



**Planning &  
Environment**

**STATE SIGNIFICANT  
DEVELOPMENT ASSESSMENT  
*Mount Owen Continued  
Operations Project*  
(SSD 5850)**



Secretary's Environmental Assessment Report  
Section 89E of the  
*Environmental Planning and Assessment Act 1979*  
November 2015

Cover Photos:  
Mount Owen Mine - Departmental Site Visit, February 2013

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The NSW Department of Planning and Environment

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## EXECUTIVE SUMMARY

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The Mount Owen mine complex is located about 20 kilometres northwest of Singleton and is the most north-easterly coal mine in the Hunter Valley Coalfields. The complex is owned by Mount Owen Pty Ltd, a subsidiary of Glencore Pty Ltd, and comprises the existing Mount Owen, Ravensworth East and Glendell open cut coal mines.

Mining first commenced at the Ravensworth East site in the 1960s. Mining at Mount Owen commenced in 1993. Both mines operate under separate consents, which together allow Glencore to employ a workforce of up to 920 people and extract up to 14 million tonnes of run-of-mine coal each year. All coal is processed at the Mount Owen mine and then transported via rail to the Port of Newcastle for export.

To sustain the ongoing operation of the existing Mount Owen Complex, Glencore is seeking approval for a proposed expansion to the Mount Owen and Ravensworth East mines. This proposal, known as the Mount Owen Continued Operations (MOCO) Project, would involve:

- a major extension to the southern boundary of the existing Mount Owen North Pit, covering some 381 hectares and allowing the recovery of an additional 74 million tonnes of coal;
- re-mining deeper coal seams beneath two previously disturbed areas of the Ravensworth East mine, to access and recover an additional 18 million tonnes of coal;
- extending the life of mining at Ravensworth East by 6 years and Mount Owen by 12 years, to 2030;
- constructing an additional private rail line and northern turnout, connecting the Mount Owen rail loop with the Main Northern Rail Line;
- upgrades to Hebden Road, including construction of a new bridge and rail overpass;
- extension of and improvements to the existing Coal Handling and Preparation Plant and coal stockpile facilities;
- upgrades to the Mine Infrastructure Area (MIA), including increased capacity at the existing heavy vehicle workshop and fuel farm, and upgrades to ancillary facilities; and
- consequential changes to the final landform and rehabilitation plans for the Mount Owen Complex.

In addition to the above components, the project would also allow for the consolidation of the existing Ravensworth East and Mount Owen project approvals into a single contemporary development consent.

The project is classified as State significant development under section 89C of the *Environmental Planning & Assessment Act 1979* (EP&A Act) as it is 'development for the purpose of coal mining'. The consent authority for the project is the Minister for Planning. However, as the project meets the terms of the Minister's delegation of 14 September 2011, the NSW Planning Assessment Commission (Commission) must determine the application.

The project was declared to be a 'controlled action' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), given the likely significant impacts on listed threatened species and communities, listed migratory species and water resources. In making this determination, the delegate for the Commonwealth Minister for the Environment accredited the State's environmental assessment processes under the EP&A Act. Consequently, the potential impacts on EPBC Act controlling provisions have been assessed under Part 4 of the EP&A Act.

The Department publicly exhibited the development application and accompanying Environmental Impact Statement (EIS) for the project from 20 January until 6 March 2015. The Department received 233 submissions, including 10 from NSW Government agencies, 1 from Singleton Shire Council, and 222 from special interest groups and members of the public. In addition, the Department received advice from the Commonwealth Department of the Environment, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, the Australian Rail Track Corporation and the NSW Forestry Corporation.

None of the public authorities objected to the project. Of the public and special interest group submissions received, 188 (or around 85%) supported the project, primarily due to the ongoing employment and local economic benefits. The remaining submissions included 30 objections to the project and 4 submissions in the form of comments. In general, objectors were concerned over potential air quality, health and biodiversity impacts of the project, as well as other matters including noise, blasting, final landforms, climate change and impacts on the local community.

Following receipt of Glencore's response to the matters raised in these submissions, the Department undertook a range of further consultation with relevant agencies and stakeholders, and commissioned independent peer reviews of the air quality and economics assessments provided by Glencore.

The Department has carried out a preliminary assessment of the merits of the project, having regard to its potential environmental, social and economic impacts, relevant statutory obligations, the information provided by Glencore and material submitted both in support and against the project.

The Department is generally satisfied that the project represents a reasonable and logical extension to the existing operations, and acknowledges that Glencore has designed the project to incorporate a range of measures to minimise potential environmental and amenity impacts, where possible.

However, the Department has identified several aspects of the project and predicted impacts that require particular attention. These key areas of interest include the:

- potential amenity and health impacts on nearby residential receivers, particularly in relation to air quality, noise and blasting impacts associated with open cut mining and overburden handling;
- impacts on biodiversity, including the clearing of around 450 hectares of native vegetation;
- establishment of final landforms that are sympathetic to the surrounding natural environment and suitably rehabilitated with appropriate vegetation types; and
- potential impacts on water resources and downstream water users.

With regards to potential impacts on the local community, the Department notes that the project could be managed to comply with relevant blast vibration and overpressure criteria at all nearby private residences, but would result in a minor increase in noise levels at some nearby receivers, relative to the currently approved operations. Consequently, the Department has recommended that two private landowners are given voluntary acquisition rights and that the owners of a further four residences are afforded rights to appropriate noise mitigation measures.

The Department commissioned Todoroski Air Sciences to undertake a comprehensive review of the air quality aspects of the project. On the basis of this review, the Department considers that further information is required to inform a full and proper assessment of the potential air quality impacts of the project on nearby residential receivers.

Accordingly, the Department has refrained from making any recommendations on air quality matters at this stage and has requested that Glencore provide further clarification of the air quality impacts likely to arise from the project. This additional information will assist the Department's assessment of potential air quality impacts in its final assessment report, and help to determine whether any restrictions or conditions should be imposed on the project to enable the management of these impacts on the community.

Glencore's proposed biodiversity offset package and rehabilitation works would adequately compensate for the proposed vegetation clearing and associated impacts on threatened flora and fauna species and their habitats. While the Department has noted some minor areas for improvement, the proposed offset and rehabilitation package would lead to an overall improvement in the quantum and connectivity of woodland communities on the Hunter Valley floor in the medium to long-term.

The Department is also satisfied that the project could be managed to account for all water take both during operations and post-mining and would not result in any material impacts on water quality, downstream users or receiving environments, beyond those associated with existing operations.

With regards to other impacts, the Department is satisfied that the project is unlikely to significantly increase impacts on the environment, the local community and surrounding infrastructure assets, relative to the existing operations. In general, the Department is satisfied that these impacts could be appropriately managed through relevant operational procedures and conditions of consent.

There are some outstanding matters related to site rehabilitation that require further attention as part of the Department's final assessment report, including distribution of woodland and grassland rehabilitation, incorporation of micro-relief in the final landform, options to minimise or backfill final voids and appropriate long-term water licensing arrangements.

In regard to these matters, the Department recognises that site limitations and the geological location of the coal resource may restrict the opportunities to improve the proposed pit shape and extraction plans. However, the Department believes there are some opportunities to improve the proposed final

landform. Consequently, the Department has sought further information from Glencore, focusing on potential options to incorporate micro-relief into upfront mine planning, minimise or remove final voids and create a final landscape that is more sympathetic to the surrounding natural environment.

Whilst acknowledging the importance of obtaining this additional information to refine its assessment of these matters, the Department does not expect this process to materially change the overall merits of the project, but rather assist in determining robust and specific conditions to govern the project.

Importantly, the project would continue to provide for the recovery of a significant 92 million tonne coal resource adjacent to and within the existing open cut operations, maximise the use of existing coal processing and transportation infrastructure and provide several years of continued employment for 920 people, all without substantially increasing the impacts of the existing operations. Furthermore, the project would produce around 5% of the State's annual export coal, involve around \$153 million in additional capital investment and generate \$235 - 280 million in royalties for the NSW Government.

Overall, the Department believes that the benefits of the project would outweigh its costs and that the proposed mine plan strikes an appropriate balance between protecting the environment and local community, and realising the significant economic benefits of the project to the region and the State. Consequently, the Department's preliminary findings are that the project is in the public interest and should be approved, subject to strict conditions.

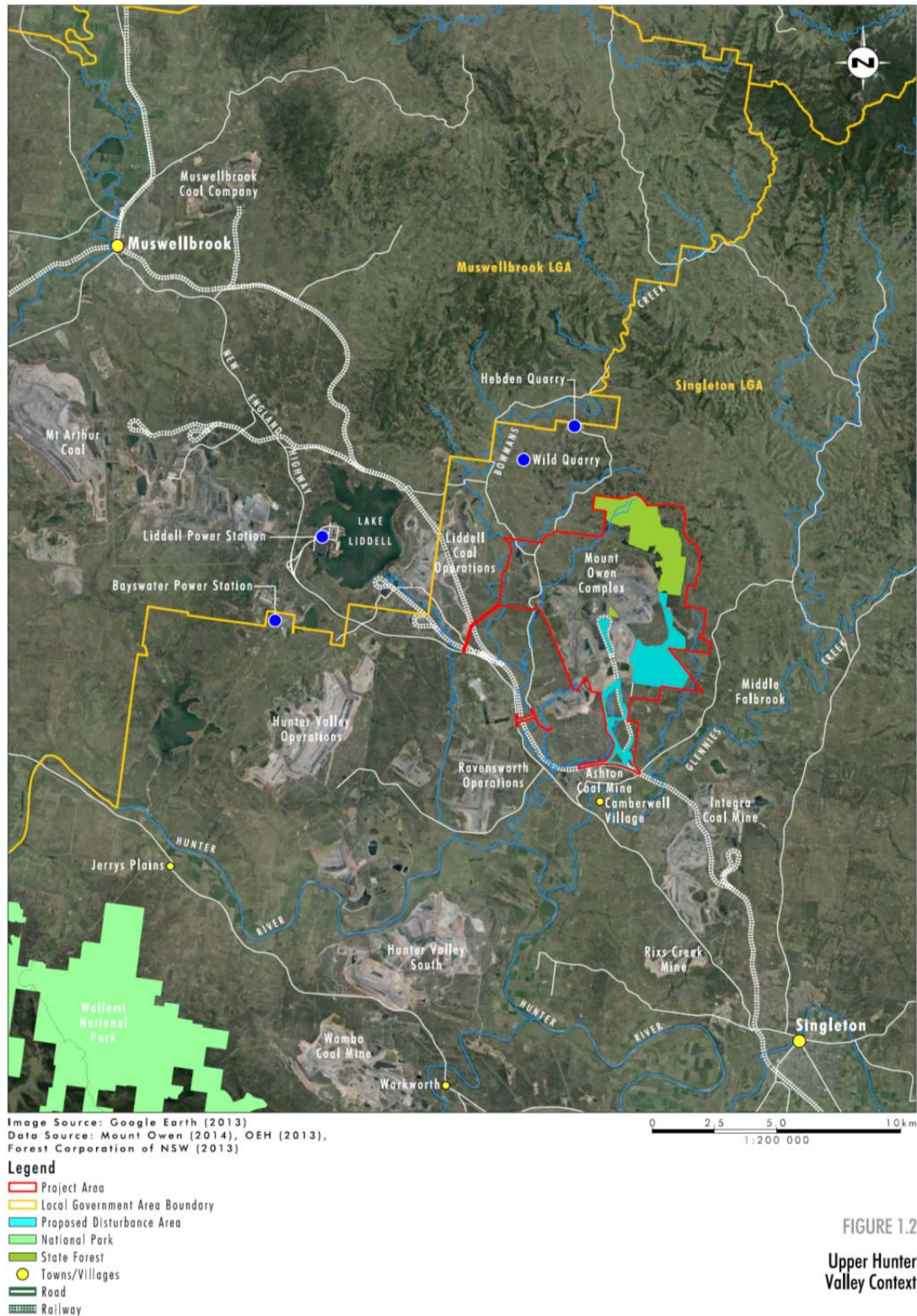
The Department has drafted a preliminary suite of conditions to govern the operation of the project (see **Appendix G**), including a number of conditions focused on ensuring that the proposed biodiversity offsets are managed to achieve their intended long-term biodiversity outcomes. The Department believes that the recommended preliminary conditions reflect current best practice for the regulation of open cut coal mining projects in NSW. It is intended that these preliminary conditions would be updated, as appropriate, to reflect the Department's final assessment of the project and ensure that any residual impacts are minimised or managed to meet appropriate standards.



# 1. BACKGROUND

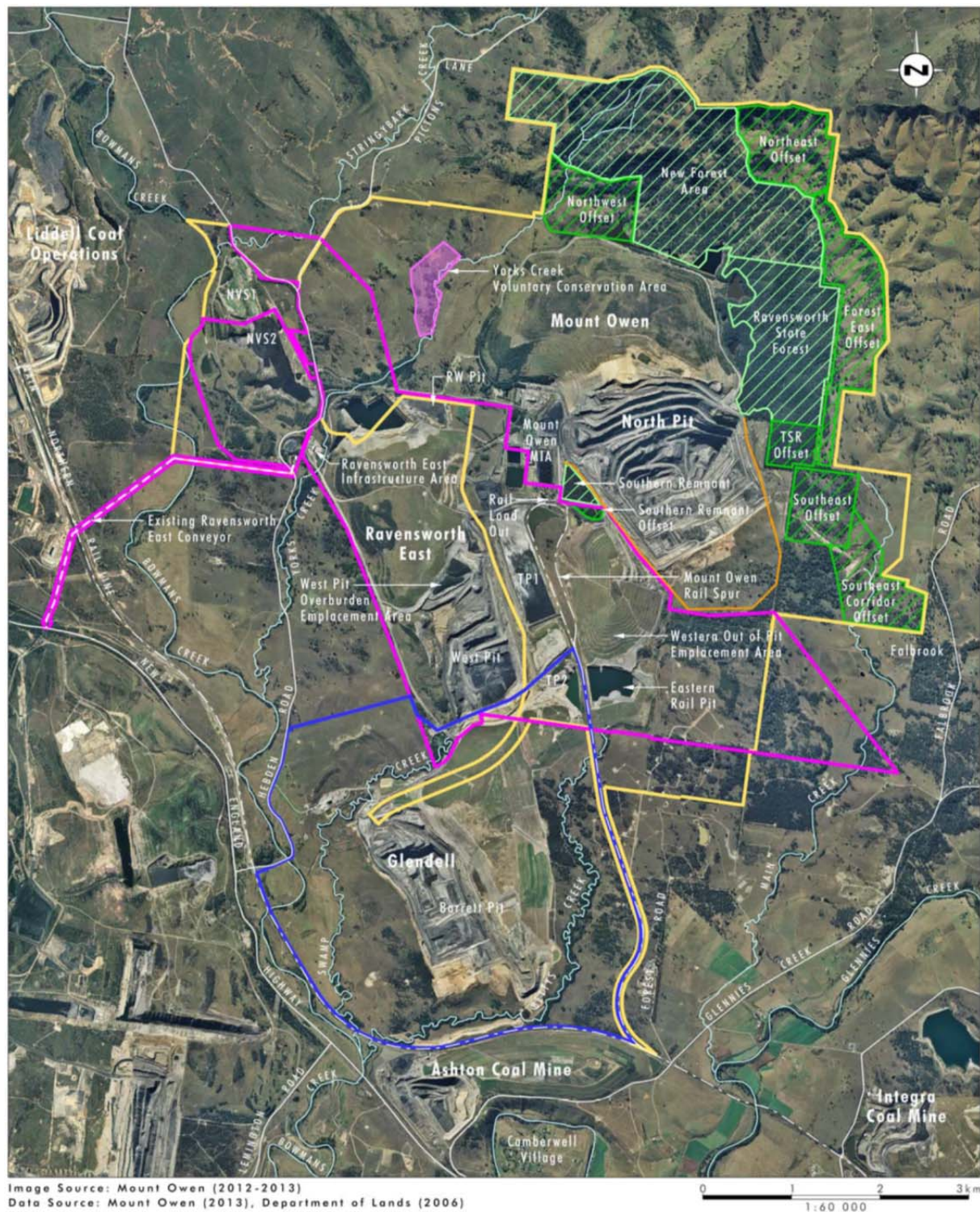
## 1.1 Existing Operations

Mount Owen Pty Ltd, a subsidiary of Glencore Coal Pty Limited (Glencore), owns and operates the Mount Owen mine complex, located about 20 kilometres (km) northwest of Singleton in the Hunter Valley coalfields. The mine complex is situated within the Singleton local government area and comprises the existing Mount Owen, Ravensworth East and Glendell open cut coal mines, a Coal Handling and Preparation Plant (CHPP) and rail loop that service the complex (see **Figures 1 and 2**).



**Figure 1: Project location**





### Legend

- Ravensworth East Mine DA Boundary (DA 52-03-99)
- Glendell Mine DA Boundary (DA 80/952)
- Mount Owen Mine DA Boundary (DA 14-1-2004)
- ▨ Existing Biodiversity Offset Area
- ▨ Ravensworth State Forest
- ▨ Yorks Creek Voluntary Conservation Area
- Approved North Pit Mining Extent

FIGURE 1.3

Mount Owen Complex  
Current Operations

**Figure 2: Existing mining operations**

Despite being managed as an integrated mining complex, mining operations at each mine are governed by separate development consents. Overall, the Mount Owen Mine consent is the dominant planning approval, with all coal mined at the complex being processed at Mount Owen's CHPP. Together, the three mines are approved to extract up to 18.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal, process 17 Mtpa coal at the Mount Owen CHPP and transport product coal via rail to the Port of Newcastle for export. In addition, the Ravensworth East Mine is allowed to transport ROM coal via an overland conveyor to local power stations for use in domestic electricity generation. A brief overview and history of the mining operations at the Mount Owen Complex is provided below.

The Ravensworth East mine (formerly the Swamp Creek Mine) commenced operations in the 1960s and is currently regulated by development consent DA 52-03-99. The consent was granted on 2 March 2000, by the then Minister for Urban Affairs and Planning under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The consent has undergone four modifications and currently allows for mining of up to 4 Mtpa of ROM coal until 2021, using open cut methods.

The Ravensworth East Mine consists of the currently operating West Pit, and the former Stage 3 Pit, RW Pit and two shallow pits known as TP1 (currently used for tailings emplacement) and TP2 (partially backfilled with overburden from Glendell Mine). Following completion of approved mining, these pits may be used for future tailings disposal and must be backfilled prior to closure.

The Glendell Mine was approved by the then Minister for Planning and Environment under Part 4 of the EP&A Act on 2 May 1983, with an original production rate of 3.6 Mtpa of ROM coal. Following early preparation works, mining commenced at the site in 2009. The approval has been modified on two occasions and the mine is currently permitted to extract up to 4.5 Mtpa ROM coal until June 2024.

The Mount Owen Mine commenced operations in 1993 under development consent DA63/91, granted by Singleton Shire Council under Part 4 of the EP&A Act, which permitted the extraction of up to 1.4 Mtpa of ROM coal. In 1994, the mine was approved to expand under a new development consent DA 66/93, granted by the then Minister for Urban Affairs and Planning under Part 4 of the EP&A Act. This consent allowed for the expansion of mining activities at a rate of up to 5.3 Mtpa of ROM coal and, following two modifications, since 1999 has permitted extraction of up to 8 Mtpa of ROM coal.

In addition, the Mount Owen Mine was granted separate consents by Singleton Shire Council for the construction of a rail link from the Main Northern Rail Line to the mine (DA 184/95, granted on 20 December 1995) and construction of a water pipeline and a 90 megalitre (ML) clean water storage dam (DA 97/96, granted on 13 August 1996). A further consent was granted by the then Minister for Planning in November 2002 (DA 346-11-2001) for the construction of a 1030 ML storage dam, with an additional 210 ML for flood surcharge. Apart from the release of water during extreme conditions (via DA 346-11-2001), no other discharge of water from the site is permitted.

The Mount Owen Mine currently operates under DA 14-1-2004, granted on 8 December 2004 by the then Minister for Planning and Infrastructure, under Part 4 of the EP&A Act. This approval enabled the continuation of mining through a major extension to the North Pit and the consolidation of all previous development consents for Mount Owen Mine. The current consent has been modified twice and currently allows for open cut mining operations until 8 December 2025. The Mount Owen consent permits:

- mining of up to 10 Mtpa of ROM coal using a truck and excavator fleet;
- processing of up to 17 Mtpa of ROM coal at the Mount Owen CHPP;
- additional ROM coal stockpiles, receiving facilities and haul roads, that enable the Mount Owen CHPP to process ROM coal from the Ravensworth East and Glendell mines;
- tailings disposal in approved voids (currently TP1) at the Ravensworth East Mine;
- overburden emplacement behind the progressing North Pit, as well as in the Eastern Rail Pit and Western out-of-pit overburden emplacement areas (OEAs);
- a private rail loop and rail loading facility, with capacity to transport up to 15 Mtpa product coal;
- a rail re-fuelling facility to service Glencore Rail trains arriving at the Mount Owen Mine; and
- a range of monitoring systems, environmental management systems (eg water management systems) and ancillary infrastructure associated with the operation of the Mount Owen Complex.

Based on the extraction of economic coal reserves within the existing consent areas, the Mount Owen, Ravensworth East and Glendell mines would be expected to continue operations for 3, 6 and 7 years, respectively. To extend the life of these operations, Glencore has undertaken extensive exploration activities and is seeking approval for a major extension permitting extraction of identified coal resources beneath and adjacent to the existing Ravensworth East and Mount Owen mines.



## 1.2 Regional Context

The Mount Owen Complex is the most north-easterly coal mining operation in the Hunter Valley coalfields. The land in this region is characterised by undulating and hilly topography, with numerous drainage lines and several dominant ridgelines, including a 385 metre (m) AHD ridgeline that runs east to west along the north of the current site boundary before wrapping around the Ravensworth State Forest to run to the south along the eastern boundary of the mine (see **Figure 2**). These ridgeline features are an important aspect of the surrounding environment, as they shield the project from public views and attenuate a range of project-related amenity impacts for receivers to the north and east.

