competing with native fauna for habitat and food. Rabbits also have indirect and secondary effects, such as supporting populations of introduced predators and denuding vegetation, thereby exposing fauna species to increased predation. Their ecology, including digging and browsing also leads to a loss of vegetation cover and consequent slope instability and soil erosion, which further degrades fauna habitat.

- **Threat abatement plan for predation by feral cats (relevant to Regent Honeyeater and Swift Parrot)**

Feral cats are significant predators in Australia that interact with native fauna in various ways, including predation, competition for resources and transmission of disease.

Measures to control feral animals are recommended in the development consent conditions (Appendix L) which would be implemented as part of a Biodiversity Management Plan and/or Biobanking Agreement(s) for the site and offset areas.

Therefore, the Department considers the approval of the action would not be inconsistent with the threat abatement plan for competition and land degradation by unmanaged foxes; rabbits; and feral cats; predation, habitat degradation, competition and disease transmission by feral pigs.

J.4 Requirements for decisions about world heritage properties

The Commonwealth determined that the action is not a controlled action for the controlling provision of World Heritage (Section 12 and Section 15A of the EPBC Act) and therefore further consideration is not required.

J.5 Requirements for decisions about national heritage places

The Commonwealth determined that the action is not a controlled action for the controlling provision of National Heritage (Section 15B and Section 15C of the EPBC Act) and therefore further consideration is not required.

J.6 Additional EPBC Act considerations

Table J3 contains the additional mandatory considerations, factors to be taken into account and factors to have regard under the EPBC Act additional to those already discussed.

Table J3 – Additional considerations for the Commonwealth Minister under the EPBC Act

EPBC Act section	Considerations	Conclusion
Mandatory considerations		
136(1)(b)	Social and economic matters are discussed in Sections 2 and 6 of the assessment report.	<p>The Department considers that the proposed development would result in a range of benefits for the local and regional economy and is of public benefit.</p> <p>Negative social impacts, particularly on the local community residing in the area have been considered in the assessment of the development.</p> <p>A range of mitigation measures have been proposed by the Applicant, including provision of a Planning Agreement with Gunnedah and Narrabri Councils.</p>
Factors to be taken into account		
3A, 391(2)	<p>Principles of ecologically sustainable development (ESD), including the precautionary principle, have been taken into account, in particular:</p> <ul style="list-style-type: none"> • the long term and short term economic, environmental, social and equitable considerations that are relevant to this decision; • conditions that restrict environmental impacts and impose monitoring and adaptive management, reduce any lack of certainty related to the potential impacts of the project; • conditions requiring the project to be delivered and operated in a sustainable way to protect the environment for future generations and conserving the relevant matters of national environmental significance; • advice provided within this report reflects the importance of conserving biological diversity, ecological and cultural integrity in relation to all of the controlling provisions for this project; and • mitigation measures to be implemented which reflect improved valuation, pricing and incentive mechanisms are promoted by placing a financial cost on the proponent to mitigate the environmental impacts of the project. 	<p>The Department considers that the project, if undertaken in accordance with the recommended conditions of consent, would be consistent with the principles of ESD.</p>
136(2)(e)	<p>Other information on the relevant impacts of the action – the Department is not aware of any relevant information not addressed in this assessment report.</p>	<p>The Department considers that all information relevant to the impacts of the project has been taken into account in this recommendation.</p>
136(2)(f)	<p>Advice was sought from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC).</p>	<p>The Department has reviewed the advice and recommendations of the IESC, and considered Whitehaven’s response to these matters in Section 6.3.</p>
Factors to have regard to		
176(5)	Bioregional plans	<p>There is no approved bioregional plan related to the activity.</p>
Considerations on deciding on conditions		

EPBC Act section	Considerations	Conclusion
134(4)	Must consider: <ul style="list-style-type: none"> information provided by the person proposing to take the action or by the designated proponent of the action; and the desirability of ensuring as far as practicable that the condition is a cost effective means for the Commonwealth and the person taking the action to achieve the object of the condition. 	All project related documentation is available from the Department's website www.majorprojects.planning.nsw.gov.au . The Department considers that the conditions at Appendix L are a cost effective means of achieving their purpose. The conditions are based on the material provided by Whitehaven that was prepared in consultation with the Department, DoEE, DPI Water, EPA, BCD and other agencies.

J.7 Conclusions on controlling provisions

Threatened species and communities (Sections 18 and 18A of the Act)

For the reasons set out in Section 6.2, Appendix I and this Appendix, the Department recommends that the impacts of the action would be acceptable, subject to avoidance, mitigation measures described in Whitehaven's EIS, Submissions Report and additional advice provided to the Department and the recommended conditions of consent in Appendix L.

A water resource, in relation to coal seam gas development and large coal mining development (Sections 24D and 24E of the Act)

For the reasons set out in Section 6.2 and this Appendix, the Department recommends that the impacts of the action on a water resource, in relation large coal mining development would be acceptable, subject to the avoidance, mitigation measures described in Whitehaven's EIS, Submissions Report and the requirements of the recommended conditions of consent in Appendix L.

J.8 Other protected matters

The Commonwealth Department of the Environment determined that other matters under the EPBC Act are not controlling provisions with respect to the proposed action. These include listed World Heritage, National Heritage, migratory species, Ramsar wetlands, Commonwealth marine environment, Commonwealth land, Commonwealth action, nuclear action, and Great Barrier Reef Marine Park and Commonwealth Heritage places overseas.

Appendix K – Statutory Considerations

The Department’s assessment of the Project has given detailed consideration to a number of statutory requirements (see **Section 4** - Statutory Context and **Section 6** – Assessment). These include:

- the objects found in Section 1.3 of the EP&A Act; and
- the matters listed under Section 4.15(1) of the EP&A Act, including applicable environmental planning instruments and regulations.

The Department has considered all of these matters in its assessment of the Project, including the Department’s PIR and this Final Assessment Report. A summary of these considerations is provided below. Reference should also be made to Section 6 of the EIS, where the Applicant has also considered applicable legislation and environmental planning instruments in detail.

K.1 Objects of the EP&A Act

A summary of the Department’s assessment against the current relevant objects (found in section 1.3 of the EP&A Act) are provided in **Table K1** (below).

Table K1 | Consideration of the proposal against the relevant objects of the EP&A Act

Objects of the EP&A Act	Consideration
<p>(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources;</p> <p>(c) to promote the orderly and economic use and development of land,</p>	<ul style="list-style-type: none"> • the proposal involves a permissible land use on the subject land; • the proposal would provide ongoing socio-economic benefits to the people of NSW and ongoing employment opportunities for members of the local community; • the targeted coal resource is located within existing coal mining lease areas, hence providing a continued efficient use of the land; and • DRG has determined that the targeted coal resource is significant from a State and regional perspective.
<p>(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;</p>	<ul style="list-style-type: none"> • the proposal can be carried out in a manner that is consistent with the principles of ESD, which have been considered through the Project EIS and the Department’s assessment (see Section 6.10 and Appendix K.2) which has sought to integrate all significant environmental, social and economic considerations.
<p>(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;</p> <p>(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),</p>	<ul style="list-style-type: none"> • the Project has sought to avoid, minimise and manage potential impacts on biodiversity and heritage; • the Project has offset residual biodiversity impacts in accordance with the NSW and Commonwealth Government Policy; • the Project would not significantly impact on either the built or cultural heritage of the site; • proposed mitigation and management measures would ensure that the Project would have acceptable impacts on Aboriginal cultural heritage and historic heritage; and • both the <i>precautionary principle</i> and the <i>conservation of biological diversity and ecological integrity</i> has been applied in the assessment to avoid serious or irreversible damage to the environment wherever possible.
<p>(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,</p>	<ul style="list-style-type: none"> • the Department notified and consulted with two affected Councils and other NSW government authorities over the Project and carefully considered all responses in its assessment.

Objects of the EP&A Act	Consideration
(j) to provide increased opportunity for community participation in environmental planning and assessment.	<ul style="list-style-type: none"> the Department publicly exhibited the proposal and the Commission has held a multi-stage public hearing to maximise community involvement.

K.2 Ecological Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*, as follows:

“ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- (a) the precautionary principle;
- (b) inter-generational equity;
- (c) conservation of biological diversity and ecological integrity; and
- (d) improved valuation, pricing and incentive mechanisms.”