As shown in **Figure 1**, the Mount Owen Complex is situated within a landscape dominated by established mining and industrial operations. In addition to the three mines in the complex, several other coal mines are nearby, including the Liddell Open Cut Coal Mine to the northwest, Ravensworth open cut and underground operations to the southwest, Ashton open cut and underground operations to the south and Integra open cut and underground operations to the southeast. Importantly, the approved longwall layout for the Integra underground mine extends in a northwest direction from the access drift off the Integra open cut and underlies a large area of the Mount Owen Complex, including the proposed RERR Pit and North Pit Extension Areas (see **Figure 3**).

In addition to these other mines, AGL Macquarie's Liddell and Bayswater Power Stations are located to the west of the complex. These are two of the State's largest coal-fired power stations. They occupy a large area of land, including land associated with their water storages (Lake Liddell and Plashett Dam, respectively) and fly-ash dams. Under the existing Ravensworth East consent, Glencore has built an overland coal conveyor (see **Figure 2**) approved to transport 4 Mtpa of ROM coal for use in domestic electricity generation at Liddell and Bayswater. Other industrial land uses in the locality include two quarries to the north along Hebden Road.

Despite the influence of industrial activities in the region, the land surrounding the complex also supports a range of primary industries. The complex is bounded to the northeast by the Ravensworth State Forest, regenerated vegetation in the New Forest Area and biodiversity offsets associated with the current Mount Owen Mine. As the approved mine progresses south, rehabilitated woodland would be established over much of the North Pit to connect these existing woodlands with an area of the Ravensworth State Forest in the centre of the complex, known as the Southern Remnant.

A range of other agricultural enterprises and rural residential holdings exist to the east of the mine. Agricultural activities in this area are largely associated with grazing, with some cropping on improved pastures associated with the alluvial soils of the Glennies Creek and Middle Falbrook floodplains. It is also important to note that the complex encompasses several surface water catchments, including those associated with Yorks, Swamp, Bowmans, Bettys and Main Creeks.

Glencore owns an extensive area of the land surrounding the mine, with the majority of mine owned residences in the vicinity being tenanted. The nearest private residences to the Mount Owen Mine are located about 1 km to the southeast and east, in the Falbrook area. Camberwell Village is the nearest township, located approximately 4.5 km from the southern boundary of the existing Mount Owen Mine. The majority of residences within this village are now mine-owned or else are subject to acquisition rights from other mines, primarily the Ashton South East Open Cut.

## 2. PROJECT

### 2.1 Description of the Project

Glencore is seeking approval to expand its operations at the Mount Owen Complex to extract an additional 92 Mt of semi soft and thermal coal over a period of 21 years. This proposal, known as the Mount Owen Continued Operations Project, would include a major extension to the existing Mount Owen North Pit and extraction of deeper coal seams in two previously-disturbed areas of the Ravensworth East Mine. The project would also involve the surrender of all existing consents relating to the Mount Owen and Ravensworth East mines, and consolidation of both operations under a single contemporary consent. Importantly, the Glendell Mine is excluded from the subject application.

The project is summarised in **Table 1** below, and described in detail in its Environmental Impact Statement (EIS, see **Appendix A**). **Figures 3 to 5** show the key components of the project, including the proposed final landform. **Figure 6** shows the land ownership surrounding the project area.

**Table 1: Key components of the project**

<b>Aspect</b>	<b>Description</b>
<i>Life of mine</i>	<ul style="list-style-type: none"> <li>21 years (mining operations until 2030), comprising an additional 12 years of mining for the Mount Owen North Pit and 6 years for the Ravensworth East Mine.</li> </ul>
<i>Mining areas</i>	<ul style="list-style-type: none"> <li>Open cut mining operations would occur in the following areas (see <b>Figure 4</b>):               <ul style="list-style-type: none"> <li>North Pit, continuing southward beyond the current pit boundary (74 Mt);</li> <li>Bayswater North Pit (BNP), mining deeper seams within the northern portion of the approved Ravensworth East Mine (12 Mt); and</li> <li>Ravensworth East Resource Recovery (RERR) Pit, mining deeper seams from generally beneath the former TP2 mining area (6 Mt).</li> </ul> </li> </ul>
<i>Extraction rates</i>	<ul style="list-style-type: none"> <li>No change to existing ROM coal extraction rates of 10 Mtpa from the Mount Owen North Pit and 4 Mtpa from the Ravensworth East mining areas.</li> </ul>
<i>Mining methods</i>	<ul style="list-style-type: none"> <li>Open cut multi-seam mining using a truck and excavator fleet</li> </ul>
<i>Mining depth</i>	<ul style="list-style-type: none"> <li>Mining depths within the North Pit Extension Area would vary from approximately 180 m to 300 m and target the Ravensworth, Bayswater and Lemington seams.</li> <li>Mining in the BNP and RERR Pit areas would target the Ravensworth and Bayswater seams, to a depth of approximately 200 m.</li> </ul>
<i>Overburden emplacement and waste management</i>	<ul style="list-style-type: none"> <li>Continued use of the Ravensworth East voids for fine coal rejects (tailings) and the option for development of in-pit tailings cells within the North Pit Extension Area.</li> <li>Progressive co-disposal of coarse rejects within in-pit overburden emplacements, including the North Pit, West Pit, BNP and RERR Pit.</li> <li>Receipt of tailings from other mines for potential emplacement within RERR Pit.</li> <li>Backfilled overburden from the BNP and RERR Pit would be relocated to the West Pit OEA or used as capping material for tailings areas.</li> </ul>
<i>Coal processing</i>	<ul style="list-style-type: none"> <li>All coal would continue to be processed using the existing Mount Owen CHPP facilities.</li> <li>All ROM coal would be trucked to the Mount Owen CHPP via internal haul roads.</li> </ul>
<i>Transport</i>	<ul style="list-style-type: none"> <li>Product coal to be transported via rail to the Port of Newcastle for export.</li> <li>Up to 2 Mtpa of ROM coal and crushed gravel to be transported on an as required basis via an existing overland conveyor to Liddell Coal Mine (for use or onward transportation) and/or Bayswater and Liddell power stations.</li> </ul>
<i>Operating hours</i>	<ul style="list-style-type: none"> <li>24 hours a day, 7 days a week.</li> </ul>
<i>Employment</i>	<ul style="list-style-type: none"> <li>No change to existing operational workforces of up to 660 full time equivalent (FTEs) at Mount Owen and 260 FTEs at Ravensworth East.</li> <li>Up to an additional 330 jobs during the 18 month construction period.</li> </ul>
<i>Capital investment</i>	<ul style="list-style-type: none"> <li>Approximately \$153 million</li> </ul>
<i>Infrastructure</i>	<ul style="list-style-type: none"> <li>Construction of an additional rail line and northern turn out, connecting the Mount Owen Rail Loop with the Main Northern Rail Line to the west of the existing rail loop turnoff, and requiring the construction of a single span bridge over Bettys Creek.</li> <li>Hebden Road upgrades, including a rail overpass and bridge over Bowmans Creek.</li> <li>Ancillary upgrades to the existing CHPP and mine infrastructure areas.</li> </ul>
<i>Site Access</i>	<ul style="list-style-type: none"> <li>Continued use of existing mine access road off Hebden Road for both mines.</li> </ul>
<i>Biodiversity offsets, rehabilitation and final landforms</i>	<ul style="list-style-type: none"> <li>The project would disturb an additional 458 hectares (ha) of land, including 451 ha of native vegetation and native grassland.</li> <li>The proposed biodiversity offset strategy comprises approximately 767.5 ha of land including 290 ha of existing native woodland and 474 ha of land to be regenerated.</li> <li>Progressive rehabilitation of the disturbance area would involve the establishment of about 368 ha of native woodland and 92 ha of grassland, with rehabilitated woodland areas providing long-term vegetated corridors between nearby conservation areas.</li> <li>Final land uses would involve a mix of agriculture and biodiversity conservation.</li> <li>The project is seeking approval to increase the number of final voids from two to four.</li> </ul>

## 2.2 Justification for the Project

Glencore has presented a number of reasons justifying the project.

### Coal Resource

The area surrounding Singleton has been known to contain coal reserves since its exploration by European settlers. The development of coal resources is a key element of the region's history. In recent years, Glencore has undertaken a drilling exploration program to verify the extent of coal reserves within its mining tenements at the Mount Owen Complex.

This extensive exploration program identified additional mineable coal reserves to the south of the currently approved North Pit and within the RERR mining area, underlying and extending south of the former TP2 Pit. In early 2014, the BNP area was also confirmed to contain economically recoverable coal reserves. Glencore has identified that together these areas contain around 92 Mt of additional ROM coal, comprising 74 Mt in the North Pit Extension Area, 12 Mt in BNP and 6 Mt in RERR Pit.

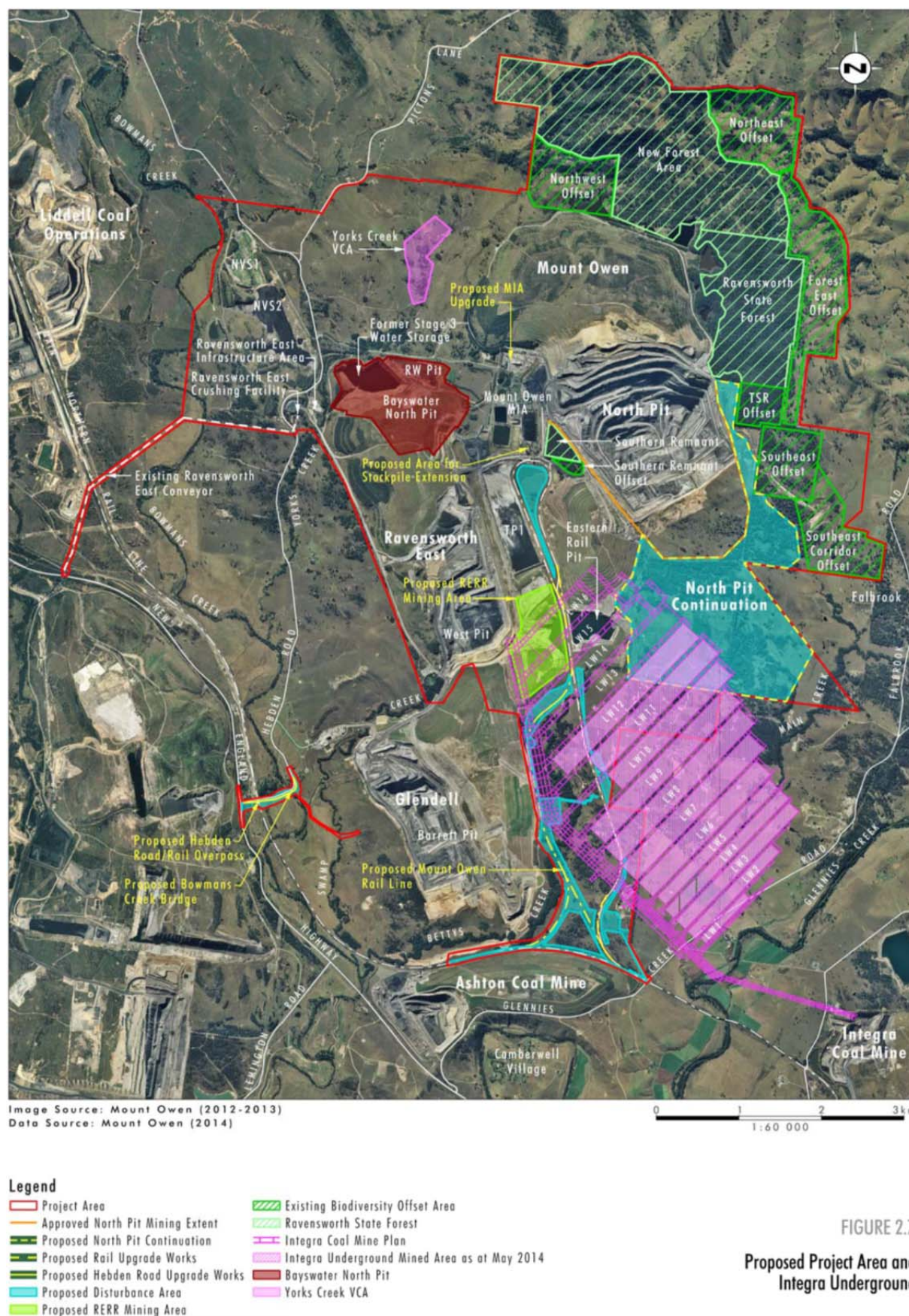
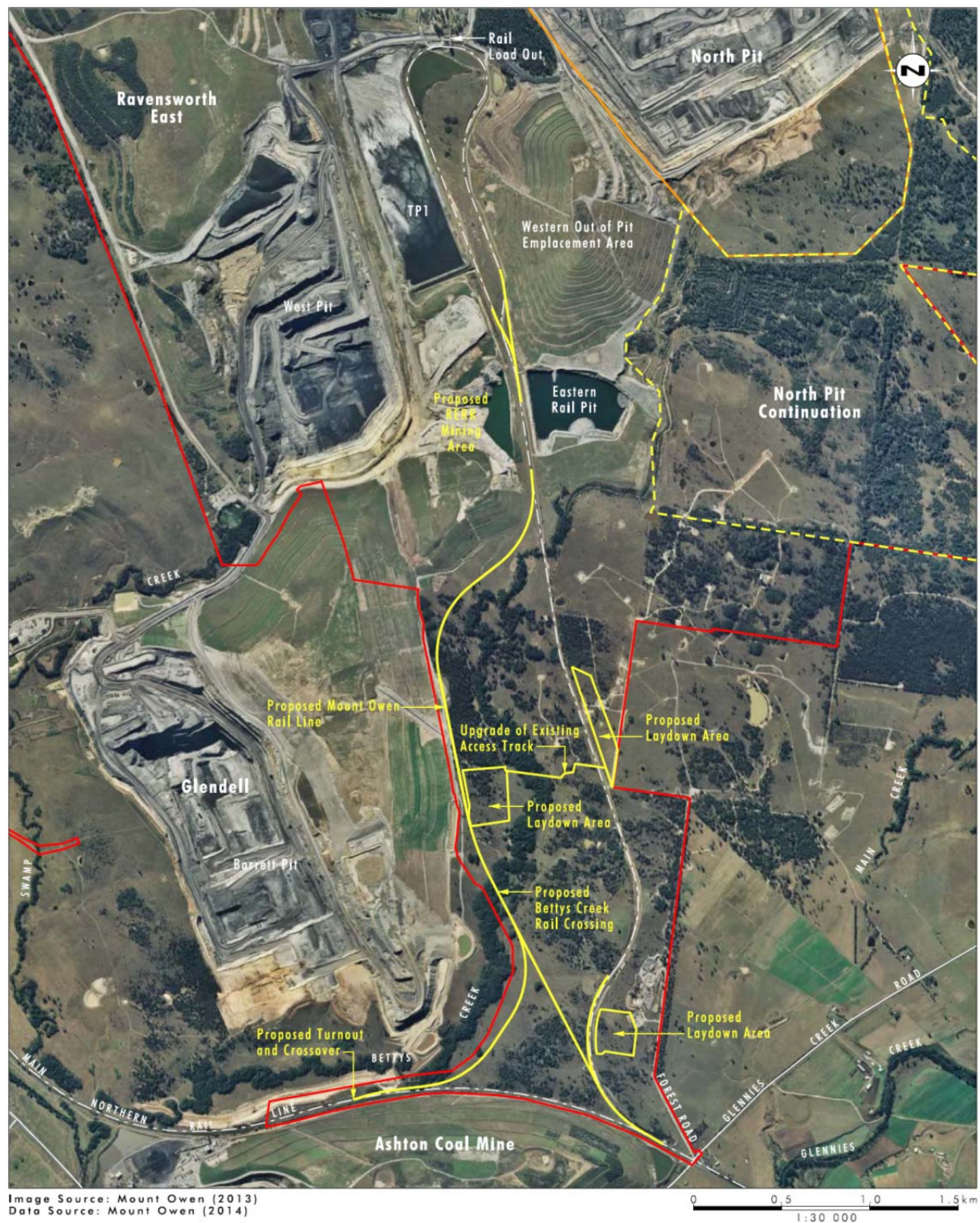


FIGURE 2.7

Proposed Project Area and  
Integra Underground**Figure 3: Mount Owen Continued Operations Project**





#### Legend

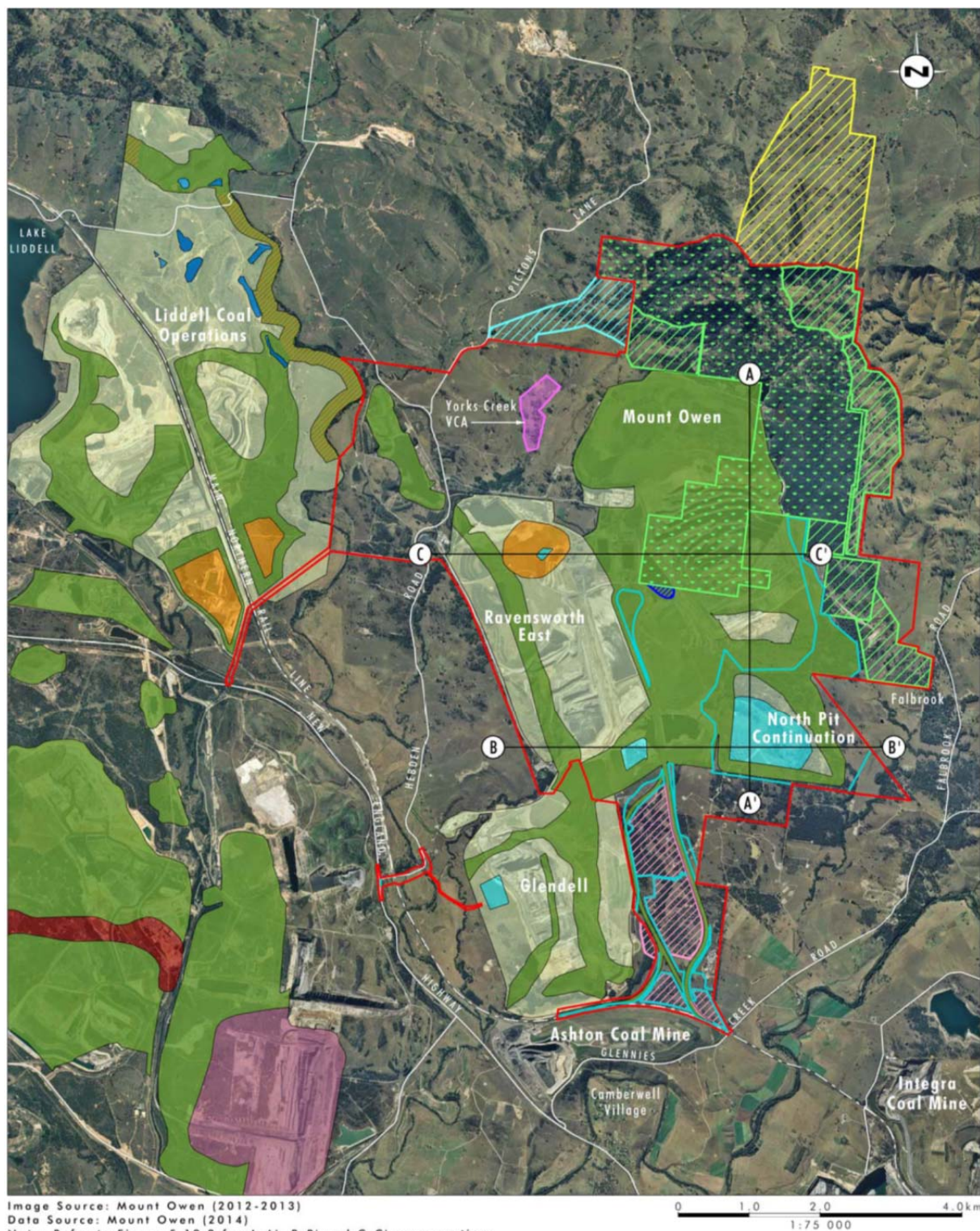
- Project Area
- Approved North Pit Mining Extent
- Proposed North Pit Continuation
- Proposed Rail Upgrade Works

FIGURE 2.13

Proposed Rail Line  
Conceptual Design

**Figure 4:** Proposed additions to the Mount Owen Rail Loop





#### Legend

- |   |  |   |
|---|--|---|
| <span style="border: 1px solid red; padding: 2px;"> </span> Project Area  | <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;"> </span> Ravensworth State Forest  | <span style="background-color: #800000; border: 1px solid black; padding: 2px;"> </span> Grazing            |
| <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;"> </span> Proposed Disturbance Area  | <span style="background-color: #FFD700; border: 1px solid black; padding: 2px;"> </span> Proposed Corridor Habitat Enhancement on Non-Mined land (Liddell Coal Operations) | <span style="background-color: #000080; border: 1px solid black; padding: 2px;"> </span> Riparian / Wetland |
| <span style="background-color: #FF69B4; border: 1px solid black; padding: 2px;"> </span> Yorks Creek VCA  | <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;"> </span> Existing Biodiversity Offset Area   | <span style="background-color: #00CED1; border: 1px solid black; padding: 2px;"> </span> Water Storage      |
| <span style="background-color: #00CED1; border: 1px solid black; padding: 2px;"> </span> Final Void Water Level   | <span style="background-color: #FFD700; border: 1px solid black; padding: 2px;"> </span> Proposed Cross Creek Biodiversity Offset Area                                     | <span style="border: 1px solid black; padding: 2px;"> </span> Section Line                                  |
| <span style="background-color: #3CB371; border: 1px solid black; padding: 2px;"> </span> Native Woodland  | <span style="background-color: #FF69B4; border: 1px solid black; padding: 2px;"> </span> Bettys Creek Habitat Management Area  |   |
| <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;"> </span> Open Grassland (Potential grazing areas) with pockets of Native Vegetation | <span style="background-color: #4682B4; border: 1px solid black; padding: 2px;"> </span> Southern Remnant Biodiversity Offset Area   |   |
| <span style="background-color: #FF8C00; border: 1px solid black; padding: 2px;"> </span> Grassland for Stabilisation  | <span style="background-color: #00CED1; border: 1px solid black; padding: 2px;"> </span> Stringybark Creek Habitat Corridor  |   |

FIGURE 5.54

Mount Owen Continued Operations Project Proposed Post Mining Land Use

Figure 5: Mount Owen Mine Complex proposed final landform



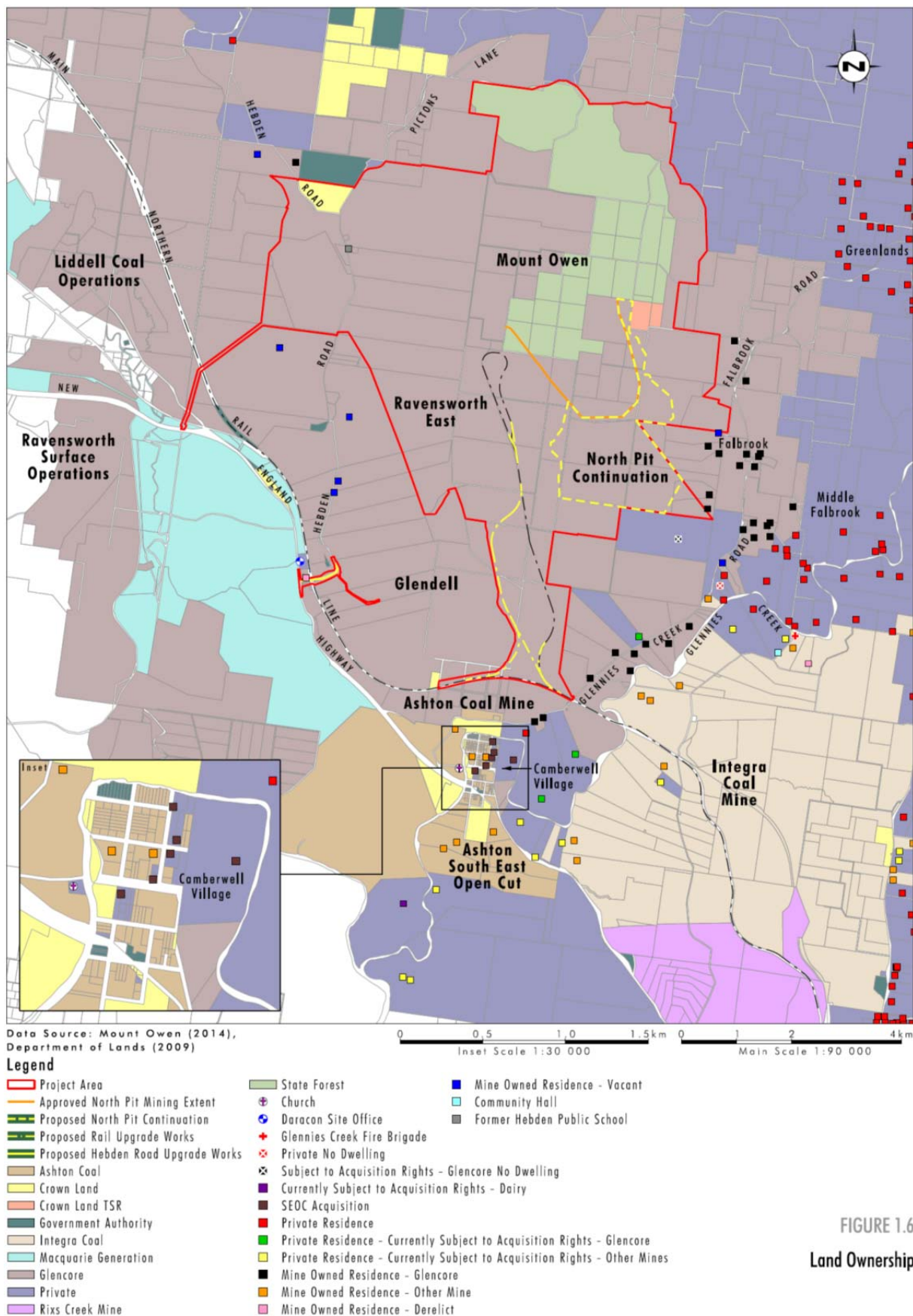


FIGURE 1.6  
Land Ownership

Figure 6: Surrounding land ownership

Glencore has identified that mining activities at the Ravensworth East Mine are expected to continue until the lapsing of the current consent in 2021. However, an extension of time is required to recover all approved extractable coal resources in this area. Additionally, based on current production schedules, mining rates in the Mount Owen North Pit would begin to be constrained by geological and engineering limitations in 2016 and would progressively scale down towards completion in 2018.

With approved extractable resources likely to be exhausted in the coming years, the proposed project would not only extend the life of the mine, but would also provide operational continuity and reduced production constraints for the North Pit and allow for optimised sequencing of coal extraction at the Ravensworth East Mine, progressing from the active West Pit, to the BNP and finally the RERR Pit.

The Division of Resources & Energy (DRE) of the Department of Industry has identified that the 92 Mt of high quality coal proposed to be extracted under the project represents a significant coal resource, both regionally and for the State, and that the project would provide for the optimised recovery of this resource from an area of the Hunter Coalfield with a long history of mining activities.

Additionally, the project would maintain the economic life of the Mount Owen mine, maximise the utility of existing infrastructure, maximise the recovery of the coal resources from previously disturbed areas and provide for the integration of management and regulatory activities at the Mount Owen Complex.

### ***Mine Design***

Glencore states that it considered numerous mine plans and applied a range of mitigation measures in designing the project, with the intention of minimising potential environmental and human amenity impacts, while still maintaining the economic viability of the project. These measures include:

- designing the North Pit Extension Area to avoid disturbance of the existing Mount Owen Biodiversity Offset Areas and adjoining Ravensworth State Forest;
- pulling back the south-eastern boundary of the North Pit Extension Area to provide appropriate environmental setbacks from Main Creek, facilitate improved landform stability and afford greater separation distances between mining activities and residential receivers to the east;
- ensuring a minimum 250 m vertical separation gap between the floor of the North Pit and the existing Integra underground workings to enable safe underground mining operations;
- locating key haul roads within the North Pit below the natural surface level to reduce potential traffic noise levels;
- progressively rehabilitating disturbed areas as the mining fronts progress; and
- creating final landforms with adequate surface drainage, that integrate with the existing mining areas and the surrounding landscape, while also providing future land use opportunities.

### ***Use of Existing Infrastructure***

Glencore states it has minimised the proposed disturbance footprint by optimising the use of existing infrastructure. The project would maximise the use of existing mining infrastructure, including by using the existing coal crushing plant to process gravel on-site for use at the neighbouring Liddell Coal Mine. Nevertheless, the project would require a range of new infrastructure and upgrades to existing infrastructure, comprising:

- an additional Mount Owen rail line and northern rail line turnout connected to the Main Northern Rail Line, to allow Glencore Rail trains the ability to turn around within the Mount Owen Complex and return to Glencore-owned mines to the west (thereby reducing constraints on the rail network).
- ancillary upgrades to the existing Mount Owen rail line to enable the park-up and maintenance of Glencore Rail trains that are not in service;
- construction of a new section of Hebden Road between the existing Bowmans Creek Bridge and the New England Highway intersection, including:
  - a rail overpass, which would improve traffic flow and reduce traffic hazards by reducing the need for traffic to queue on the New England Highway; and
  - a new Hebden Road bridge crossing over Bowmans Creek, which would allow for two-way traffic movements and provide road safety improvements;
- extension of and improvements to the existing CHPP and coal stockpile facilities; and
- upgrades to the Mine Infrastructure Area (MIA), including increased capacity at the existing heavy vehicle workshop and fuel farm and upgrades to ancillary facilities.

### ***Economic Benefits***

Glencore has estimated that the project would generate a total net benefit of \$758 million (net present value or NPV) to the local and regional economy, at a benefit to cost ratio of 1.30, and would provide \$258 million (NPV) in royalties to the NSW Government over the life of the mine. DRE has reviewed

the predicted royalties and advised that this figure would likely be greater, at around \$280 million (NPV), based on its assumptions around future coal prices.

To provide additional certainty, the Department commissioned the Centre for International Economics (CIE) to undertake a peer review of Glencore's economic impact analysis (EIA) and cost-benefit assessment (CBA). This peer review subtracted the royalties generated from mining in the BNP (as this could occur regardless of the project) and calculated slightly lower royalties of \$235 million (NPV). The Department therefore considers that the project can be expected to generate royalties to the NSW Government of between \$235 and \$280 million (NPV).

The EIA does not estimate the tax revenue which may be generated from the project, as this is considered to be a transfer payment in the CBA. The Department is therefore unable to consider the quantum of company taxes in its assessment, other than to note that additional tax revenue from the project would benefit the community of NSW and the local region.

### **Employment**

As the project is not seeking to increase production rates or the existing operational equipment fleet, the operational workforce would not change relative to existing arrangements at the respective mines. The current workforce comprises up to 660 FTEs at Mount Owen and 260 FTEs at Ravensworth East. The project would also generate up to 330 construction jobs over the 18 month construction period.

Furthermore, Glencore has identified that at its peak (in 2020), the project is expected to generate combined direct and indirect employment for approximately 1,200 FTEs, of which 1,091 are estimated to be employed in the Hunter region.

## **3. STRATEGIC CONTEXT**

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### **3.1 NSW Coal Industry**

Society is heavily reliant on coal to meet its basic energy needs, both at the domestic and international level, with coal providing around 80% of NSW's electricity needs, 75% of Australia's electricity needs and 40% of the world's electricity needs.

The International Energy Agency (IEA) expects the world's energy consumption to grow by 37% by 2040. While steps are being taken across the world to reduce the reliance on fossil fuels for electricity generation, the IEA has forecast increasing demand for coal over the life of the Mount Owen Continued Operations Project.

The NSW coal industry generates around 80% of the value of the State's mineral production, making coal by far NSW's biggest mineral commodity. NSW coal production has grown steadily over the past decade, primarily to meet demand from Asian export markets. Despite recent downturns in export coal prices, NSW continues to produce large volumes of export quality coal for the Asian market.

In 2013-2014, NSW produced approximately 196 Mt of saleable coal, of which 136 Mt was exported, principally through the Port of Newcastle. This coal production was worth some \$15.2 billion and generated around 31% of the State's export revenue.

Port and rail capacity are currently being expanded to enable around 230 Mt of coal to be exported from Newcastle each year, with NSW coal exports expected to continue to rise in line with this increased capacity in the short to medium term, subject to fluctuations in market demand.

At present, the Hunter Coalfield is the most significant coalfield in NSW, producing around 60% of the State's coal. It comprises 15 large mining complexes, such as at Mount Owen, which are located in a broad corridor on either side of the Main Northern Rail Line between Singleton and Muswellbrook.

In 2014, employment in the NSW coal industry employed just over 22,000 people, a reduction of about 1,400 from the previous year. The Hunter Coalfield accounts for over half of the coal mining jobs in NSW (ie about 12,000 jobs). With the potential employment of up to 920 FTEs at the Mount Owen and Ravensworth East mines, the project represents ongoing employment for around 8% of the mining jobs in the Hunter Coalfield.



### 3.2 Hunter Strategic Regional Land Use Plan

The *Upper Hunter Strategic Regional Land Use Plan* (SRLUP, September 2012) provides a framework for balancing strong economic growth with the protection of high value agricultural land within the Upper Hunter region. The plan identifies key regional planning challenges as:

- improving the balance between agricultural land uses and resource development proposals, focusing on achieving co-existence between mining, coal seam gas and agriculture;
- maintaining or enhancing opportunities for environmentally responsible mining and coal seam gas development to deliver reliable energy supplies to the State that reduce energy costs and carbon emissions and that generate economic wealth for the State;
- maintaining or enhancing future opportunities for sustainable agriculture; and
- defining and protecting strategic agricultural land.

One of the first steps in achieving these outcomes was the identification and mapping of three categories of strategic agricultural land in the region. These categories include Biophysical Strategic Agricultural Land (BSAL), which is essentially the best farming land in the region, and the Equine and Viticulture Critical Industry Clusters (CICs), which represent a unique concentration of productive agricultural enterprises associated with two iconic agricultural industries in the Upper Hunter region.

To ensure that potential impacts on these strategic agricultural lands are appropriately considered, any mining or coal seam gas proposals that occur on strategic agricultural land outside existing mining lease areas must be referred to the independent Mining and Petroleum Gateway Panel. This Gateway Process allows for the early identification of potential impacts on agricultural land and water resources and the determination of any additional information or assessment requirements that are necessary to inform the merit assessment of the proposed development.

Glencore has claimed that the Gateway Process does not apply to the project, as the company holds relevant mining tenements over the subject land and no BSAL or CIC land exists in proposed mining areas. To support this argument the EIS included soil survey and test results for the areas surrounding the proposed Hebden Road upgrades and within the proposed North Pit Extension Area. These tests indicate that the soils in this area do not meet the criteria for BSAL, as they have moderate to very low capability classes (LSC Classes 4 to 7) and moderately low to low soil fertility ratings.

However, DRE's submission on the project identified that Glencore is yet to convert an existing assessment lease (AL08) into a mining lease to account for additional disturbance within the North Pit Extension Area. Consequently, the Department has advised Glencore that it is required to obtain an SVC or Gateway Certificate for the project, before the project application can be determined.

Glencore subsequently lodged an SVC application to verify the land capability classes reported in the EIS and confirm that BSAL is not present in any area of the project not subject to a current mining lease. Once this SVC application has been determined, the Department will finalise its assessment of the potential impacts of the project on BSAL.

### 3.3 Glencore Operations in the Hunter Valley

Several aspects of the MOCO Project relate to interactions with other nearby Glencore-owned mines. It is therefore important to provide a brief overview of Glencore's operations in the Hunter Valley.

Glencore currently owns 10 coal mining operations in the Hunter Valley Coalfield, stretching from Bulga in the southeast to Mangoola in the northwest. A number of these operations are located adjacent to one another in the greater Ravensworth area. These operations include the Ravensworth open cut and underground, Liddell open cut, Ravensworth East open cut, Mount Owen open cut and Glendell open cut. In addition, the Department is aware that Glencore has recently signed a binding agreement to purchase the neighbouring Integra Underground Mine (see **Figure 3**).

The co-location of these mines enables Glencore to achieve several efficiency gains (including shared use of CHPP processing capacities and infrastructure assets, train maintenance and refuelling areas and water management infrastructure) and coordinate its mine closure and rehabilitation strategies.

Glencore currently operates an integrated water management system across the Mount Owen Complex, Ravensworth Complex and Liddell Coal Mine. This system, known as the Greater Ravensworth Water Sharing Scheme (GRWSS), allows Glencore to share water between these mines and better manage its regional water balance by better matching water makes and water takes.

In addition to providing efficiency gains for Glencore, the GRWSS provides several environmental benefits including the beneficial reuse of dirty and mine-affected water, reduced discharges of excess water to the environment and reduced reliance on extraction of clean water from local watercourses (benefiting the environment, downstream water users and reducing demand for limited licensed water entitlements). By consolidating water discharges under the environment protection licences (EPLs) for the Ravensworth and Liddell coal mines, the GRWSS also enables more efficient management and enforcement of discharge limits.

The close proximity of these mines also enables the strategic planning of post-mining land uses and rehabilitation corridors, at a regional scale. As shown in **Figure 8**, Glencore has already coordinated the location of several existing biodiversity offset and rehabilitation areas to provide long-term habitat linkages throughout the greater Ravensworth area. As discussed in Section 6.4, this strategic approach to offsetting can have significant benefits, strengthening the conservation values of otherwise isolated biodiversity offset areas and improving the mobility and potential recovery of threatened fauna species in the medium to long-term.

To build upon these established efficiencies, the MOCO Project is seeking approval to enable gravel transfers from the Mount Owen Complex to the neighbouring Liddell Coal Mine (for use as road base to reduce dust emissions) and the consolidated emplacement of tailings from the Mount Owen and other nearby CHPPs in the approved tailings emplacement areas at the Mount Owen Complex. The Department supports the transport of gravel to the Liddell Coal Mine to help reduce dust emissions from its haul roads and believes that there is merit in consolidating the management and emplacement of tailings streams. Further consideration of these matters is provided in Section 6.

## 4. STATUTORY CONTEXT

The Department has considered statutory requirements for the assessment of the project under the EP&A Act, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and other relevant legislation. In regard to the EP&A Act, this has included consideration of the:

- objects found in section 5 of the Act;
- matters relating to threatened species found in sections 5A-5D of the Act;
- the matters listed under section 79C of the Act;
- applicable environmental planning instruments and draft instruments, including the recent repeal of clause 12AA of the Mining SEPP; and
- various other requirements of the Act and its Regulations, including concerning public exhibition.

The Department has considered all of these matters in its preliminary merit assessment of the project and has provided a summary of this assessment below. Further consideration of the objects and other relevant provisions of the EP&A Act and environmental planning instruments is found in **Appendix D**.

### 4.1 State Significant Development

The proposed development is declared to be State significant development under section 89C of the EP&A Act as it is 'development for the purposes of coal mining', as specified in clause 5 of Schedule 1 to *State Environmental Planning Policy (State and Regional Development) 2011*.

Consequently, the Minister for Planning is the consent authority for the development. However, the development application falls within the Minister's delegation to the Planning Assessment Commission (Commission) dated 14 September 2011, because there were more than 25 public submissions in the nature of objections. Consequently, the Commission must determine the application.

### 4.2 Permissibility

The project disturbance area is located in the Singleton local government area. All subject land within the proposed open cut mining areas is zoned RU1 (Primary Production) under the *Singleton Local Environmental Plan 2013* (Singleton LEP). Open cut mining is permissible with consent in this zone.

The land required to establish the second rail spur connection to the Main Northern Rail Line and the rail overpass, bridge and associated upgrades to Hebden Road is zoned as either RU1 (Primary Production) or SP2 (Infrastructure). The Department notes that the land zoned SP2 relates to the Main Northern Rail Line railway corridor and the New England Highway classified road corridor. The proposed rail and road upgrades are permissible with development consent within these zones.

Additionally, some of the proposed biodiversity offset areas situated outside the project disturbance area, but within the project boundary, are located on land zoned E2 (Environmental Conservation). The proposed environmental protection works are permissible with consent in this zone.

Consequently, all components of the project are permissible with development consent and the Commission may determine the application.

### 4.3 Objects of the EP&A Act

The Minister or his delegate must consider the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the decision on whether or not to approve the project are found in sections 5(a)(i),(ii),(vi) and (vii). They are:

*To encourage:*

- (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;*
- (ii) *the promotion and co-ordination of the orderly and economic use and development of land;*
- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats; and*
- (vii) *ecologically sustainable development.*

The Department is satisfied that the project encourages the proper development of resources (Object 5(a)(i)) and the promotion of orderly and economic use of land (Object 5(a)(ii)), since the:

- project represents permissible land uses on the subject land;
- coal resource has been determined by DRE to be significant from a State and regional perspective;
- coal resource is located within existing coal exploration and mining lease areas, in a region that is dominated by coal mining operations;
- project can be largely carried out using existing mine site and transport infrastructure; and
- project would provide considerable socio-economic benefits.

Consideration of the protection of the environment (Object 5(a)(vi)) is provided in Section 6 of this report. Importantly, the Department believes that the project has been designed to minimise potential environmental impacts where practicable, including through setbacks from creek lines, standoffs from biodiversity offset areas and the extraction of 18 Mt of coal from within previously disturbed land.

Overall, the Department considers that the project is able to be undertaken in a manner that would maintain or improve the biodiversity values of the region in the medium to long-term. The Department is also satisfied that the impacts to threatened species and habitats can be managed and/or mitigated through appropriate conditions that require biodiversity offsets and detailed rehabilitation strategies.

The Department has considered the encouragement of ecologically sustainable development (ESD, see Object 5(a)(vii)) in its assessment of the project (see **Appendix D**). The Department also notes Glencore's consideration of these matters (see Section 7.3 of the EIS), and considers that the project is able to be carried out in a manner that is consistent with the principles of ESD.

The Department's assessment has sought to integrate all significant environmental, social and economic considerations in forming and presenting a recommendation to the consent authority. The costs and benefits of the project have been independently peer reviewed and carefully considered.

### 4.4 Significant effect on threatened species

Sections 5A to 5D of the EP&A Act relate to the consideration, assessment and management of threatened species. In deciding whether the project is likely to have a significant adverse effect on threatened species, populations or ecological communities, or their habitats, the consent authority is required to take into consideration:

- the factors listed in subsection (2) of section 5A of the EP&A Act (the '7 part test'); and
- any assessment guidelines issued and in force under the *Threatened Species Conservation Act 1995* (TSC Act) or *Fisheries Management Act 1994*.

The Department has considered the 7 part tests which have been presented in Appendix 11 of the EIS and the *Threatened Species Assessment Guidelines* (DECC 2007) in deciding whether the project is likely to cause significant effects on threatened species, populations or ecological communities, or their habitats. This consideration has informed the Department's assessment of these impacts (see Section 6.4).

#### 4.5 Environmental Planning Instruments

Several environmental planning instruments apply to the project, including:

- *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007* (Mining SEPP);
- *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP);
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*;
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection*;
- *State Environmental Planning Policy No. 55 – Remediation of Land*;
- *Hunter Regional Environment Plan (Heritage) 1989*; and
- *Singleton Local Environmental Plan 2013*.