The Department has considered the principles and programs of ESD, as follows:

Precautionary Principle

The Department has assessed the Project’s threat of irreversible environmental damage and considers that there is sufficient scientific certainty to enable the determination of the application. The Department has considered all the available information presented and consulted closely with independent experts and key Government agencies to obtain advice on various aspects of the Project.

While it is acknowledged that the Project would result in a number of environmental impacts of varying significance, the key matters that could result in serious or irreversible damage relate to unmitigated impacts on biodiversity values and impacts on water resources.

The EIS and Department’s assessment has identified management and mitigation measures to address potential environmental impacts, and include commitments and requirements to implement monitoring, auditing and reporting mechanisms.

Overall, the Department has assessed these matters in detail (see **Section 6**) and considers that the recommended risk-based conditions and performance measures would provide appropriate protection for the environment and minimise the potential for any serious or irreversible environmental damage.

Intergenerational equity

Intergenerational equity has been addressed through maximising efficiency and coal resource recovery and developing environmental management measures which are aimed at ensuring the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The Department acknowledges that coal and other fossil fuel combustion is a contributor to climate change, which has the potential to impact future generations. However, the Department also recognises that there remains a clear need to develop coal deposits to meet society’s basic energy requirements for the foreseeable future. The proposal includes measures to mitigate potential GHGE’s from the operation of the Project, which would be recommended as a requirement of the Project’s operating conditions and detailed in an Air Quality and Greenhouse Gas Management Plan.

The Department’s assessment of direct energy use and associated GHGE’s (ie Scope 1 and Scope 2 emissions) has found that these emissions would be low and comprise a very small contribution towards climate change at both the national and global scale (see **Section 6.10**).

The Department considers that the socio-economic benefits and downstream energy generated by the Project would benefit future generations, particularly through the provision of national and international energy needs in the short to medium term.

Conservation of Biological Diversity and Ecological Integrity

The Project's potential impacts on biodiversity have been outlined in the Department's assessment of the Project (**Section 6.4**). The Department considers that the conservation of biological diversity and ecological integrity has been applied through avoiding and minimising biodiversity impacts. The Department considers that the Project's potential impacts would be reasonably mitigated and/or offset to enable the long-term biodiversity outcomes to be achieved for the region.

Improved Valuation, Pricing and Incentive Mechanisms

Valuation and pricing of resource has been considered through economic, social and cost-benefit analyses which have been completed as part of the EIS. The cost benefit analyses sought to weigh up the Project's costs and benefits based on its full range of environmental, social and economic impacts. The Department has carefully considered the costs and economic benefits of the Project and support the conclusion that it would deliver a significant net benefit to the local region and the State of NSW (see **Section 6.8**).

The Department has also recommended performance-based conditions, where possible, to provide incentive to Whitehaven to achieve environmental outcomes and objectives in the most cost effective way.

K.3 Environmental Planning Instruments

Under Section 4.15 of the EP&A Act, the consent authority is required to consider, amongst other things, the provisions of the relevant EPI's, including any exhibited draft EPI⁸. Section 4 of the PIR provides a summary of the Department's consideration of the relevant EPI's and notes Whitehaven's consideration of applicable provisions of relevant EPIs in its EIS. Further consideration is provided in the Department's assessment (see **Section 6**) and below.

Applicable Local Environment Plans

The Department has considered the permissibility of the proposed development under the Gunnedah and Narrabri LEPs (see **Section 4**).

SEPP No. 33 – Hazardous and Offensive Development (SEPP 33)

The key aims of SEPP 33 are to ensure that, in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impacts and that any measures proposed to be employed to reduce the impact of the development are taken into account.

Clause 12 of SEPP 33 requires persons proposing to carry out development for the purposes of potentially hazardous industry to prepare a Preliminary Hazard Analysis (PHA) and to submit this with the DA. The EIS considered the potential hazards and risks associated with the Project, including the storage of hazardous goods, potential for fire and/or explosion and contamination of land, water and air and contained a PHA (see Appendix P of the EIS).