The Department has noted Glencore's consideration of these matters in the EIS and assessed the project against the relevant provisions of these instruments (see **Appendix D**). Based on this assessment, the Department is satisfied that the project can be carried out in a manner that is consistent with the aims, objectives and provisions of these instruments.

#### 4.6 Integrated & other Approvals

Under section 89J of the EP&A Act, a number of approvals are not required to be separately obtained for the project. These include:

- various heritage approvals required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977*;
- an authorisation under the *Native Vegetation Act 2003* for the clearing of native vegetation; and
- certain water approvals under the *Water Management Act 2000*.

The Department has considered the matters covered by this legislation in consultation with the relevant agencies, and has recommended conditions to mitigate and/or offset the potential impacts of the development on these matters.

Under section 89K of the EP&A Act, a number of further approvals are required, but must be granted substantially consistent with any development consent for the project. These include:

- variations to the existing mining leases and any new mining leases under the *Mining Act 1992*;
- approvals for development within the Patrick Plains Mine Subsidence District under the *Mine Subsidence Compensation Act 1961*;
- variations to the site's existing EPL under the *Protection of the Environment Operations Act 1997*; and
- consent for road works under section 138 of the *Roads Act 1993*.

The Department has consulted with the authorities responsible for granting these approvals during the assessment process. None of these authorities object to the approval of the project, subject to the imposition of suitable conditions (see Section 6, below).

#### 4.7 Site Verification Certificate

As outlined in Section 3.2 and stipulated in DRE's submission, the proposed project requires a new mining lease to be issued to enable open cut mining to occur in the proposed North Pit Extension Area. Consequently, the provisions of clause 50A of the EP&A Regulation apply and Glencore is required to obtain a site verification certificate or Gateway Certificate for the project.

In response to this advice, Glencore applied for a site verification certificate (SVC) to confirm that the land subject to proposed mining activities outside of the existing mining lease does not contain BSAL. Once this SVC application has been determined, the Department will finalise its assessment of the potential impacts of the project on BSAL.

#### 4.8 Commonwealth Approval

A delegate of the Commonwealth Minister for the Environment determined on 24 October 2013 that the proposed project is a 'controlled action' under the EPBC Act. The proposed project was



determined as being likely to have a significant impact on controlling provisions and matters protected under the EPBC Act, including:

- listed threatened species and communities (under sections 18 & 18A of the EPBC Act), in particular the following species were identified as being likely to be significantly impacted:
  - Spotted-tail Quoll;
  - Regent Honeyeater;
  - Swift Parrot; and
  - Koala;
- listed migratory species (under sections 20 & 20A); and
- a water resource, in relation to coal seam gas development and large coal mining development (under sections 24D & 24E).

Further assessment requirements were issued by the Commonwealth Department of the Environment (DoE) on 4 November 2013, and were included as a supplement to the environmental assessment requirements earlier issued by the Department.

As part of its determination, DoE accredited the State's environmental assessment processes under the EP&A Act. Consequently, the potential impacts on the EPBC Act controlling provisions have been assessed under Part 4 of the EP&A Act. The Department's assessment of the potential impacts of the project on controlling provisions relating to biodiversity and water resources is provided in Sections 6.4 and 6.6 (below). Following the NSW determination on the project, the Department will refer the Mount Owen Continued Operations Project to the Commonwealth Minister for the Environment for separate determination under the EPBC Act.

The proposed project was jointly referred by the Department and DoE to the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC) for advice on surface and ground water impacts, as well as potential impacts on downstream watercourses and receiving environments. The advice provided by the IESC is summarised in Section 5, has been considered by the Department in Section 6 and informed the conclusions presented in Section 8 and the recommended conditions of consent in **Appendix G**.

#### **4.9 Exhibition and Notification**

Under section 89F of the EP&A Act, the Secretary is required to publicly exhibit the EIS for the project for at least 30 days. After accepting the EIS for the project, the Department:

- publicly exhibited the EIS from 20 January 2015 until 6 March 2015:
  - on the Department's website;
  - at the Department's Information Centre;
  - at Singleton Shire Council's office; and
  - at the Nature Conservation Council's office;
- advertised the exhibition in the Newcastle Herald, Hunter Valley News and Singleton Argus;
- notified relevant State Government authorities and Singleton Shire Council; and
- notified relevant transport and infrastructure authorities in accordance with the Mining SEPP and the Infrastructure SEPP.

In undertaking these processes, the Department has satisfied the notification requirements of section 89F of the EP&A Act and the relevant environmental planning instruments.

During the assessment process, the Department also made a range of documents relevant to the assessment of the project available on its website.

#### **4.10 Planning Assessment Commission Review**

On 19 November 2015, the Minister for Planning asked the NSW Planning Assessment Commission (Commission) to review the merits of the Mount Owen Continued Operations Project, and requested that the Commission hold public hearings during the review. The terms of reference for the Commission's review are shown below. Once it receives the Commission's review report, the Department will finalise its assessment of the merits of the project and refer the development application back to the Commission for determination.

1. Carry out a review of the Mount Owen Continued Operations Project, by:
  - a) considering the EIS for the development, the issues raised in submissions, the formal response to submissions, and any other information provided on the development during the course of the review or as part of the public hearings;
  - b) considering the likely economic, environmental and social impacts of the development in the locality, in the region and for the State;
  - c) assessing the merits of the development as a whole, having regard to all relevant NSW Government policies and guidelines; and
  - d) providing recommendations on any additional reasonable and feasible measures that could be implemented to avoid, minimise and/or manage the potential impacts of the development;
2. Hold a public hearing during the review as soon as practicable after the Department of Planning and Environment provides its preliminary assessment report to the Commission; and
3. Submit its final report on the review to the Department of Planning and Environment within 12 weeks of receiving the Department's preliminary assessment report, unless otherwise agreed with the Secretary of the Department.

## 5. CONSULTATION

In response to the exhibition of the project, the Department received 233 submissions, comprising:

- 11 from public authorities, including Singleton Shire Council and 10 NSW Government agencies;
- 188 public and special interest groups submission in support of the project; and
- 34 public and special interest group submissions objecting to or commenting on the project.

The Department also received advice from DoE, the IESC, the Australian Rail Track Corporation and the NSW Forestry Corporation, along with supplementary advice from the above public authorities.

A summary of the issues raised in submissions is provided below. A full copy of these submissions and Glencore's response to submissions (RTS) are provided in **Appendices B and C**, respectively.

### 5.1 Additional Assessment

The Department commissioned two independent expert reviews regarding key elements of the EIS and assessment of the project. These were:

- **Air Quality Review** – the Department commissioned Todoroski Air Sciences to undertake a peer review of the air quality impact assessments contained in the EIS and RTS, including consideration of the residual issues raised by the EPA (see **Appendix E**); and
- **Economic Review** – the Department commissioned the Centre for International Economics (CIE) to undertake an independent peer review of the economic assessments contained in the EIS and RTS, including the Cost Benefit Analysis and Economic Impact Analysis (see **Appendix F**).

### 5.2 Public Authorities

No public authorities objected to the project. However, most of the public authorities raised issues or expressed concerns with specific aspects of the project in their submissions and/or advice, and made recommendations relating to their administrative and regulatory responsibilities.

Following the provision of additional information in the RTS, most public authorities have advised the Department that they are satisfied that their concerns have been adequately addressed and/or can be managed through appropriate conditions of approval. Accordingly, the following summary focuses primarily on the key residual issues or concerns that require further consideration in Section 6.

**Singleton Shire Council** (Council) did not object to the project. However, Council requested the Department afford appropriate consideration to noise mitigation; progressive rehabilitation; suitable road maintenance requirements; best practice blast management; air quality, groundwater and surface water monitoring and reporting systems; and the establishment of a Voluntary Planning Agreement.

In addition, Council asked that Glencore be required to offer acquisition to a landowner that would have significant air quality impacts, that biodiversity offsets are located within its LGA, the final landform is integrated with surrounding future land uses and local Aboriginal heritage interests are protected.

The **Office of Environment and Heritage** (OEH) acknowledged in its initial submission that when assessed against the *Interim Policy on Assessing and Offsetting Biodiversity Impacts* (2011), the proposed offset package would be broadly suitable to offset the impacts of the project, but that further clarification was needed regarding substitution ratios for non-like-for-like vegetation communities.

OEH also undertook a comparative assessment of the project against the *NSW Biodiversity Offsets Policy for Major Projects* (2015) and associated Framework for Biobanking Assessment (FBA). However, as the project was issued Director-General's requirements (DGRs) prior to adoption of the new policy and FBA, OEH has since agreed that the Department should consider the merits of the proposed offset package in accordance with the previous 'Interim Policy'.

In this regard, OEH has advised that the offset package contains generally appropriate vegetation communities, known records of threatened fauna species, more than twice the woodland vegetation and fauna habitat than would be disturbed by the project and is strategically located adjacent to existing conservation areas, thereby improving the conservation values of these properties.

OEH recommended that the proposed biodiversity offsets be secured under an appropriate conservation mechanism and that Glencore is required to monitor revegetation areas to ensure the success of its rehabilitation and focus its offset (and rehabilitation) strategy on the re-establishment of threatened flora species and communities, and habitat for threatened fauna.

With respect to other matters, OEH has recommended a range of conditions to manage potential impacts on Aboriginal heritage, and has advised that Glencore should be required to develop appropriate mitigation measures to manage potential flood impacts on one parcel of State-owned land, in consultation with the affected government authority.

The **NSW Environment Protection Authority** (EPA) sought clarification on a range of issues relating to predicted air quality impacts and the establishment of appropriate noise criteria for the project. Specifically, the EPA was concerned with the treatment of background PM<sub>2.5</sub> concentrations, predicted exceedances of relevant air quality criteria, the assessment of diesel emissions and commitments surrounding diesel particulate matter controls. EPA also noted the air quality modelling did not fully comply with its approved methods and questioned the calibration of the modelled PM<sub>10</sub> impacts.

To manage these issues, EPA recommended that all reasonable and feasible measures are implemented to minimise potential air quality emissions and requested a range of additional information, including either a more detailed and comparative analysis of the probabilistic approach adopted or justification to adequately address the contradictions in the air quality assessment.

The EPA has confirmed that the RTS adequately addressed a number of its initial concerns, but identified some residual air quality matters that require further consideration in the Department's assessment. Additionally, the EPA has recommended that the Department determine whether the predicted operational noise exceedances are acceptable and advised that, if the project is approved, the EPA would include conditions under any relevant EPL that limit blast fume emissions.

The **Division of Resources & Energy** (DRE) of the Department of Industry identified that, before mining within the area of AL 08, Glencore would need to convert this assessment lease to a mining lease. This would require the submission of a mining lease application to DRE and the grant of a new mining lease over the affected area.

With regard to mine safety, DRE was satisfied that the proposed blasting activities would not impair the structural integrity of the Integra underground mine, but noted that potential subsidence impacts should be further considered and that safety protocols should be developed to address potential blasting and subsidence interactions. DRE was satisfied that personnel evacuation and safety protocols could be established under updated management plans and Mining Operations Plans.

DRE also advised that it considered the coal resource to be significant at both the regional and State level. In 2013-14, the Mount Owen Complex was ranked the fifth largest of the 56 operating coal mines in NSW. DRE identified that the project was vital to the maintenance of the current production levels at the mine and recommended a range of conditions related to post-mining rehabilitation and the management of interactions with the Integra underground mine.

The **Office of Agricultural Sustainability & Food Security** (OASFS) within the **Department of Primary Industries** (DPI) did not raise any issues with the project. Overall, OASFS concluded that the

proposed Hebden Road upgrades would not be expected to materially affect the agricultural productivity of surrounding land, that there would be sufficient soil material to undertake post-mining restoration activities and that the project would have minimal social or economic impacts on the agricultural productivity of affected land or associated agricultural enterprises within the region.

DPI's **Office of Water** (DPI Water) identified that it was satisfied that the groundwater modelling provided was fit for purpose and that the project would adhere to Level 1 minimal impact considerations under the Aquifer Interference Policy. Nevertheless, DPI Water raised some issues regarding predicted groundwater and surface water impacts, water licensing and the water balance.

To address these issues, DPI Water requested that Glencore prepare a water strategy to outline the timing and mechanisms for acquiring relevant water entitlements and clarify some apparent discrepancies between the surface water management systems in the EIS and RTS. DPI Water also requested clarifications regarding the management of clean water flows and management of surface water flows and licensable take associated with the final landform.

DPI Water has indicated that the majority of these issues can be addressed through the provision of additional information and strategies, or under a Water Management Plan for the project. However, DPI Water retains some concern about Glencore's ability to license the surface water take associated with the large number of dams included in its proposed final landform. Additional information has been requested to clarify this outstanding matter, which is discussed further in Section 6.6.

The **NSW Dams Safety Committee** (DSC) identified that the project would involve activities and potential impacts within the notification areas for two prescribed dams - the Mount Owen North Void Tailings Dam and Mount Owen Rail Loop Tailings Dam. DSC has identified that it would need to endorse any proposed mining within the notification areas, but does not foresee any complications in conditioning these activities, given the similarity of the project to existing arrangements at the mine.

**NSW Health** did not object to the project, but raised several concerns with the potential air quality, noise and health impacts of the project on the local community. Specifically, NSW Health expressed a preference for the EIS to consider the potential for stricter air quality standards in the future and made several recommendations related to the conditioning of the project, including the application of reasonable and feasible dust mitigation measures, appropriate noise mitigation, blasting controls during adverse meteorological conditions and management of dust impacts on rainwater tanks.

**Roads and Maritime Services** (RMS) did not object to the proposed upgrades to the intersection between Hebden Road and the New England Highway, but requested that a Construction Traffic Management Plan is developed to manage the works and minimise potential disruptions to traffic.

**Transport for NSW** (TfNSW) did not object to the project, but advised that Glencore should consult with the ARTC regarding the proposed rail infrastructure upgrades and both Council and the RMS regarding the design of the proposed road works.

**NSW Rural Fire Service** (RFS) has no objections to the project, subject to the implementation of the comprehensive bush fire management plan in place at the existing mine and described in the EIS.

DPI has advised that neither **Crown Lands** nor **NSW Fisheries** raise any concerns with project.

The **Australian Rail Track Corporation** (ARTC) has confirmed its satisfaction with the proposed installation of a second rail spur connection to the Main Northern Rail Line and would continue to consult with Glencore during the project to confirm its requirements for the design of this connection. The ARTC has also confirmed that the proposed coal haulage on the Main Northern Rail Line could be accommodated under existing or renegotiated Access Holder Agreements over the life of the project.

In addition to the above, Glencore has provided the Department with correspondence from the **NSW Forestry Corporation**, signifying its satisfaction with the proposed final landform. Importantly, the NSW Forestry Corporation was supportive of Glencore's commitment to avoid the existing forested area of Ravensworth State Forest and was satisfied with the final landform, given that it would shift the approved final void to the south, outside the Ravensworth State Forest.

The **Commonwealth Department of the Environment** (DoE) made a number of comments and requested additional information relating to Matters of National Environmental Significance (MNES), namely listed threatened and migratory species and water resources.



Following the provision of additional information in the RTS, DoE advised that it is generally satisfied with the consideration of water resource matters and has recommended a number of management measures and monitoring commitments to be reflected in any conditions of consent.

With regard to biodiversity impacts, DoE requested a range of additional information concerning the type and age of vegetation communities to be impacted, proposed rehabilitation activities and the proposed long-term conservation mechanism. In addition, DoE sought a range of specific information required to assess the adequacy of the proposed biodiversity offset package, including details of the proposed restoration activities in the Stringybark Creek Habitat Corridor and further details of the monitoring and active management measures that would be undertaken to ensure the proposed regeneration of grassland areas achieves the intended vegetation community outcomes.

The Commonwealth **Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development** (IESC) provided scientific advice on the project to both the Department and DoE. In short, the IESC concluded that the likely impacts of the project would be generally limited to those of local importance and would likely be similar in scale and significance to the impacts associated with the existing Mount Owen and Ravensworth East mining operations. Nevertheless, these local impacts would contribute to cumulative water resource issues in the Hunter Valley.

Having reviewed the EIS, the IESC concluded that the Surface Water Assessment provided reasonable estimations of the risks to Bowmans Creek and its tributaries, but limited information on the existing conditions along Glennies Creek. To address these issues, the IESC identified a range of additional information that could be provided by Glencore, for consideration in the Department's assessment.

Likewise, the IESC considered the groundwater model in the EIS to be robust and well-constructed. However, it noted that the groundwater assessment could benefit from further information about aquatic fauna and habitat, including the presence or absence of groundwater dependent ecosystems in riparian corridors downstream of the project.

Overall, given the project scale and the location of mining leases, the IESC advised that Glencore had incorporated measures to reduce the project's potential impacts on water resources, by mining deeper seams within previously disturbed land and implementing a 450 m setback from Main Creek. However the IESC advised that Glencore should clarify the effectiveness of management plans at the existing mine, identify the impacts of predicted spillages to downstream watercourses and develop specific criteria for managing the effects of drawdown on groundwater dependent ecosystems.

### 5.3 Community and Interest Group Submissions

The public exhibition of the EIS attracted strong interest in the local community, with the Department receiving over 222 public submissions. Of these submissions, around 85% supported the project.

The 188 submissions in support of the project came from a range of stakeholders, including mine employees and their families, local businesses and individual members of the community. In general, these submissions expressed support due to the local and regional socio-economic benefits of the project, ongoing job security and perceived good environmental management at the existing mine.

Of the remaining public submissions 30 objected to the project and 4 made comments on the project. A number of these submissions were quite comprehensive, with the vast majority expressing concerns with the potential air quality and biodiversity impacts. The key concerns relating to air quality included increased dust emissions (especially at nearby residences), health impacts from air pollutants and inadequacies in the modelling. With respect to biodiversity, the key concerns related to the proposed clearing of native vegetation and consideration of the cumulative impacts on threatened species.

Other issues raised in the 30 submissions objecting to the project, included:

- *noise* – requests for the clarification of existing noise monitoring results and concerns regarding a range of noise impacts (including low frequency noise) on local residences and livestock;
- *blasting* – concerns regarding the potential for structural damage of buildings from blast vibrations and the management of blast fumes during adverse weather conditions;
- *human health and amenity* – concerns with potential health and amenity impacts of the project and requests for the installation of mitigation measures and/or property acquisitions in the local region;
- *local community* – concerns that the project would affect a number of properties in the Camberwell and Middle Fallbrook communities, with associated social costs and impacts on property values and future growth in the region;

- *final landform* – concerns with the proposed final landform, including visual aesthetics, the creation of functioning ecosystems and the presence of three final voids;
- *visual* – concerns with visual impacts encroaching closer to residents, the timing of progressive rehabilitation and the potential for night lighting impacts (including from mobile equipment);
- *transport* – concerns with the proposed road traffic and heavy vehicle movements on local roads, including potential interactions with school bus routes;
- *rail haulage* – Coal & Allied objected to the proposed use of its privately-owned Newdell rail loop for the transport of product coal, in the absence of appropriate commercial agreements;
- *social* – concerns that social and environmental costs could be shifted to the NSW community;
- *economic* – concerns that the economic assessment does not adequately assess whether the project would provide a net benefit to the NSW community as a whole;
- *cumulative impacts* – requests for more a comprehensive consideration of the cumulative impacts of mining in the Hunter Valley;
- *existing operations* – concerns regarding the environmental management and reporting at the existing Mount Owen Complex; and
- *general objections to mining* – including that coal mining contributes to climate change.

## 6. ASSESSMENT

The Department has considered the following in its assessment of the project:

- the EIS, submissions from the public, special interest groups, public authorities and the IESC;
- Glencore's response to submissions (RTS) on the project and related supplementary information;
- independent reviews of the air quality assessment and the economic appraisal of the project;
- supplementary information provided by Glencore in response to submissions on the RTS; and
- applicable environmental planning instruments and draft instruments, including the recent amendment to the Mining SEPP which repealed Clause 12AA;
- relevant NSW Government policies and guidelines, including the *Upper Hunter Strategic Regional Land Use Plan* (SRLUP) and the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP);
- the suitability of the site for the project;
- relevant provisions of the EP&A Act, including its objects and the requirements of section 79C.

The following is a summary of the findings of this assessment.

### 6.1 Air Quality

The EIS includes a specialist air quality impact assessment (AQIA) undertaken by Pacific Environment Limited (PEL) considering the likely impacts of the project in relation to 24-hour, monthly and annual average air quality criteria for dust deposition, total suspended particulates (TSP), fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and blast fumes.

Potential air quality impacts were the most frequent concern raised in community objections to the project. In particular, these objectors raised concerns with the predicted impacts at their properties, consideration of cumulative impacts in the Hunter Valley, potential health effects from dust and blast fume emissions and also challenged various aspects of the air quality modelling.

The EPA and NSW Health also raised issues in relation to the AQIA, which were responded to in Glencore's RTS. Despite this response, the EPA remains unsatisfied with Glencore's consideration of diesel particulate emissions, blast fume emissions (at two residential receivers R114 and R116) and the assumptions underpinning the cumulative impact assessment. Likewise, HNE Health reiterated its concerns regarding the consideration of air quality impacts on the nearby community. The Department has considered these matters in more detail below.

#### Peer Review

Consistent with established practice for large coal mining projects in the Hunter Valley and in recognition of the concerns raised in submissions, the Department commissioned Todoroski Air Sciences (TAS) to undertake a comprehensive review of the AQIA and Glencore's responses to concerns raised in respect of the predicted air quality impacts (see **Appendix E**).

While recognising that the AQIA was likely to provide a conservative output, the TAS independent peer review identified several uncertainties and potentially material issues with the air quality data, methodology and impact assessment. Specifically, TAS questioned and/or raised concerns with the site specific silt and moisture contents, validity of the emissions inventory levels, calculation of

background levels, meteorological conditions used in the model, choice of monitoring data used in the model, application of calibration factors for other mines, completeness of the blast fume assessment and slight differences between the modelling approach and the EPA's Approved Methods.