The Department has considered Whitehaven's assessment of these matters and commitments to maintain appropriate setbacks between hazardous substance facilities and nearby land users. The Department considers that suitable mitigation measures could be incorporated into the design of the Project to ensure that it would meet relevant standards and be compatible with the existing or likely future use of land surrounding the Project. With the proposed measures in place, the PHA demonstrated that the potential hazards associated with the Project can be managed.

⁸ Note that due to the effect of clause 11 of the SRD SEPP, development control plans do not apply to SSD.

The Department considers that the Project would not increase risks to public safety and would not alter the consequences or likelihood of a hazardous event on the site or during materials transport. As such, the Department considers that the Project is consistent with the provisions of SEPP 33.

SEPP No. 44 – Koala Habitat Protection (SEPP 44)

A new *SEPP (Koala Habitat Protection) 2019* SEPP commenced on 1 March 2020, replacing the previous SEPP 44. However, clause 15 of the new SEPP provides that ‘a development application made, but not finally determined, before the commencement of this Policy in relation to land to which this Policy applies must be determined as if this Policy had not commenced.’ Consequently, the provisions of SEPP 44 continue to apply to the Project. SEPP 44 aimed to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

The Project area is located in the Narrabri Shire Council and Gunnedah Shire Council local government areas, both of which are listed under SEPP 44. The EIS’s assessment found that Koalas are known to use the area proposed for the Project and that a total of about 50.3 ha would be impacted, of which about 1 ha is likely to be core Koala habitat (see **Section 6.4.3**). To address these impacts, Whitehaven (in consultation with BCD) has proposed an additional biodiversity offset strategy package and a Koala Plan of Management.

The Department considers that the Project is consistent with the aims, objectives and requirements of SEPP 44.

SEPP No. 55 – Remediation of Land (SEPP 55)

SEPP 55 relates to the remediation of contaminated land. Whitehaven has considered the potential land contamination matters associated with the Project in its EIS. The majority of proposed disturbance area is comprised of rural land, located within the already Approved Project disturbance boundary. The Department considers that the additional areas of disturbance associated with the Project would not have a significant risk of existing contamination and that the proposal is generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (State and Regional Development) 2011 (the SRD SEPP)

Under Section 4.36 of the EP&A Act the Project is considered a State Significant Development, because it is development for the purposes of coal mining. No scale limitations apply in respect of this declaration. That is, any coal mining, of any scale and proposed anywhere in the State, is SSD.

In accordance with section 4.5 of the EP&A Act and clause 8A(1) of the SRD SEPP, the Commission is the consent authority and must determine the application, as more than 50 public submissions in the nature of objection were received.

SEPP (Infrastructure) 2007 (the Infrastructure SEPP)

The Infrastructure SEPP requires the consent authority to notify relevant public authorities about the development that may affect public infrastructure or land, including electricity transmission and distribution networks, gas pipeline corridors, railways and rail corridors.

The Department notified all relevant public authorities and including Narrabri Shire and Gunnedah Shire Councils, RMS, TfNSW, the ARTC and Crown Lands.

The Department has consulted with public authorities and considered the matters raised in its assessment of the Project (see **Section 6**). Where appropriate, the Department has also developed conditions of consent to address the recommendations and advice of these public authorities. The Department considers that such conditions would provide appropriate protection for public infrastructure. As such, the Department considers that the requirements of the Infrastructure SEPP have been satisfied.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)

Permissibility

Clause 7(1)(b) of the Mining SEPP identifies that mining is permissible with consent on any land where development for the purposes of agriculture or industry may be carried out (with or without consent). Clause 7(1)(d) provides that ‘facilities for the processing or transportation of minerals or mineral bearing ores’ are permissible with consent on land ‘on which mining may be carried out (with or without development consent), but only if they were mined from that land or adjoining land’. Consequently, the proposed development is permissible with consent under the Mining SEPP, and the Commission may determine the application.

Matters for Consideration

Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining. These matters were considered in Whitehaven’s EIS (see Section A5.1.5 of Attachment 5). The Department has considered these matters in its assessment of the Project and has included a brief outline of the key considerations below.

Non-discretionary development standards (clause 12AB)

Clause 12AB identifies non-discretionary development standards for the purposes of section 4.15(2) of the EP&A Act in relation to the carrying out of development for the purposes of mining. Table A5-1 in the EIS’s Attachment 5 sets out Whitehaven’s consideration of the applicable standards and whether or not the Project meets them. The Department agrees with this assessment.