The TAS peer review recognised that these matters are unlikely to change the assessment of the general impacts of the project, but they could influence the precision of air quality predictions at specific receiver locations. On this basis, the Department considers that further information is required to inform a full and proper assessment of potential impacts on the surrounding community. Importantly, the Department notes that this information could affect the consideration of landowner rights under the NSW Government's *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP) and inform the development of potential operational conditions.

Accordingly, the Department has requested that Glencore respond to each of the matters raised in the TAS peer review. Glencore has agreed to provide a formal response to each of the matters raised by TAS, including any further clarification and/or modelling that may be required.

Nonetheless, the AQIA provides sufficient information to inform the Department's consideration of the general impacts and overall merits of the project. The purpose of seeking further clarification is instead aimed at achieving greater certainty in the consideration of impacts at nearby residences, application of the VLAMP and development of operational conditions. As the Department has not yet received Glencore's response to the TAS peer review, the following provides a preliminary assessment of the air quality impacts of the project.

### **Existing Air Quality Environment**

The existing air quality environment in the greater Ravensworth region is influenced by particulate emissions from several mining operations, especially during the drier months when there is higher potential for wind erosion from exposed areas. This region also experiences elevated PM<sub>2.5</sub> fine particulate levels in Winter months, however as identified in the CSIRO's *Upper Hunter Fine Particle Characterisation Study*, these elevated Winter levels are more heavily influenced by the burning of wood heaters in nearby towns than any seasonal increase in emissions from mining operations.

Extensive monitoring data from the existing Mount Owen operations provide a more specific and detailed picture of the current air quality environment in the immediate vicinity of the project site. Glencore's existing air quality monitoring network includes a range of high volume air samplers (HVAS), tapered element oscillating microbalance instruments (TEOMs) and dust deposition gauges, and provides important site-specific information for a range of air quality parameters around the mine.

Using this information, the AQIA identified that between 2002 and 2013, annual average PM<sub>10</sub> levels upwind and downwind of the existing Mount Owen Mine generally complied with the relevant 30 µg/m<sup>3</sup> air quality criterion. Nevertheless, one monitoring station indicates that this criterion is exceeded at mine-owned residences near the Middle Falbrook area around once every 3 years. This would indicate that the existing PM<sub>10</sub> background levels are sometimes close to the criterion for receivers in the Middle Falbrook area.

The AQIA also recognised that monitoring data from the region surrounding the mine confirms that existing background dust levels are known to exceed the 24-hour PM<sub>10</sub> assessment criterion of 50 µg/m<sup>3</sup> at both mine-owned and private residences, particularly during the warmer Summer months.

While several monitors indicate that dust levels from the existing mine currently exceed the annual average dust deposition criterion of 4 g/m<sup>3</sup>/month at several nearby mine-owned properties, private receivers near the project would be expected to comply with this criterion.

In considering the existing air quality environment, it is important to recognise that Glencore is not the only contributor to cumulative air quality impacts in the region and that it already owns a number of residences close to the project. Generally, these mine-owned residences represent properties that were offered acquisition due to significant impacts from the existing operation and in effect provide a buffer between the Mount Owen Complex and remaining private landowners.

### **Mitigation Measures**

Glencore currently implements a range of dust mitigation measures at the Mount Owen Complex that have been designed in consideration of the benchmarking study prepared by Katestone Environmental in 2011 for the control of dust emissions from coal mines in NSW. The measures in

this study have been generally adopted by the Department and the EPA as representing current best practice in the mining industry. In addition, the EPA has applied a pollution reduction program (PRP) aimed at identifying and further reducing dust emissions generated on the site.

These measures are reflected in Glencore's existing Air Quality and Greenhouse Gas Management Plan (AQGHGMP). Under the project, Glencore would continue to implement a range of best practice mitigation measures aimed at minimising dust emissions from:

- *haulage roads* - by using larger vehicles, reducing vehicle speeds, using gravel to stabilise the surface and treating the surface through watering with dust suppressants or polymer emulsions;
- *wind erosion of overburden emplacements or cleared land* - by establishing temporary cover crops and progressively rehabilitating disturbed areas, restricting vehicle access on disturbed areas and emplacing overburden and tailings in open cut pits;
- *wind erosion of coal stockpiles* - by watering and applying chemical wetting agents to maintain coal moisture, limiting stockpile heights and managing the shape of coal stockpiles to reduce erosion;
- *mining operations* - by minimising travel distances, reducing drop heights, applying water sprays during drilling and modifying scheduled blast activities or other operations during adverse weather conditions; and
- *coal handling infrastructure* - by shielding conveyers from wind.

In addition, Glencore would continue to undertake real-time meteorological and dust monitoring, to help forecast meteorological conditions likely to cause increased dust generation and provide proactive alerts to enable the modification of operations as dust levels approach relevant criteria.

Overall, the Department considers that the dust mitigation, management and monitoring measures implemented at the Mount Owen Complex are both reasonable and feasible and reflect best practice for the control of dust emissions from open cut coal mines in NSW. The Department is satisfied that there is limited opportunity for further substantial improvements.

### **Air Quality Impacts**

As identified in Section 2, the project would effectively act as a continuation of the existing Mount Owen and Ravensworth East operations and would extract the same volume of coal and overburden, using the same mining methods. Consequently, the project would be expected to generate similar levels of dust and particulate matter to those generated by existing operations.

Nevertheless, as mining in the North Pit would progress around 2 km to the southeast over the life of the project, it can be expected that dust levels at some private properties would change in response to the closer proximity of mining activities. This expectation is supported by the AQIA modelling, which predicts higher impacts at residences in the Middle Falbrook area in the latter years of the project.

In addition to the shifting location of mining activities, increased dust generation could also arise from changes to operational activities, including increased road haulage distances as the mine front moves further from the CHPP. Importantly, these matters have been considered in the AQIA and Glencore has incorporated several measures (such as establishing haul roads at elevations below the pit walls) into the proposed mine plan, to reduce the potential for increased dust generation.

The AQIA and RTS indicate the project is likely to contribute to or result in exceedances of relevant PM<sub>10</sub> criteria at several private properties southeast of the mine, primarily in the Middle Falbrook area. The AQIA predicts that the project would comply with relevant criteria for total suspended particles, dust deposition and PM<sub>2.5</sub> at nearby private receivers.

However, given the issues raised in the TAS peer review, there is some uncertainty about the AQIA's precision of predicted air quality impacts at specific residences, particularly in the Middle Falbrook area. On this basis, the Department does not believe that it has sufficient information, at this stage, to inform a full and proper assessment of potential air quality impacts on residential receivers.

### **Mine-Owned Residences**

In addition to private properties, the Department recognises that Glencore owns and tenants a number of residences in the area surrounding the mine, and that dust levels at many of these mine-owned properties would continue to significantly exceed the relevant dust criteria under the project.

While there are no set dust criteria for mine-owned properties, the Department believes that tenants of these properties should be informed of any potential health risks associated with predicted air quality

impacts. Under the current Mount Owen consent, Glencore is required to advise the landowners and/or tenants of any property that is significantly affected by air quality emissions about the possible health and amenity impacts of elevated dust concentrations, in consultation with NSW Health.

If the project is approved, then the Department recommends that these same requirements are included in the new consent. On this basis, the Department is satisfied that all current and future tenants would be made aware of the potential health implications of dust generated by the project and that these issues can be appropriately managed.

### ***Blast Fumes and Diesel Emissions***

The AQIA indicates that, under a worst-case scenario involving a large blast during adverse weather conditions, blast fumes could exceed the 1-hour average NO<sub>2</sub> criterion of 246 µg/m<sup>3</sup> at nearby private residences. The EPA raised concerns with the level and frequency of these predicted exceedances and requested that appropriate mitigation measures are implemented to address this matter.

Glencore's RTS confirmed that the stated NO<sub>2</sub> levels were not likely to occur under the project and represented an unmitigated event. In practice, the project would incorporate a number of management measures to reduce the likelihood of blast fumes exceeding the criterion. These measures would be similar to those in the existing Mount Owen Complex Blast Management Plan, including several procedures designed to ensure that blasting does not occur during adverse weather conditions.

The Department is generally satisfied that blast fume emissions could be managed to comply with relevant limits. This confidence is largely driven by evidence that the existing Mount Owen operations has been able to operate with relatively few blasting-related issues. It would therefore be expected that the ongoing operation of the Complex could be managed in similar manner.

Nevertheless, the TAS peer review has identified some issues with the modelling of predicted blast fume emissions that require further clarification. These issues focus on clarifying the number of receivers that could be impacted by blast events, rather than the risk or likelihood of a blast exceedance. The Department will consider these matters further in its final assessment report.

The EPA's submission questioned the assessment of NO<sub>x</sub> emissions arising from diesel combustion by the project. To ensure these matters are appropriately addressed, the Department requested that TAS provide specific feedback on the treatment of diesel fuel emissions in the AQIA. Overall, the TAS peer review supported the approach taken in the AQIA and considered that the diesel emissions were appropriately captured in the modelling.

Importantly, the Department notes that Glencore already implements a number of measures to minimise its diesel use and NO<sub>x</sub> emissions at Mount Owen. In addition, Glencore has stated that it will continue to focus on improving vehicle efficiency and reducing diesel consumption as this provides significant economic incentives for the mine and also helps to minimise NO<sub>x</sub> emissions. Overall, the Department is satisfied that the EPA could manage any specific sources of NO<sub>x</sub> emissions under any PRP that it chooses to attach to the EPL for the Mount Owen Complex.

### ***Greenhouse Gas Emissions***

The EIS includes a Greenhouse Gas and Energy Assessment (GGEA) that assessed direct and indirect emissions associated with the project. This assessment indicates that the project would not materially change the mine's annual average greenhouse gas emissions (GHGEs) compared to the existing Mount Owen operations, but would increase the total emissions generated over the life of the mine, in line with the 12 year extension in mine life.

The GGEA estimates that the project would contribute about 491,000 tonnes of Scope 1 and Scope 2 CO<sub>2</sub> equivalent emissions each year. This represents about 0.09% of Australia's annual average emissions under the Kyoto Protocol. Total indirect emissions over the life of the project would be about 132 Mt of Scope 3 CO<sub>2</sub> equivalent emissions, however much of this would not be accounted for in Australia's annual emissions, as product coal would be primarily exported for combustion overseas.

In considering the merits of the proposed GHGEs, the Department notes that it would be far more greenhouse intensive to extract the equivalent 92 Mt of coal from a new mine compared to the proposed extension of the existing Mount Owen Mine. Under the conditions of consent for the existing Mount Owen Mine, Glencore is already required to investigate ways to minimise the release of greenhouse gases and, as identified above, it is in Glencore's financial interest to minimise energy-related emissions, particularly regarding the quantities of diesel used by the mining fleet.



Given that the project would not change annual average GHGEs and represents a continuation of the existing operations, the Department is satisfied with these matters can be managed appropriately under conditions of consent requiring implementation of all reasonable and feasible measures to minimise GHGEs.

### **Conclusion**

In summary, the project would be expected to generate a slight increase in air quality impacts at nearby residences to the southeast, as the mine progresses into the North Pit Extension Area. The Department is generally satisfied that the increase in air quality impacts would be relatively minor compared to the existing air quality environment and that several operational measures could be implemented to minimise potential impacts, especially during adverse meteorological conditions.

Nevertheless, the Department notes that the AQIA indicates that several properties are likely to trigger relevant provisions in the VLAMP and be afforded rights to appropriate mitigation or acquisition as a result of the project. Given that the uncertainties and modelling issues raised in the TAS peer review may influence the consideration of landowner rights under the VLAMP, the Department has refrained from making any specific recommendations on these aspects of the project at this stage.

Notwithstanding the need for some additional clarification in response to the TAS peer review, the Department is generally satisfied with Glencore's consideration of blast fumes, diesel emissions and GHGEs, and that these emissions can be managed to acceptable standards. Overall, the Department believes that the air quality aspects of the project can be managed under relevant conditions of consent and will finalise its consideration of these matters and any appropriate management conditions, once it has received Glencore's response to the TAS peer review.

## **6.2 Noise**

A detailed noise assessment for the project was undertaken by Umwelt Pty Ltd in accordance with the *NSW Industrial Noise Policy (INP)*, the *NSW Road Noise Policy (RNP)*, the *Interim Construction Noise Guideline (ICNG)* and the *Rail Infrastructure Noise Guideline (RING)*. The Department has considered this assessment, relevant matters raised by agencies and the community and the VLAMP.

In particular, the noise assessment considered potential changes to noise impacts associated with:

- extending the life of mining at Ravensworth East by 6 years and Mount Owen by 12 years to 2030;
- extending the Mount Owen North Pit and deeper extraction at the Ravensworth East Mine;
- constructing 7 - 8 km of private rail lines and connecting them with the Main Northern Rail Line;
- constructing a rail overpass, bridge and associated upgrades to Hebden Road;
- changes to the location of blasting activities; and
- changes to the location and height of OEAs.

Importantly, the noise modelling for the site was prepared using data from Mount Owen's existing continuous monitoring network, augmented by attended monitoring measurements. This data is expected to provide an accurate indication of the actual noise impacts of the project. Overall, the Department is satisfied that the noise assessment is robust and provides a sound basis for the characterisation and consideration of impacts associated with the project.

Nonetheless, it is important to recognise that a number of community and special interest group objectors expressed concerns over the noise impacts of the existing mine, the predicted increases in noise impacts at local residences and the consideration of cumulative noise impacts.

### **Background Noise**

As shown in **Figure 7**, Glencore and the owners of other nearby mines own the majority of residences in the immediate vicinity of the project. The nearest private receivers are located somewhat further from the project and can be characterised into four broad groups; namely those to the east and southeast (Falbrook and Middle Falbrook), south (Camberwell), northwest (Hebden) and northeast (Greenlands).

Receivers in the Camberwell and the Middle Falbrook areas currently experience mining-related noise from the existing Mount Owen Complex, and from the nearby Integra, Ashton and Ravensworth coal mines. Conversely, those receivers in the Hebden and Greenlands areas are relatively sheltered from mining noise and experience limited impacts, mainly due to intervening topographical features.

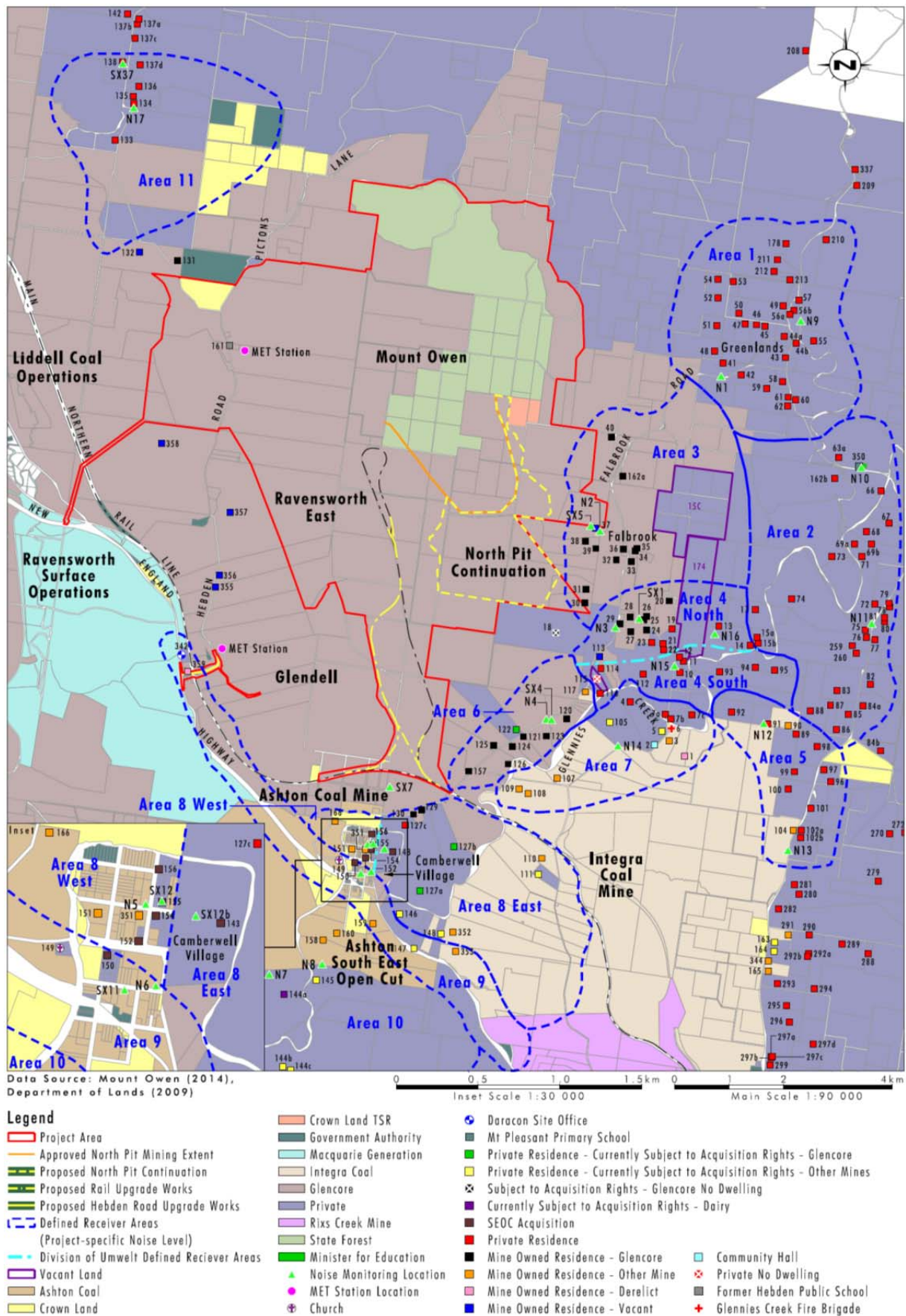


Figure 7: Locations of sensitive noise receivers

In the Camberwell area, background noise levels are significantly influenced by natural topographic features and the nearby presence of the New England Highway, notwithstanding the contribution of mining noise. This is illustrated by the monitoring results contained in the noise assessment that show measured background levels in Camberwell Village near the Highway reaching 45 dB(A) during the day/evening and 38 dB(A) at night, and more distant receivers to the east of Camberwell Village experiencing levels of 35 dB(A) during the day/evening and 30 dB(A) at night.

Local topographic features and proximity to existing industrial noise sources have also led to two distinct noise catchments in the Middle Falbrook area. Receivers located on the open floodplains along Glennies Creek experience measured background noise levels of around 32-35 dB(A) during the day and evening and 31-34 dB(A) at night, whilst those receivers located amongst the wooded ridgelines to the north experience lower background noise levels of around 30 dB(A) during the day, 32-34 dB(A) in the evening and 31-32 dB(A) at night.

Background noise levels in the Falbrook, Greenlands and Hebden areas reflect typical levels for rural farming environments in the Hunter Valley, with measured noise levels remaining below 30 dB(A) at all times. While these areas experience slightly higher background noise in the evening than the day, this has no implication for establishing rating background levels (RBLs) for the project in these areas since the adopted RBLs would be set at the default minimum 30 dB(A) applicable under the INP.

### **Establishing Project Specific Noise Limits**

Given the significant variability in measured background noise levels around the project, the noise assessment grouped nearby residences into 11 representative receiver locations (see **Figure 7**).

Following careful consideration of the data provided in the noise assessment, the Department felt that further refinement of these areas was required to more accurately delineate the noise catchments of both Camberwell Village (Area 8) and Middle Falbrook (Area 4). To address this issue, the Department requested an updated version of **Figure 7** showing the eastern and western noise catchments in Camberwell Village and the northern and southern noise catchments in the Middle Falbrook area, which broadly reflect the transition from floodplains to wooded ridgelines.

With the benefit of this refinement, the Department has established RBLs across 13 representative receiver locations and adjusted these RBLs to account for the presence of elevated background levels during the evening and night-time periods. These adjusted levels have been established in consideration of the allowance provisions for atypical areas under the INP and reflect the precedent set in the Department's 2010 assessment of the nearby Integra Mining Complex, by allowing the maximum evening and night time RBLs to be set at up to 3 dB(A) and 1 dB(A) above the measured daytime noise level, respectively.

Consistent with general community expectations and current practice, the Department does not set the daytime noise criterion lower than for either the evening or night time periods. Similarly, the evening noise criterion is not set lower than is set for the night.

Based on this consideration, the Department has identified a range of intrusive criteria for noise impacts, including operational PSNLs and noise goals for both sleep disturbance and construction activities (see **Table 2**).

**Table 2: Noise criteria**

<b>Receiver locations</b>	<b>Adopted RBLs (<math>L_{Aeq, 15min}</math>) (day/evening/night)</b>	<b>Adopted RBLs + 5 dB (<math>L_{Aeq, 15min}</math>) (day/evening/night)</b>	<b>Adjusted PSNLs (<math>L_{Aeq, 15min}</math>) (day/evening/night)</b>	<b>Sleep Disturbance Criteria (<math>L_{A1, 1min}</math>) (night only)</b>
Area 1	30 / 30 / 30	35 / 35 / 35	35 / 35 / 35	45
Area 2	30 / 30 / 30	35 / 35 / 35	35 / 35 / 35	45
Area 3	30 / 30 / 30	35 / 35 / 35	35 / 35 / 35	45
Area 4 - North	30 / 32 / 30	35 / 37 / 35	37 / 37 / 35	45
Area 4 - South	32 / 32 / 31	37 / 37 / 36	37 / 37 / 36	46
Area 5	30 / 32 / 30	35 / 37 / 35	37 / 37 / 35	45
Area 6	34 / 35 / 35	39 / 40 / 39	40 / 40 / 39	50
Area 7	32 / 35 / 33	37 / 40 / 38	40 / 40 / 38	48
Area 8 - East	31 / 34 / 30	36 / 39 / 35	39 / 39 / 35	45
Area 8 - West	36 / 39 / 37	41 / 44 / 42	44 / 44 / 42	52
Area 9	45 / 43 / 38	50 / 48 / 43	48 / 48 / 43	53
Area 10	30 / 30 / 30	35 / 35 / 35	35 / 35 / 35	45
Area 11	30 / 30 / 30	35 / 35 / 35	35 / 35 / 35	45
<b>Construction Noise Management Levels</b>			+5 / +0 / +0	+0

The noise assessment also established PSNLs for a range of non-residential receivers, including a public school, community hall, church, fire station and certain industrial premises. These PSNLs are consistent with the amenity criteria prescribed in Table 2.1 of the INP and detail the acceptable and maximum noise levels permissible when these non-residential facilities are in use.

While the PSNLs have been based on the provisions of the INP, the Department has also considered the effects of draft noise guidelines and policies. Following its review of the INP, the EPA has recently released the draft *NSW Industrial Noise Guideline* (ING) for public consultation. The draft ING maintains that, in most cases, PSNLs for the evening and night periods should be less than that of the preceding period, whilst recognising that alternative approaches may be justified and adopted where atypical events would result in perverse outcomes. Furthermore, the draft ING proposes a minimum daytime criteria of 40 dB(A), which is higher than the levels in **Table 2** for all receivers, except those located along or near the New England Highway.

Consequently, the Department is confident that the PSNLs adopted for this assessment are consistent with the current INP, align with the aims of the draft ING and provide an accurate and conservative basis for the assessment of potential noise impacts arising from the project.

### **Operational Noise**

The noise assessment included predictions of intrusive noise levels associated with the continuation of mining operations in the project disturbance area and the simultaneous operation of plant and equipment across the site, including the Mount Owen North Pit and Ravensworth East Mine.

The predicted noise levels were modelled against a range of weather conditions, to provide a comparison of worst-case noise scenarios for operations in Years 1, 5 and 10. These modelling scenarios all assumed that relevant equipment was appropriately attenuated and that the noise mitigation measures currently in place at the existing Mount Owen Mine, along with the additional measures set out in Section 8 of the noise assessment, would be implemented throughout the project.

This modelling indicates that receivers southeast of the mine would experience the greatest impacts from the project. Glencore has indicated that residents in the Middle Falbrook area would be expected to experience around 0-2 dB(A) additional noise, relative to current operations. More distant receivers to the south are expected to experience limited incremental impacts, as the majority of the potential noise impacts would be masked by the noise of closer mining operations, primarily the Integra and Ashton mines. Most receivers to the north would be largely unaffected by the project, primarily due to the presence of several intervening ridgelines and the larger distances involved.

In summary, the project would continue to affect a number of receivers surrounding the Mount Owen Complex and exceed the PSNLs at 17 privately-owned residences and 4 vacant lots. The majority of these private properties (residences 10, 11, 12, 14, 41, 48, 91, 92, 94, 95, 111, 112 and 122) would be expected to experience marginal exceedances of up to 2 dB(A) above the PSNLs, as the mining front progresses to the southeast. The Department notes that most people would not be able to perceive an increase of this magnitude above the PSNLs.

In addition to these marginal impacts, the project is expected to result in moderate exceedances of between 3 and 5 dB(A) above the PSNLs at residences 13, 19, 21 and 93, and significant exceedances in excess of 5 dB(A) at residences 22 and 23. While the Department acknowledges that noise at these vacant lots would significantly exceed the PSNLs, they would not be expected to exceed the relevant rural amenity criteria for vacant land identified in Table 2.1 of the INP.

Consequently, under the VLAMP, only residences 22 and 23 should qualify for voluntary acquisition rights due to significant noise impacts. Residences 13, 19, 21 and 93 should be afforded rights to appropriate noise mitigation measures aimed at mitigating the predicted moderate (3-5 dB(A)) exceedances of the PSNLs.

### **Cumulative Noise**

The noise assessment also considered the cumulative noise impacts of the project together with surrounding mining operations and industrial sources, including the Liddell, Glendell, Ashton and Integra coal mines. This assessment indicates that cumulative noise levels are predicted to comply with the relevant acceptable night-time amenity criteria of 40 dB(A) for rural areas under the INP.



Glencore has committed to using a comprehensive network of continuous monitoring stations and supplementary attended monitoring to determine the contribution of the project to cumulative noise levels in the region and to guide the management of noise emission sources on site.

The Department is satisfied that this represents a reasonable and feasible approach to ensuring that the project is not the driving cause of any exceedances of the cumulative noise criteria.

### ***Sleep Disturbance***

In accordance with the INP Application Notes and consistent with current practice, the  $L_{A1}$  (1 minute) indice has been compared against background noise levels to evaluate potential sleep disturbance. No existing dwellings have been predicted to exceed the default minimum trigger level of 45 dB(A).

### ***Low Frequency Noise***

The Department acknowledges the community's interest in the assessment of low frequency noise impacts and has long taken the position that more robust procedures were required for such assessment. This situation has been addressed to a large extent with the recent release of the draft ING, which provides for more contemporary assessment methods, such as frequency analysis.

While the Mount Owen EIS was compiled long before the release of the draft ING, it presents a range of similar contemporary data to support the claim that the project would not result in excessive low frequency noise impacts. The information supplied is consistent with the Department's understanding of low frequency noise and the claim that there would be no undue impacts is in line with expectations.

Given the above and the fact that the project essentially represents a continuation of the existing mine, the Department is satisfied that the project would not appreciably increase low frequency noise impacts at local residences. Notwithstanding, the Department will develop conditions that require the contemporary assessment of low frequency noise as part of regular compliance measurements.

### ***Construction Noise***

The project would be expected to generate short-term elevated levels of construction noise from development of an additional private rail line and connection to the rail network, and the roadworks proposed near the junction of Hebden Road and the New England Highway. These components of the project have been assessed against the ICNG. The Department believes this approach is appropriate given the nature of the construction activities and their short duration.

Construction would also be primarily undertaken during standard construction hours. However, for safety reasons and other constraints such as rail track possession on the rail network, there may be some activities which must be undertaken outside of normal working hours. In such cases, the Department requires that the noise generated from construction activities should be managed within the mine's operational noise limits. Where this is not possible, the Department has developed a condition which requires an 'out-of-hours operational procedure' to be prepared consistent with the requirements of the *Transport Construction Authority - Construction Noise Strategy* (2011).

In summary, the Department recommends the project's combined operational and construction noise should not exceed a level of 5 dB(A) above the recommended operational criteria (ie PSNLs) during the standard construction hours of 7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturdays. While construction activities may also be undertaken outside of these times, the Department recommends that combined operational and construction noise impacts do not exceed the recommended operational criteria for the project, except and unless an out-of-hours operational procedure for the specific works has been developed and approved by the Secretary.

The Department recognises that based on the predictions in the noise assessment, one residence (111) is likely to exceed the construction noise criteria by 2 dB(A) during the day. This property is already entitled to acquisition on request due to air and noise impacts from the nearby Integra Mine. Additionally, the Integra consent allows the owner of this property to request the installation of additional mitigation measures aimed at reducing air and/or noise impacts within the residence.

Given the short term nature of the proposed construction noise and the measures already in place to mitigate noise at this property under a separate consent, the Department does not believe that any further measures are required to mitigate noise from construction activities.

**Traffic Noise**

The contribution of the project's operational and construction traffic was assessed against the EPA's RNP. Given the project is not seeking to change the existing workforce or extraction rates, equipment operated or heavy vehicle deliveries, the operational traffic noise impacts are not expected to change relative to existing operations.

While the additional traffic associated with construction activities is expected to result in a minor increase of around 0.2 dB(A) at St Clement's Anglican Church and receiver 147, the Department notes that an increase of this magnitude would be indiscernible against the background levels.

The Department is therefore satisfied that the predicted road traffic would not cause any significant increase in noise impacts at nearby sensitive receivers, relative to existing operations.

**Rail Noise**

While Glencore is seeking to develop an additional rail line, northern turnout to the Main Northern Rail Line and ancillary upgrades to the Mount Owen Rail Loading Facility, the project would not substantially change the general operation or use of the Mount Owen rail line. The project would not change the currently approved freight capacity, train movements and product coal loading arrangements for the Mount Owen Complex. These movements and stoppages on the rail loop have been previously assessed under the INP as part of the existing projects' operational noise impacts.

As Glencore is not seeking to modify the existing train fleet or coal train dispatches, there would be no change to existing pass-by noise levels or train frequency on the Main Northern Rail Line. However, as the northern turnout would allow empty eastbound Glencore Rail trains to use the Mount Owen rail loop to turn around and return west, the project could potentially reduce the frequency of non-project rail traffic and associated noise impacts along the Main Northern Rail Line to the Port of Newcastle.

In considering the impacts of these additional 'turn around' trains, it is important to note that unlike the stop-start process of loading carriages on a coal train (which can generate wheel squeal and wagon bunching noises), these trains would not require loading and could therefore travel at a more continuous speed around the rail loop. Given that Glencore would already be required to manage the loading of trains on the rail loop to meet relevant PSNLs, the Department is satisfied that Glencore could likewise manage any additional 'turn around' trains to meet the PSNLs for the project.

**Conclusion**

In summary, the project would be likely to generate a minor incremental increase in noise impacts for nearby receivers, particularly those properties located in the Falbrook and Middle Falbrook areas. Overall, the Department is satisfied that the predicted impacts are relatively minor when compared to the existing noise environment and that the project could be operated to minimise the likelihood of impacts to the greatest extent possible, especially during adverse meteorological conditions.

The Department recommends that Mount Owen be required to offer acquisition on request to the two receivers likely to be significantly impacted by the project and provide additional mitigation measures on request to the four receivers that are likely to be moderately impacted by the project.

In recognition of the community concern regarding potential noise impacts, the Department also recommends that Glencore be required to update its Noise Management Plan for the complex to incorporate all reasonable and feasible noise mitigation and management measures, including the use of attenuated fleet, restricting operations in noise sensitive areas (such as elevated OEAs) at night, and using real-time noise monitoring and meteorological forecasting to guide mining operations.

**6.3 Blasting and Vibration**

A Blast Impact Assessment (BIA) was undertaken to model the potential ground vibration and airblast overpressure impacts of blast events at nearby receivers. As part of the project, blasting activities would move closer to a range of receiver locations including residences on privately-owned land, historic buildings and structures, infrastructure and Integra Mine's underground mine workings. A summary of key receiver locations and the relevant guideline or standard used to derive Glencore's proposed blast criteria is provided in **Table 3**. The Department considers Glencore's proposed blast criteria to be appropriate and supported by relevant information.

Consideration of potential blast fume emissions is included in the Department's assessment of air quality impacts (see Section 6.1).

**Table 3: Proposed blast criteria for Mount Owen Complex (excluding Glendell Mine)**

<b>Receiver</b>	<b>Guideline or standard</b>	<b>Airblast overpressure level (dB (Lin Peak))</b>	<b>Ground vibration peak particle velocity (mm/s)</b>
Residences on all privately-owned land	<i>Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC)</i>	115 for 95% and 120 for 100% of blasts/year	5 for 95% and 10 for 100% of blasts/year
<b>Historic buildings and structures</b>			
St Clements Church	Mount Owen BMP	115 for 95% and 120 for 100% of blasts/year	2 for 95% and for 100% of blasts/year
Ravensworth Homestead	Ravensworth East development consent criteria (DA 52-03-99)	126	5
Chain of Ponds Inn	Liddell Coal development consent criteria (DA 305-11-01)	133	10
Kangory (Dulwich) Homestead	Ravensworth Homestead criteria adopted	126	5
Former Hebden Public School	Site specific assessment <sup>3</sup>	n/a	16
John Winter Memorial	Site specific assessment <sup>3</sup>	n/a	250
<b>Infrastructure</b>			
Electricity transmission lines	Mount Owen BMP	n/a	50
Prescribed dams	Dams Safety Committee	n/a	50
Main northern rail line	Mount Owen BMP	n/a	25
Public roads	<i>Effect of blasting on infrastructure (ACARP No. C14057) and AS 2187.2-2006</i>	n/a	100
Integra Mine's surface facilities	AS 2187.2-2006	n/a	25 or 100 <sup>1</sup>
Integra Mine's underground workings	Lewandowski et al 2006 <sup>5</sup>	n/a	10 or 250 <sup>2</sup>

Notes:

<sup>1</sup> 25 mm/s for occupied non-sensitive sites (eg factories or commercial premises) or 100 mm/s for unoccupied structures of reinforced concrete or steel construction.

<sup>2</sup> The Lewandowski et al report identifies a safe vibration limit of 250 mm/s, but recommends that personnel be withdrawn from workings for vibrations above 10 mm/s.

### Residential receivers

The BIA identifies that, given the distance between proposed blasting activities and residential receivers, the project could be managed to achieve acceptable ground vibration and airblast overpressure levels over the majority of the project life. The Department considers it likely that blasting would become more noticeable to residents in the Middle Falbrook area as mining progresses to the southeast in the North Pit Extension Area. While four private residences are predicted to experience some minor exceedances (1-3 dB) of the 115 dB airblast overpressure criteria for human comfort towards the end of the mine life (when blasting at the south-eastern edge of the North Pit Extension Area), these impacts would comply with the ANZECC amenity criteria guideline (see **Table 3**).

Ground vibration levels at receivers near the North Pit Extension Area in the final years of operation would be between 0.1 – 2.5 mm/s and comply with the relevant criteria in **Table 3**. No exceedances of the airblast overpressure or ground vibration human comfort criteria are predicted for any residential receivers as a result of blasting in the BNP or RERR Pit. This is primarily due to the large distances separating these two mining areas from residential receiver locations.

The BIA noted that there was no relevant Australian guideline for assessing structural damage to buildings. In lieu, it based its assessment on British Standard 7385-2, which indicates that cosmetic damage to buildings could occur at ground vibration levels > 15 mm/s (depending on the frequency of vibration). As Glencore predicts ground vibration levels would comply with the more stringent human-comfort criteria under ANZECC guidelines (see **Table 3**), no structural damage should be expected to occur. The Department accepts this approach and also notes that all residential receivers would be situated outside the 500 m blast exclusion zone and would therefore not be affected by flyrock.

The Department is satisfied that the proposed blasting activities would comply with relevant amenity guidelines for residential receivers and are unlikely to result in any material impacts on built structures on privately-owned residential land.

**Infrastructure**

The BIA identifies that ground vibration and airblast overpressure levels generated by blasting would comply with the acceptable limits set out in **Table 3** at all nearby infrastructure over the life of the mine. The Department believes the proposed blasting activities have a low risk of impacting nearby infrastructure (including public infrastructure), but notes that Glencore would need to continue to manage any such risk under an updated Blast Management Plan (BMP) for the complex.

As part of the updated BMP, Glencore would be required to manage the maximum instantaneous charge (ie explosive size) of blasts to ensure that ground vibration levels remain below the limit of 50 mm/s at two prescribed dams on the site (TP1 and NVS2). Glencore has indicated it expects to cap these dams before blasts reach these levels (thus allowing for higher impact levels), but has acknowledged that if this does not occur, blasts would need to be managed to ensure the 50 mm/s limit is not exceeded.

In relation to the Integra Mine, Glencore predicts that the ground vibration and airblast overpressure levels would be within acceptable limits at the pit top facilities. However, subject to mine scheduling, blast events do have the potential to impact the Integra Mine's underground workings. Previous interactions in 2005 and 2006 were successfully managed by Glencore and the former operator of the Integra Mine (Vale Mining) through establishment of protocols for vibration prediction, blast notification and underground personnel management. Glencore has proposed that similar management protocols are adopted for the project, in consultation with Integra Mine, and proposed a range of potential management criteria.

DRE considers that predicted blast events would not result in any significant impacts on Integra's workings, but recommended that protocols and procedures are established to facilitate communication between the mines. This would involve prior notification of scheduled blasts, personnel evacuation protocols and agreed management procedures for blasting which would occur within 500 m of approved and developed underground workings in the Integra Mine.

The Department agrees with DRE's recommendations and believes that an agreed protocol could provide for the appropriate management of potential blasting impacts on the operation of the underground mine and the safety of its underground workforce. Importantly, the Department notes that Glencore has signed a binding agreement to purchase the Integra Mine and is therefore further satisfied that an appropriate management protocol could be developed between the two mines.

**Historic buildings and structures**

The BIA includes an assessment of a range of historic buildings and structures, including Ravensworth Homestead, the former Hebden Public School and the John Winter Memorial. This assessment identifies that the project would not cause any exceedances to ground vibration or airblast overpressure limits. The Department is satisfied that blasting activities are likely to have negligible impacts on listed heritage items near the mine and recommends that ongoing and appropriate monitoring continue to be undertaken as part of an updated BMP.

**Management and monitoring**

Glencore has proposed a range of management strategies to ensure that proposed blasting activities are undertaken in accordance with relevant criteria. These include:

- using ground vibration and air blast modelling to assist in blast design (including blast size);
- considering geological conditions that may be conducive to higher air blast impacts;
- undertaking pre-blast meteorological condition reviews to avoid blasting in unfavourable weather;
- using appropriate stemming heights, material and initiation sequences;
- maintaining appropriate burden specification to avoid face burst;
- not undertaking simultaneous blasting when mining in different pits; and
- implementing a 500 m exclusion zone for blasting, which would include Hebden Road and the Mount Owen mine access road near the BNP

In addition, Glencore proposes to extend its existing blast monitoring network to include:

- two new blast monitors to the south and southeast, to monitor blasts in the North Pit Extension Area and RERR Pit;
- one new blast monitor for the NVS2 dam; and
- one new blast monitor at the closest electricity transmission tower to the southwest of the BNP.



## **Conclusion**

The Department considers that Glencore has undertaken a comprehensive blast impact assessment and is satisfied that the project would be unlikely to result in any material impacts on nearby residential receivers, infrastructure or historic buildings and structures (see **Table 3**). The Department is satisfied that Glencore could manage blasting activities in accordance with suitable criteria and that appropriate management strategies can be applied, including an updated BMP for the Mount Owen Complex.

## **6.4 Biodiversity**

The EIS included a specialist ecological assessment prepared by Umwelt Pty Ltd, based on a range of flora and fauna studies undertaken since 1996, including targeted flora surveys undertaken in 2011-2014. This assessment considered the likely impacts arising from the proposed vegetation and habitat clearing, and incorporated a range of measures to mitigate and offset the impacts of the project on native flora and fauna species and vegetation communities.

With the exception of the Ravensworth State Forest, the vast majority of land surrounding the Mount Owen Complex has at some stage been cleared for agricultural activities. In 1994, the Mount Owen Mine was granted approval for a major extension that permitted clearing of around 240 ha of Ravensworth State Forest. This approval was conditional on establishment of the New Forest Area to the north of the project and rehabilitation of the site post-mining.

Nevertheless, the project area still maintains a diverse range of vegetation communities. Those areas that have not been disturbed by mining can be broadly characterised as derived native grasslands on gentler undulating slopes and floodplains, interspersed with woodland regrowth and fragmented areas of remnant woodland and forest vegetation along creek lines and on steeper slopes.

Glencore has progressively rehabilitated large areas of the site that have been previously disturbed by mining activities with a range of successful woodland and grassland communities. Most of these rehabilitated areas were initially established as grassland communities to provide stabilisation and cover crops, and are currently being transitioned on a progressive basis towards long-term woodland communities. Older woodland rehabilitation areas on the site have demonstrated successful establishment and recruitment of over-storey species and are beginning to develop into more complex ecological systems with a range of sub-storey and groundcover species.

### **Existing Biodiversity Offset Requirements**

Under the existing Mount Owen approval, Glencore is required to acquire and protect 415 ha of biodiversity offset areas to the north and east of the mine, adjacent to the existing Ravensworth State Forest and New Forest Area, and establish an additional 4 ha Southern Remnant Offset adjacent to the 10 ha of vegetation that constitutes the southern remnant of Ravensworth State Forest.

This approval also requires Glencore to progressively establish grassland and woodland communities across the post-mining landform and provide a range of woodland corridors and fauna habitat. Similarly, the Ravensworth East approval requires Glencore to rehabilitate at least 30% of the Ravensworth East site to woodland and provide for the establishment of long-term vegetation corridors connecting the Ravensworth State Forest Southern Remnant with surrounding remnant vegetation and the other remaining portions of the Forest.

In considering the value and function of these offset areas in the regional setting, it is important to note that Glencore is also required to conserve significant biodiversity offset and rehabilitated woodland areas under its Glendell, Ravensworth and Liddell Coal Mine approvals (see **Figures 8 and 9**).

As a consequence of owning several coal mines in the greater Ravensworth area, Glencore has been able to establish a number of its offset areas in close proximity, strengthening the conservation values of these lands and providing a strategic, coordinated suite of biodiversity offsets that augment one another and together provide effective fauna corridors that connect large extents of remnant native vegetation, State forest and rehabilitated woodland (see **Figure 8**).

### **6.4.1 Flora Impacts**

Floristic studies undertaken as part of the ecological assessment identify that the project would disturb around 520 ha of vegetation, primarily associated with the North Pit Extension Area, including almost 100 ha of land that has been previously rehabilitated or planted with native vegetation communities. **Table 4** provides a detailed breakdown of the vegetation to be cleared by the project and shows that some 387 ha of vegetation conforms to the definition of one or more endangered ecological community (EEC) under the TSC Act and/or the EPBC Act.