Compatibility with other land uses (clause 12)

The Department’s assessment has considered the potential impacts of the Project on other land uses in the area, including land use for water catchment purposes, conservation purposes, residential purposes and industrial purposes. The Department has considered the potential noise, air quality and visual impacts at nearby private residences, as well as the potential impacts on the communities dependent on the water catchment. This consideration has been undertaken in consideration of the public benefits of the Project and measures to avoid, mitigate and minimise any land use incompatibility.

Overall, the Department considers that, subject to appropriate conditions, the Project could be managed to minimise any potential land use conflicts and meet the aims, objectives and provisions of clause 12.

Voluntary Land Acquisition and Mitigation Policy (clause 12A)

The Department’s assessment has considered the NSW Government’s *Voluntary Land Acquisition and Mitigation Policy* in detail, in **Sections 6.3.2 and 6.3.5**. This assessment concluded that the property Mirrabinda (property 127) would be entitled to acquisition rights under the NPfl. The Department notes that this landholding has been afforded acquisition rights for the Approved Project.

Natural Resource Management and Environmental Management (clause 14)

Clause 14(1) requires that, before granting consent for development for the purposes of mining, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure that impacts on water resources, threatened species and biodiversity are avoided or minimised to the greatest extent practicable and that greenhouse gas emissions are minimised to the greatest extent practicable. Potential impacts are comprehensively addressed in the Department’s assessment of these matters in **Section 6**.

The Department has recommended a detailed suite of conditions to ensure that the Project is undertaken in an environmentally responsible manner, including but not limited to, conditions in relation to water resources, threatened species and biodiversity and greenhouse gas emissions.

Resource Recovery (clause 15)

The Department has considered the recovery of coal resources in its assessment of the Project. It considers that the Project can be carried out in an efficient manner that optimises resource recovery while giving appropriate recognition to and protection for the environmental values that may be affected.

The Department has also recommended conditions requiring Whitehaven to implement reasonable and feasible measures to minimise waste and maximise the salvage and re-use of resources within the disturbance area (including water, soil and vegetative resources).

Transport (clause 16)

While the framing of clause 16 is quite broad, its particular purpose is to limit the transport of coal, other minerals and their ores, and extractive materials on public roads. A fundamental change proposed to the Approved Project is for development of a CHPP, rail load-out facility and rail spur. Once completed, no coal from the Project would be transported on public roads, except for a small amount of ROM coal (150,000 tpa) currently approved for road transport to domestic markets. All product coal would be transported by rail to export market.

The Department has consulted with the applicable road and rail authorities in relation to the Project and taken these submissions into consideration in its assessment (see **Section 6.7**). The Department has also recommended conditions to limit traffic impacts from the Project.

Rehabilitation (clause 17)

Clause 17 outlines particular requirements relating to consideration of whether any consent granted should be subject to conditions aimed at ensuring rehabilitation of land disturbed by mining and, in particular, whether conditions should require preparation of a rehabilitation management plan, appropriate treatment of waste, remediation of soil contamination and the avoidance of public safety risks.

The Department has considered the full range of final landform options presented by the Applicant (see **Section 6.5**) and considers that the proposed final landforms and rehabilitation plans could be achieved to meet contemporary best practice in the NSW mining industry, and has recommended a comprehensive suite of conditions relating to rehabilitation of land disturbed by the Project.

Summary of Mining SEPP

Based on its assessment of the development, the Department considers that the Project can be managed in a manner that is generally consistent with the aims, objectives and provisions of the SEPP.

K.4 Dark Sky Planning Guideline

Clause 92(1)(d) of the EP&A Regulation requires that the consent authority must consider the Dark Sky Planning Guideline for any SSD development on land less than 200 km from the Siding Spring Observatory.

The Department's consideration of the Dark Sky Planning Guidelines and recommended condition to minimise the upward spill of light, in accordance with good lighting design principles, is provided in Section 6.9 of this report.

Appendix L – Recommended Conditions of Consent

See the Department's website at: <https://www.planningportal.nsw.gov.au/major-projects/project/9621>