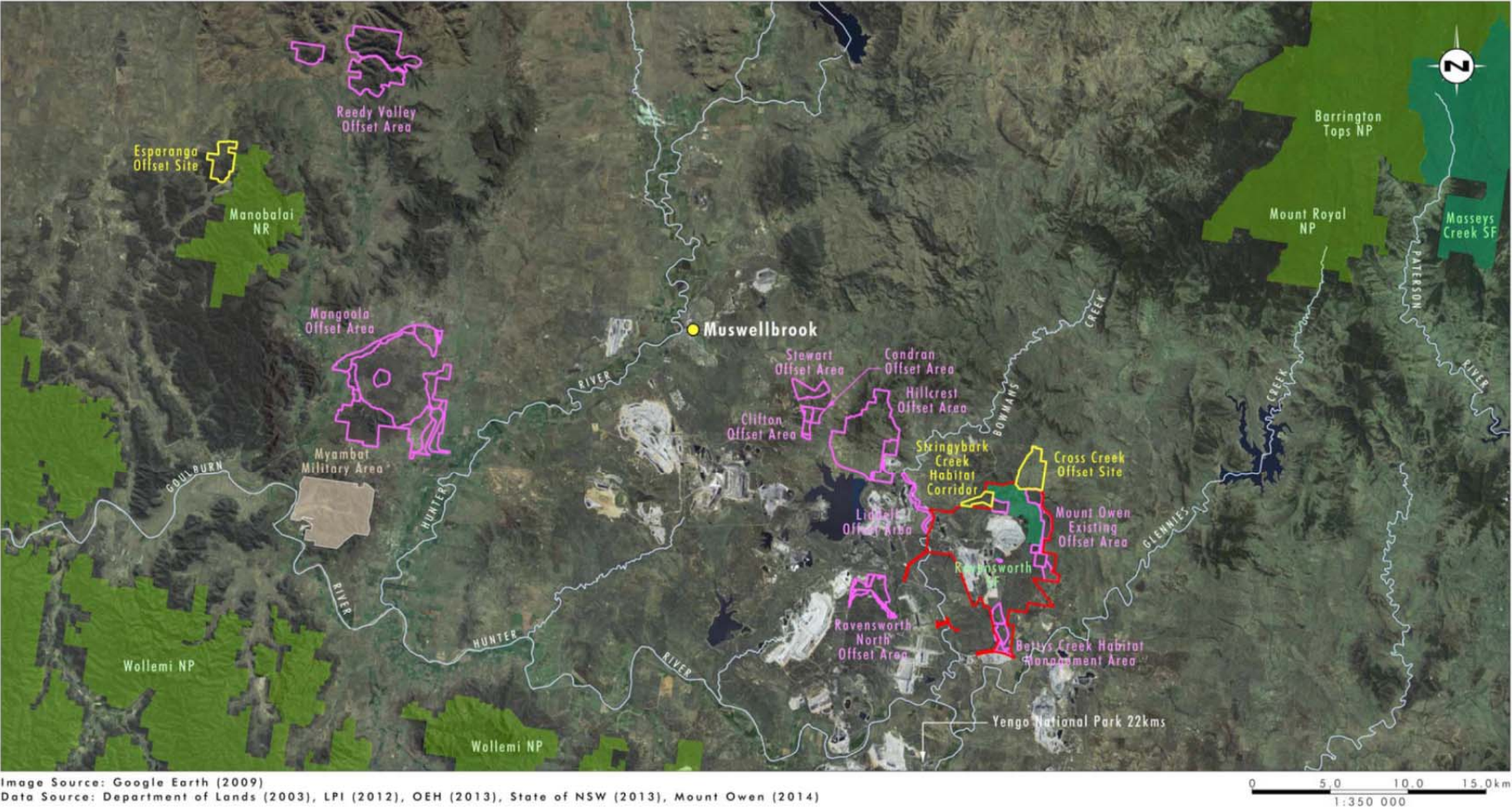


Figure 8: Proposed biodiversity offsets and existing offset areas for Glencore’s Hunter Valley mining operations

Overall, these studies identify that the vast majority of the project disturbance area conforms to the classification of the *Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC* and its associated derived native grasslands. The remaining disturbance area comprises Bulloak forests and shrubland, broadly associated with the natural regeneration of disturbed lands, and several small areas of riparian vegetation along natural gullies and watercourses (including Main Creek and Bettys Creek).

**Table 4: Vegetation communities**

<b>Vegetation type</b>	<b>Disturbance Area (ha)</b>	<b>Proposed Offset Area (ha)</b>	<b>Offset Ratio</b>
Derived Native Grassland ( <i>Central Hunter Ironbark – Spotted Gum – Grey Box Forest and Central Hunter Box – Ironbark Woodland</i> )	223.1	374.1	1.7
Derived Native Grassland ( <i>White Box Woodland</i> ), which conforms to <b>White Box – Yellow Box – Blakely's Red Gum Woodland EEC</b> ^		85.1	
Derived Native Grassland ( <i>Red Gum Open Forest on Alluvium/Colluvium</i> ), which conforms to <b>White Box – Yellow Box – Blakely's Red Gum Woodland EEC</b> ^		5.9	
Derived Native Grassland ( <i>Narrabeen Ironbark Woodland</i> )		0.4	
<b>Total Derived Native Grassland</b>	<b>223.1</b>	<b>465.5</b>	<b>2.1</b>
<b>Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC</b>	131.9	37.2	0.3
Planted <b>Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC</b>	27.4		
Blakelys Red Gum variant of <b>Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC</b>		14.5	
<b>Central Hunter Grey Box – Ironbark Woodland EEC</b>	4.4		
<i>Central Hunter Bulloak Forest Regeneration</i>	54.0		
<i>Central Hunter Swamp Oak Forest</i>	5.8	0.5	0.1
<i>Kunzea Closed Shrubland</i>	4.7		
<i>Hunter Valley River Oak Forest</i>	0.2		
<b>Upper Hunter White Box - Ironbark Grassy Woodland which conforms to White Box – Yellow Box – Blakely's Red Gum Woodland EEC</b> ^		46	
<i>Spotted Gum Open Forest Complex on Sandstone</i>		3.2	
<i>Shrubby White Box Woodland</i>		9.2	
<i>Red Gum Open Forest on Alluvium/Colluvium</i>		2.7	
<i>Narrabeen Sheltered Dry Forest</i>		59.3	
<i>Narrabeen Ironbark Woodland</i>		91	
<b>Spotted Gum – Narrow-leaved Ironbark Forest, consistent with Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC</b>		21.6	
<b>Drainage Flat Red Gum Woodland EEC</b>		1.0	
<i>Depauperate Dry Rainforest</i>		4.7	
<b>Total Native Forests, Woodland and Shrubland</b>	<b>228.4</b>	<b>290.9</b>	<b>1.3</b>
<i>African Olive Infestation</i>		8.0	
<b>Total Vegetation</b>	<b>451.5</b>	<b>764.4</b>	<b>1.7</b>
<i>Established woodland EECs to be cleared vs offset (immediate offsets / long-term regeneration)*</i>	<b>163.7</b>	<b>120.3 / 585.8</b>	<b>0.7 / 3.6</b>
<i>Native forest, woodland and shrubland to be cleared vs offset (immediate offset / long-term regeneration)*</i>	<b>228.4</b>	<b>290.9 / 764.4</b>	<b>1.3 / 3.3</b>
Mine Rehabilitation #	68.9	518	
<b>Total Vegetation (including Rehabilitation)</b>	<b>520.4</b>	<b>1282.4</b>	<b>2.5</b>

Notes:

All EECs are indicated in bold text

^ = Conforms to EPBC Act listed White Box – Yellow Box – Blakely's Red Gum Woodland and Derived Native Grassland CEEC.

# = Mine rehabilitation in the project disturbance area ranges from exotic-dominated grassland to immature forest complexes.

\* = No scaling has been applied for time delays or the success of regenerating derived native grassland communities to EECs.

The Department notes that while no remnant red gum trees were recorded in the project disturbance boundary, there appears to be suitable habitat for *Hunter Lowland Red Gum Forest EEC* within the disturbance area. This vegetation community occurs along natural channels and gullies in the adjacent

Ravensthorpe State Forest and ceases abruptly at the boundary of the State Forest, where historical clearing for pasture grazing has resulted in a landscape dominated by derived native grasslands.

Accordingly, the Department believes there is a reasonable likelihood that the derived native grasslands in the North Pit Extension Area may include small areas derived from *Hunter Lowland Red Gum Forest*, as well as larger areas associated with the more dominant *Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC* and *Central Hunter Box – Ironbark Woodland EEC*.

### **Threatened flora species and populations**

The ecological assessment concluded that the project was unlikely to have a significant impact on any threatened flora species or populations listed under the TSC Act, as no known individuals had been historically recorded in the project disturbance area or found during targeted flora surveys of the site.

Nevertheless, the ecological assessment acknowledged that two vulnerable flora species and three endangered flora populations are known to occur in the broader region and have been recorded in the area immediately surrounding the Mount Owen Complex. These include:

- Slaty Red Gum – TSC Act and EPBC Act;
- *Ozothamnus tessellatus* – TSC Act and EPBC Act.
- Tiger Orchid population in the Hunter Catchment – TSC Act;
- Weeping Myall population in the Hunter Catchment – TSC Act; and
- River Red Gum population in the Hunter Catchment – TSC Act.

Additionally, OEH identified that it considered the project area to be within the maximum range of the threatened orchid *Pterostylis chaetophora*, but acknowledged that the site specific flora surveys indicate this species is unlikely to be present in the disturbance area. Despite the absence of identified orchid specimens in field surveys, the Department notes the project would clear terrestrial habitat that could be suitable for *Pterostylis chaetophora* and a number of potential host trees for Tiger Orchids. The Department has therefore recommended that Glencore be required to relocate any threatened orchid species found during pre-clearance surveys to appropriate locations in the adjacent offset sites.

It is also noted that, while the proposed offset sites provide potential habitat for several threatened flora species and populations, no other threatened flora species and populations have been recorded in any of these areas, except one recorded Tiger Orchid specimen at the Esparanga Offset Site.

In consideration of the relatively limited extent of potential impacts on threatened flora species and populations, the Department is satisfied that the established pre-clearance surveys and management measures in place at the Mount Owen Complex, combined with Glencore's proposed offset package (see below), would be sufficient to mitigate the likelihood of any significant impacts on these threatened flora species and populations as a result of the project.

### **Groundwater Dependent Ecosystems (GDEs)**

GDEs are ecosystems which require access to groundwater (beyond soil-based groundwater from rainfall) to meet all or some of their water requirements. The ecological assessment identified the presence of three terrestrial vegetation communities that may be dependent on shallow groundwater resources during periods of reduced surface flows. These communities include the Central Hunter Swamp Oak Forest, Hunter Lowland Red Gum Forest EEC and Hunter Valley River Oak Forest.

These vegetation communities generally occur along the riparian corridors of the creeks surrounding the project and would be potentially impacted by changes to the volume of surface water flow in these catchments and any drawdown or reduced recharge of shallow aquifers. As discussed in Section 6.6, several nearby creeks have already experienced groundwater drawdown associated with mining activities at both the Mount Owen Complex and Integra Underground Mine, with a significant section of Bettys Creek having also been diverted away from its pre-mining alluvial aquifers.

In response to the IESC's request, Glencore has confirmed that 44.35 ha of the *Central Hunter Swamp Oak Forest GDE* could be affected by drawdown from the project. However, as this area comprises a small proportion of the community in the Hunter Valley (around 3.6%) and the majority of the affected community would experience drawdown effects of less than 2 m, Glencore has argued that the project is unlikely to impact the health of this community in the long-term.

Overall, the ecological assessment identifies that the predicted groundwater drawdown around the project would fall within the existing range of variability for the naturally ephemeral creeks in the area. Consequently, the ecological assessment concludes that any temporary change in the volume of



surface water flows, the presence or duration of persistent pools and decreases in groundwater levels or pressures resulting from the project are unlikely to result in an observable impact on the flora species present within the identified GDEs. Likewise, the ecological assessment concludes that the project is unlikely to result in any material impacts on local aquatic fauna or stygofauna populations that may be present in these systems.

The Department is satisfied that the project is unlikely to materially impact identified GDEs in the area around the project. However, in consultation with DoE and to ensure that any impacts on these communities are appropriately managed, the Department recommends that Glencore be required to comprehensively monitor and manage potential impacts on GDEs and include specific trigger levels for further remedial action as part of an updated Biodiversity Management Plan.

#### **6.4.2 Fauna Impacts**

The ecological assessment identified that 29 threatened fauna species have been recorded or have the potential to occur within or in close proximity to the proposed disturbance area. These threatened fauna predominantly comprise mobile bird and bat species, but also include 5 threatened mammal species and one threatened amphibian.

The removal of grassland areas and mature woodland and forest communities identified in **Table 4** is considered likely to impact several of these species, primarily due to the loss of habitat resources including hunting and foraging areas, dead trees, fallen timber, rocky outcrops, feed trees and hollow-bearing trees. The reduced extent of connected woodland vegetation could also impact the home ranges of several mobile fauna species and increase competition for nearby habitat resources.

Glencore has proposed a range of mitigation and management measures aimed at reducing the significance of these impacts to the greatest extent practicable and has provided a range of compensatory measures to account for the likely residual impacts on nearby threatened fauna species. With these measures in place, the ecological assessment concluded that the project was unlikely to result in significant long-term impacts on threatened fauna.

Furthermore, the ecological assessment asserted that while the project may cause short term impacts on threatened fauna, it was unlikely to significantly impact the lifecycles or long-term populations of the relatively mobile threatened fauna species identified. This conclusion is primarily based on the fact that most of the identified threatened species could relocate to suitable extant vegetation and enhanced habitat within neighbouring offset areas. Notwithstanding, both OEH and DoE have flagged that there would be a time lag between the proposed impact and the availability of alternative habitat in the nearby offset areas, and emphasised the need for Glencore to actively manage these offsets to ensure suitably complex habitat is established in a timely manner.

To promote the movement of fauna to these offset areas, Glencore has committed to clear vegetation on a progressive basis in front of the advancing North Pit, comprehensively rehabilitate post-mining areas and actively promote the regeneration and restoration of complex vegetation communities on its offset properties. In addition, as Glencore would not need to disturb much of the wooded vegetation identified in **Table 4** until late in the project life, there are opportunities to minimise the delay in replacing this habitat, by proactively establishing new woodland areas over the next few years.

Once complete, these progressively rehabilitated areas would integrate with the other remnant vegetation and offset areas around the Mount Owen Complex and significantly improve the long-term connectivity of woodland vegetation across the greater Ravensworth, Falbrook and Hebden regions.

Overall, the Department is satisfied that the project would not significantly increase impacts on threatened fauna species beyond those associated with existing approved operations and that any incremental impacts can be appropriately managed through updated management plans and the recommended conditions of consent. Further consideration of the potential impacts on specific threatened fauna species is provided below.

#### ***Significant Impacts on Threatened Fauna***

The ecological assessment and submissions from OEH and DoE have identified that, without appropriate mitigation measures, the project would likely result in significant impacts on five threatened fauna species listed under the TSC Act and/or the EPBC Act. These species include the Koala, Spotted-tailed Quoll, Squirrel Glider, Swift Parrot and Regent Honeyeater.

### Koalas

In accordance with *State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)*, the Department has considered the presence of core or potential Koala habitat under this assessment. As the Singleton local government area is listed in Schedule 1 of SEPP 44, the provisions of the SEPP apply to the project.

The ecological assessment concluded that the project would not impact any areas of core or potential Koala habitat. This is primarily due to flora surveys which identified that preferred feed tree species listed in SEPP 44 comprise less than 15% of tree species in the upper and lower strata of the forest and woodland vegetation present in the disturbance area.

Despite the lack of preferred feed trees and the absence of evidence of Koala habitation during annual fauna monitoring efforts and targeted field surveys, the ecological assessment did acknowledge the potential presence of Koalas in the disturbance area. This is due to tentative recordings of Koala scats at the existing mine and both historic and recent sightings of individual Koalas within the proposed Hebden Road disturbance area and woodland areas adjacent to the North Pit Extension Area.

In assessing the likely project impacts on Koala populations, it is important to recognise that SEPP 44 aims to conserve and manage Koala habitat to reverse the current trend of Koala population decline. Overall, the Department is satisfied that the project is unlikely to have any significant impacts on Koala populations and would eventually lead to improved long-term habitat outcomes, in part given the presence of a small proportion of preferred feed trees in the proposed offset sites and especially following the establishment of woodland vegetation corridors under the proposed rehabilitation plan.

The Department also notes that the woodland areas in the proposed rehabilitation plan focus almost entirely on the establishment of *Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC*. While the Department recognises that this community previously covered the majority of the proposed disturbance area mining, the Department believes there is merit in having some increased diversity amongst the woodland communities in the final landform.

As identified above, the Department believes that the pre-mining mix of vegetation communities would have likely included River Red Gums along gully environments and drainage lines. As this species is recognised as being present (and occasionally dominates) within the *Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC*, and is known to occur in the adjacent Ravensworth State Forest, the Department believes this species should be incorporated in appropriate areas within the proposed post-mining woodland rehabilitation corridors.

By integrating this tree species into the rehabilitation strategy, the proposed woodland corridors would not only facilitate the movement of Koala populations between large stands of remnant vegetation, but would provide pockets of preferred feed trees to support these mobile populations. To reflect this position, the Department has recommended a condition requiring Glencore to rehabilitate the site, with a focus on the re-establishment of key impacted flora species and habitat resources.

### Spotted-tailed Quolls

Breeding populations of Spotted-tailed Quolls are known to occur in the area surrounding the Mount Owen Mine, with a number of confirmed den sites and latrines in the Ravensworth State Forest, Hillcrest Offset Area (north of Liddell Coal Mine) and riparian vegetation along Bowmans Creek. Sightings and GPS tracking programs have confirmed that the quolls in this area use existing biodiversity offset sites, stockpiled timber and rock den structures and rehabilitated areas near the Mount Owen Mine.

The project would result in the loss of approximately 223.7 ha of woodland, forest and riparian habitat and 223.1 ha of derived native grassland habitat suitable for the Spotted-tailed Quoll. Although no den sites have been identified in the disturbance area, this loss of potential habitat and foraging resources could still lead to a significant impact on the local Spotted-tailed Quoll population.

To address these potential impacts, Glencore has proposed a robust biodiversity offset strategy that includes establishment of 756.4 ha of biodiversity offsets located close to the project area and contiguous with remnant vegetation known to host healthy Quoll populations. Glencore has also committed to actively enhance these offset areas to increase their likelihood of being used by Quolls. These works include regeneration of woodland corridors to link the known home ranges of recorded Quolls and the establishment of habitat resources, such as timber stockpiles and denning sites.

The Department acknowledges that Glencore has been successful in recreating den structures and habitat features for Spotted-tailed Quolls in the Ravensworth State Forest and New Forest Areas, and is satisfied that these measures could be effectively implemented in additional offset areas.

Furthermore, Glencore has provided a specific focus on the establishment of Quoll habitat along the Stringybark Creek Habitat Corridor. The Department acknowledges the strategic role this offset area would play in improving habitat connectivity within the local area, and providing closer connections between the adjacent Northwest and New Forest offset areas, and the nearby Bowmans Creek Riparian Corridor offset area (to be established under a separate approval for the Liddell Coal Mine).

Both the Department and OEH acknowledge that Glencore does not own the land between these offset areas, and is currently unable to provide an offset along the entire length of Stringybark Creek. However, the Department notes that opportunities exist to establish rehabilitated woodland corridors in strategic locations across the post-mining landscape, which would connect the Ravensworth State Forest with Glencore's more distant offsets in the northwest (see Section 6.5, below).

Overall, the Department is satisfied that the proposed offset areas and ancillary measures would satisfactorily address any likely impacts on Spotted-tailed Quoll populations. The Department considers that improving the connection of Glencore's offset areas within the greater Ravensworth area would not only improve the health of the local Quoll population, but would also increase the likelihood of improved genetic diversity. Consequently, the Department has recommended that Glencore review the location of grassland and woodland areas within its final landform and consider all feasible options for providing increased connectivity between woodland areas.

#### Squirrel Gliders

The Ravensworth State Forest and associated vegetation surrounding the Mount Owen Complex is a known refuge for an established population of Squirrel Gliders. However, this population is expected to have reduced to almost half its pre-mining levels following the removal of around 240 ha (or 55%) of the former Ravensworth State Forest, under the 1994 Mount Owen Extension Project.

Studies have indicated that the Ravensworth State Forest Squirrel Glider population supports fewer individuals per hectare than known coastal populations, with individual Squirrel Gliders exhibiting a fivefold increase in home ranges. The ecological assessment speculates that this may be due to a lack of appropriate foraging resources and specific understorey species in Ravensworth State Forest.

As with the Spotted-tailed Quoll, the main impacts of the proposed project on the Squirrel Glider are associated with clearing of remnant woody vegetation. Removal of this known foraging and nesting habitat could impact on potential home ranges of this population and increase the scarcity of remaining habitat resources, especially mature hollow-bearing trees.

The ecological assessment considers the loss of approximately 17% of the remnant vegetation within the project area to be a significant reduction in habitat for the local population of Squirrel Gliders and notes this has the potential to place the locally viable population at risk of extinction.

While the Department accepts that Glencore has provided a suite of offsets to compensate for the loss of remnant vegetation, these offset areas rely heavily on regeneration or revegetation of woodland over time. Fortunately, as the proposed vegetation clearing would occur progressively over a 10 year period, the Department believes there are opportunities to minimise any potential lag effects and manage the timely replacement of the proposed vegetation loss.

Consequently, the Department has recommended that Glencore be required to actively promote the timely regeneration of offset areas to woodland and has incorporated a number of management controls, measures, milestones and requirements into the recommended conditions. Furthermore, to offset the proposed removal of any additional hollow-bearing trees, the Department has recommended that Glencore be required to re-use hollows from cleared hollow-bearing trees in its rehabilitation and offset areas and install a number of additional nest boxes on site, given their success to date.

Finally, with respect to rehabilitation, the Department has recommended that Glencore's rehabilitated woodland corridors incorporate a range of appropriate mid-storey and groundcover species, including (where possible) preferred feed species for Squirrel Gliders, and that these woodland areas are established as soon as practicable behind the progressing mine front.

### Other threatened species

The ecological assessment identified 23 threatened bird and bat species known to occur in the project area. If its effects are left unmitigated, the ecological assessment considers that the project could result in potentially significant impacts to 12 of these species. The most likely impacts are associated with the loss of tree hollow roosts and nesting sites, habitat resources, hunting areas and feed trees.

Given the mobile nature of these species, the ecological assessment considers that they are capable of seeking alternative habitat in the neighbouring Ravensworth State Forest, existing offset sites and proposed offset sites (including existing woodland, build habitat features and, in the longer term, regenerated woodland areas). Furthermore, the ecological assessment notes that most vegetation in the disturbance area has either been planted or naturally regenerated in the past 30 years and as such, would provide less habitat resources per hectare than the mature vegetation in and around the neighbouring Ravensworth State Forest.

Given the relatively young age of the vegetation to be cleared, the ecological assessment argues that there would be a minimal time delay in establishing alternative habitat resources (including both regenerated woodland and artificial habitat structures) in the proposed offset areas. While the Department acknowledges this argument, it has recommended several conditions aimed at improving the presence of foraging and habitat resources in these areas. These requirements include the need to incorporate a mix of species in revegetated woodland communities (including preferred feed species for threatened fauna) and the establishment of denning structures and nest boxes on-site.

The ecological assessment also includes a number of reasonable and feasible mitigation measures (eg pre-clearance surveys) that the Department considers should be reflected in a Biodiversity Management Plan for the Complex. In combination with the recommended conditions and biodiversity offsets, the Department considers these measures should be adequate to mitigate the likely impacts of the project on threatened fauna.

The Department has given particular consideration to the Swift Parrot and Regent Honeyeater, given their status as threatened species under both the TSC Act and EPBC Act. Consistent with the assessment of the other 11 threatened bird species known to occur in the project area, the ecological assessment concluded that the likely impacts on the Swift Parrot would be primarily associated with the removal of habitat resources. The Department notes that Swift Parrots breed in Tasmania in Summer and would mainly use the project area for tree hollows and foraging resources (eg nectar and lerps in Eucalyptus forests) during Winter migrations along the east coast.

While the ecological assessment notes that no Regent Honeyeaters have been recorded in the disturbance area, the project has the potential to impact this species through the loss of habitat, nesting sites and foraging resources. The Department acknowledges that this is the most common threat to Regent Honeyeaters in the Hunter Valley and is not unique or limited to the Mount Owen site.

Overall, the Department is satisfied that the proposed biodiversity offset package adequately accounts for potential impacts on threatened bird and bat species, including the Swift Parrot and Regent Honeyeater. Nevertheless, to address the potential disparities between the quality of foraging and habitat resources in the proposed disturbance area and those associated with the offset areas, the Department believes that Glencore should be required to implement all reasonable and feasible measures to provide for the timely replacement of cleared vegetation with appropriate and complex vegetation communities on its regenerated offset and rehabilitated lands. These measures would include monitoring of offset and rehabilitated sites and development of trigger levels for more active regeneration (including direct seeding or planting of root stock to achieve the desired species mix).

While one threatened amphibian species (Green and Gold Bell Frog) is known to occur in the broader project area, annual monitoring undertaken on the site since 1999 has not identified the presence of this species in the proposed disturbance area. Consequently, the ecological assessment concluded that this species is unlikely to be significantly impacted by the project.

Overall, the Department is satisfied that the proposed biodiversity offset package adequately compensates for the likely impacts on threatened fauna species, particularly with respect to Koalas, Spotted-tailed Quolls and Squirrel Gliders, and would improve the likelihood of long-term recovery for these species, by providing a future increase in suitable habitat and foraging resources.

### **6.4.3 Biodiversity Offset Strategy**

To compensate for the 451 ha of additional native vegetation to be cleared under the project and the associated loss of fauna habitat and resources, Glencore has developed a biodiversity offset package



comprising 465 ha of nearby land, a 303 ha off-site offset in the Great Eastern Ranges priority area and a range of targeted on-site woodland restoration and rehabilitation efforts.

The proposed land based offsets are shown in **Figures 8 and 9**, and comprise the:

- Cross Creek Offset site, a 367 ha property located adjacent to the existing Mount Owen Biodiversity Offset Areas;
- Stringybark Creek Habitat Corridor, a 97.5 ha vegetation corridor located adjacent to the existing Mount Owen Biodiversity Offset Areas; and
- Esparanga Offset site, a 303 ha property located in the Manobalai region and situated within the Upper Hunter Strategic Assessment - Great Eastern Ranges priority area.

The Department supports the proposed location of the on-site offsets alongside the existing Mount Owen conservation areas and considers that they would not only increase the resilience of the existing offset areas, but provide improved habitat linkages into the future. With the progressive rehabilitation of woodland corridors over time, this broad suite of offsets would connect with the Southern Remnant of the Ravensworth State Forest and conservation areas surrounding the nearby Liddell Coal Mine.

Likewise, the Esparanga Offset site would assist in the establishment of a strategic vegetation corridor connecting the elevated ranges to the west of the Hunter Valley, and would complement the extensive amount of remnant vegetation in this region, including the adjacent Manobalai Nature reserve and Glencore's existing Reedy Valley and Mangoola offset areas (see **Figure 8**).

The ecological assessment identifies that the dominant vegetation communities in the land-based conservation areas are broadly similar to those proposed to be cleared under the project and would provide alternative habitat for a number of threatened species that have the potential to be impacted by the project. Generally speaking, the Department is satisfied that the offset package would deliver significant regional benefits for threatened flora and fauna species and populations.

#### **Approach to biodiversity assessment**

In considering Glencore's approach to biodiversity offsets, it is important to recognise that the DGRs for the project (issued in March 2013) required the EIS and ecological assessment to be undertaken in accordance with OEH's previous *Interim Policy on Assessing and Offsetting Biodiversity Impacts on Part 3A, State Significant Development and State Significant Infrastructure Projects* (Interim Policy).

On 1 October 2014, OEH released a new biodiversity offset policy, known as the *NSW biodiversity offsets policy for major projects* and an associated 'Framework for Biobanking Assessment' (FBA). Given this new policy was available prior to exhibition, OEH's submission considered the adequacy of proposed biodiversity offset package against the requirements of the FBA. In providing this advice, OEH acknowledged that strict application of the FBA to the data obtained from survey efforts aimed at addressing the Interim Policy would result in a range of perverse outcomes and therefore recommended that the Department use 'discretion' in applying the new biodiversity offset policy.

The Department and OEH have since conferred on this matter and agreed that the project should be assessed against the policy framework that was in place at the time the DGRs were issued. Consequently the following assessment has been undertaken in consideration of the requirements of the Interim Policy. This policy focuses on a tiered approach to biodiversity offsets, commencing with Tier 1 (improve or maintain), and progressing to Tier 2 (no net loss) and Tier 3 (mitigated net loss). Glencore has sought to meet the Policy's specifications for a Tier 3 'mitigated net loss'.

The Interim Policy identifies that it is reasonable to apply variation criteria to ensure that suitable offsets can be found in a reasonable time, the costs of offsetting can be brought within a reasonable range and vegetation to be cleared is offset at a ratio of at least 2:1. The policy also sets out a range of criteria for calculating the adequacy of offsets and includes provisions that allow for impacts on one species to be offset through conservation of another species of equal or greater conservation status.

#### **Adequacy of biodiversity offsets**

Having considered the proposed biodiversity offset package against the requirements of the Interim Policy, the Department believes that the direct offset areas and management measures proposed are likely to be sufficient to compensate for the project's proposed vegetation losses.

It is important to note that Interim Policy does not require offsets for clearing certain native grasslands and does not provide for the use of rehabilitation in calculating the adequacy of biodiversity offsets. On

this basis, the Department calculates the project would provide an upfront offset ratio for established woodland of 1.3:1 and a long-term ratio of 3.3:1, subject to successful regeneration of offset areas.

OEH's initial submission identified that the vegetation communities in the offset areas (including EECs) are generally appropriate to compensate for the proposed impacts. However, OEH highlighted the risks associated with Glencore's heavy reliance on regeneration of EECs from equivalent derived native grassland communities and the need for this regeneration to be actively managed to ensure establishment of appropriate communities incorporating a wide mix of species in post-mining revegetation areas.

Specifically, OEH stated that regeneration should not just focus on establishment of canopy and shrub species, but should include 'a mix of groundcover species too, particularly from different guilds or functional groups, such as cycads, ferns, forbs, geophytes, herbs, native legumes, rushes, and sedges'. The Department agrees with OEH on this and believes that Glencore should be required to establish resilient, self-sustaining and functional vegetation communities, especially when these communities are offsetting impacts on EECs.

To mitigate against the risk that the regeneration of offset areas does not achieve its design purposes, the Department has adopted OEH's advice and recommended that Glencore be required to develop a regeneration strategy as part of its biodiversity offsets management plan. This strategy would need to clearly identify the measures to be put in place at each of the proposed offset sites and include details about the level of direct management required to achieve the target woodland regeneration and revegetation, periodic targets for the recovery of grassland areas to woodland communities and trigger levels where further, more intensive management activities (including weed management and direct seeding or planting of underrepresented species) would be required.

The proposed offset package relies heavily on the regeneration of offset lands and only provides for an upfront offset ratio of 0.7:1, to account for the clearing of some 164 ha of EECs (see **Table 4**). In addition, only 37 ha of the 106 ha of EECs present in the offset areas correspond to the EECs being cleared. Notwithstanding the limited amount of upfront offsets and fewer immediate benefits of the offset package, the Department notes that, once established, the proposed regeneration areas would help to increase the overall woodland vegetation on the Hunter Valley floor. Importantly, the ecological assessment notes that the proposed regeneration areas are located adjacent to several woodland areas containing threatened fauna species. Consequently, regenerating these grassland areas to complex woodland communities would provide a larger area of contiguous woodland and could lead to significant biodiversity outcomes and assist in the recovery of locally threatened fauna populations.

While recognising that Glencore's biodiversity offset package is heavily reliant on regeneration, the Department notes the proposed offset areas would provide upfront offsets that are at least equivalent to the area of native woodland and forest being disturbed and would meet the Interim Policy's requirement for a 2:1 offset ratio, following regeneration of grasslands located within the offset sites.

Therefore, despite the lack of upfront offsets for EECs, the Department is satisfied that, providing the proposed EEC regeneration areas are satisfactorily established, the project would meet the Interim Policy's requirements and provide for the long-term conservation of over three times the area of EECs that would be cleared. In reaching this conclusion, the Department also notes that the offset sites are strategically located adjacent to existing conservation areas, would increase the area of contiguous woodland and fauna habitat to be conserved in the greater Ravensworth area, provide important habitat corridors and assist in the long-term recovery of locally threatened fauna populations.

Nevertheless, the Department is aware that the Commonwealth has advised Glencore that the offsets package does not meet relevant Commonwealth requirements for impacts on threatened fauna species and has requested that Glencore provide additional areas of established woodland to improve its upfront biodiversity outcomes. The Department believes that Glencore should aim to ensure that any additional offset areas focus on the conservation of established woodland and forest EECs.

The Department will consider Glencore's response to the Commonwealth's advice before making a final recommendation on the adequacy of offsets in its final assessment report. Importantly, both the Department and OEH are satisfied that any additional upfront offsets that may be warranted could be required under relevant conditions of consent.

### **Rehabilitation**

Consistent with the approach taken for recent Hunter Valley projects assessed under the Interim Policy, the Department has considered Glencore's proposed rehabilitation separately from biodiversity

offsets. This is due to the time needed to achieve biodiversity outcomes from rehabilitated land and the inherent risks of establishing a high quality, diverse ecosystem on rehabilitated landscapes.

The Department accepts that well-implemented rehabilitation can play an important role in promoting the recovery of local and regional biodiversity over the medium to long-term. Under the FBA, OEH's approach to calculating offsets for proposed rehabilitation is to apply a significant discount to credits generated (to account for establishment times and risks). This approach is broadly consistent with that here adopted by the Department.

Under the project, Glencore has committed to establish a further 350 ha of rehabilitated woodland at the Mount Owen Mine (equivalent to the increase in disturbance footprint), bringing the total area of woodland to be rehabilitated across the Mount Owen and Ravensworth East mines to around 1740 ha.

When considered in conjunction with existing and proposed biodiversity offset areas, the consolidated Mount Owen and Ravensworth East operations would provide for the establishment and conservation of around 2700 ha of native woodland over the medium to long-term. When coupled with over 600 ha of remnant vegetation in the New Forest and Ravensworth State Forest, this would provide around 3300 ha of contiguous woodland communities and habitat, which would be further complemented by additional offset areas required under separate approvals for the broader network of Glencore mines.

The Department has recommended conditions requiring Mount Owen to establish approximately 1740 ha of rehabilitated woodland areas on the post-mining landform and provide for the permanent protection of these areas through appropriate conservation mechanisms. In addition, the Department has recommended a condition requiring Glencore to focus its rehabilitation on the re-establishment of threatened flora species and communities that are likely to be disturbed by the project or are present in the surrounding area, and provision of habitat and preferred feed species for key threatened fauna.

#### **6.4.4 Conclusion**

The Department acknowledges that the project would result in the clearing of around 451 ha of native vegetation. This area of native vegetation includes some 228 ha of established woodland and forest communities, of which 164 ha conforms to the definition of an EEC.

In this respect, the Department is aware that the project has the potential to result in significant impacts on EECs, threatened flora species and populations and threatened fauna species. To minimise the likelihood of such impacts, Glencore has designed the project to stand off existing offset areas and sensitive creek lines and has committed to the perpetual protection of over 1100 ha in additional biodiversity offset and rehabilitation areas, to account for the impacts of the project.

It is important to recognise that a significant component of the proposed offset strategy is dependent on the successful regeneration of grassland areas and rehabilitation of post-mining areas to woodland communities. Consequently, the Department has recommended a number of prescriptive conditions relating to the establishment of complex ecological communities within these offset areas and governing the ongoing management and protection of these areas. The Department believes that the offset package would meet the requirements of the former Interim Policy.

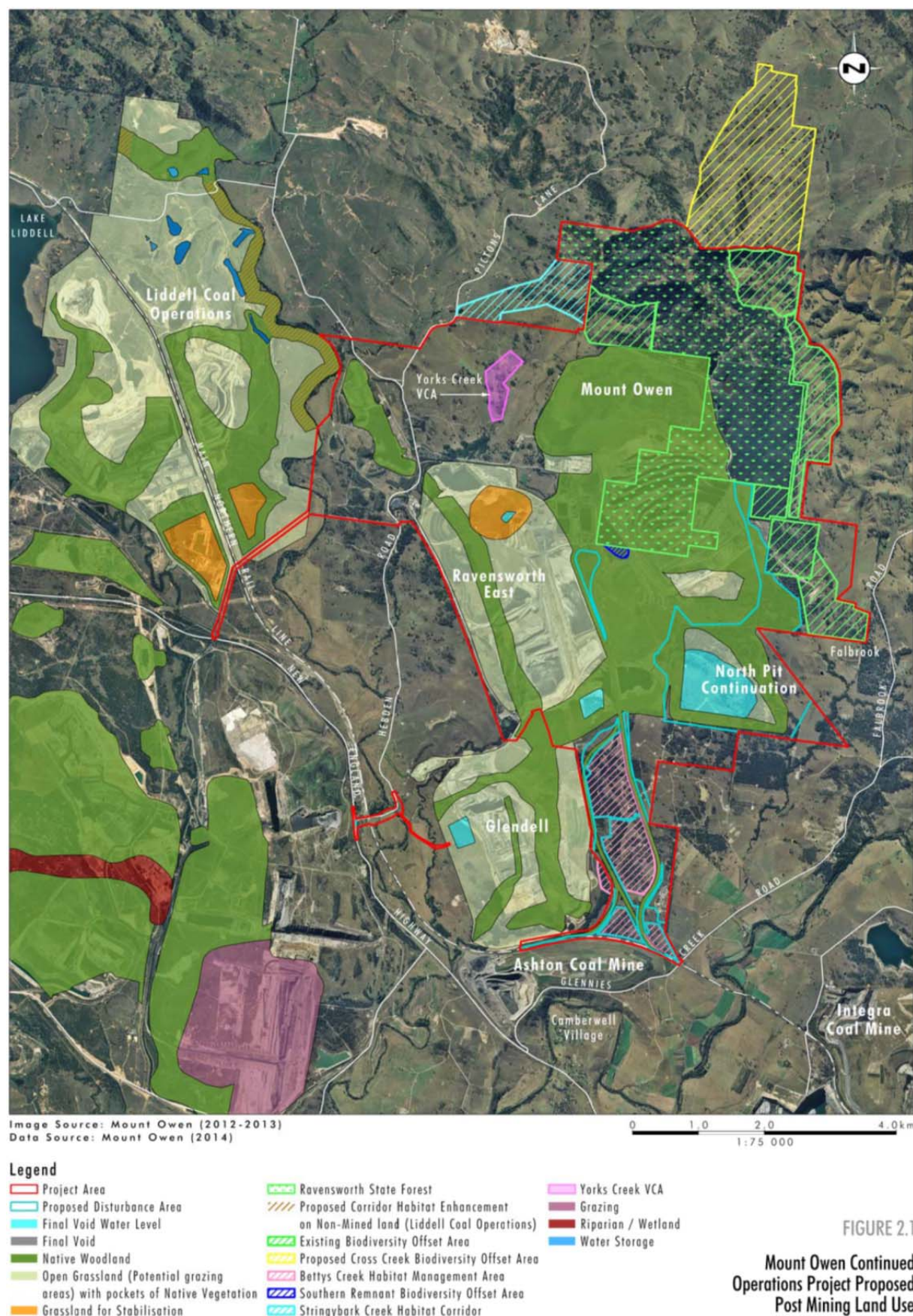
Overall, the Department is satisfied that the project has been designed to avoid, mitigate and manage biodiversity impacts where practicable, the proposed offset package is sufficient to compensate for any residual impacts of the project and the project could be undertaken in a manner that would likely result in a net improvement in the biodiversity values of the locality in the medium to long-term.

### **6.5 Final Landform and Rehabilitation**

To facilitate the continuation of mining operations through the extension of the Mount Owen North Pit and enable access to deeper coal seams at the Ravensworth East Mine, Glencore has proposed a number of changes to the approved post-mining landforms at the Mount Owen Complex (see **Figure 9**).

The project is seeking approval to extend the existing North Pit OEA to establish a tiered landscape behind the progressing mine front, extend the Western out-of-pit OEA to cover the former Eastern Rail Pit, backfill the West Pit of the Ravensworth East Mine, shift the currently approved North Pit final void further south away from the Ravensworth State Forest, retain two final voids at the Ravensworth East Mine, amend the distribution of woodland rehabilitation corridors and make consequential changes to the contouring and relief of the final landform.





**Figure 9: Proposed Mount Owen Complex rehabilitation strategy**

Glencore is proposing to rehabilitate the final landform with a mixture of native woodland communities and grassland areas. Conceptually, woodland communities would cover the majority of the Mount Owen site and around 30% of the Ravensworth East site. The remaining flatter areas earmarked for future agricultural use would be returned to a suitable mix of native and introduced pasture species.

The final landform has also been designed to incorporate reinstated catchment areas and watercourses that would return a significant proportion of the pre-mining surface water catchments to the surrounding creek lines. While Glencore has acknowledged that further work is required to refine the composition of vegetation within rehabilitated areas, incorporate additional micro-relief and determine final void shapes prior to mine closure, the company maintains that the conceptual mine plan provides sufficient certainty regarding its commitment to establish a best practice final landform.

Importantly, the NSW Forestry Corporation has confirmed its satisfaction with the proposed final landforms and rehabilitation plans for those aspects of the project that would occur on its land. Specifically, the NSW Forestry Corporation was supportive of the removal of an approved final void (and associated steeply sloping land) from within the boundaries of the Ravensworth State Forest.

### ***Rehabilitated Woodland***

The existing conditions of consent for the Mount Owen and Ravensworth East mines require Glencore to establish rehabilitated native woodland corridors across the final landscape to reconnect with the Southern Remnant of the Ravensworth State Forest. At present, 30% of the Ravensworth East Mine and around 90% of the Mount Owen Mine need to be rehabilitated with native woodland communities.

As discussed above, one of the key components of the proposed biodiversity offset package is the establishment of additional rehabilitated woodland within the post-mining landscape. These woodland communities are not only important to compensate for the clearance of EECs, but also provide a network of sheltered habitat that would enable threatened fauna to move safely between areas of remnant vegetation in the surrounding landscape.

Importantly, the proposed rehabilitation plans shown in **Figure 9** demonstrate that in the medium to long-term, the project would continue to provide direct connections between remnant and rehabilitated woodland areas, extending from the Glendell Mine and Betty's Creek Habitat Management Area in the south, to the Ravensworth State Forest and associated offset areas in the northeast, the Hillcrest Offset Area in the northwest and the rehabilitated Ravensworth Operations in the southwest.

The Department notes that Glencore has committed to investigate opportunities to improve vegetation linkages between the Swamp Creek Corridor Offset and offsets at the Liddell Coal Mine. However, considering Spotted-tailed Quolls prefer to migrate close to watercourses, the Department believes there is an alternative corridor that Glencore could consider, that would go a long way to achieving OEH's intent of creating a connected woodland migration route for Quolls.

This alternative corridor could be achieved by rehabilitating a small area of land surrounding the Bayswater North Pit with woodland communities rather than pasture, thereby connecting the Mount Owen rehabilitation area with Yorks Creek. In this way, Glencore would be able to provide a wooded corridor that extends from the Ravensworth State Forest to the Hillcrest Offset Area, and is linked by a contiguous area of woodland traversing the existing Yorks Creek riparian corridor and the rehabilitated areas of the Mount Owen, Ravensworth East and Swamp Creek mines.

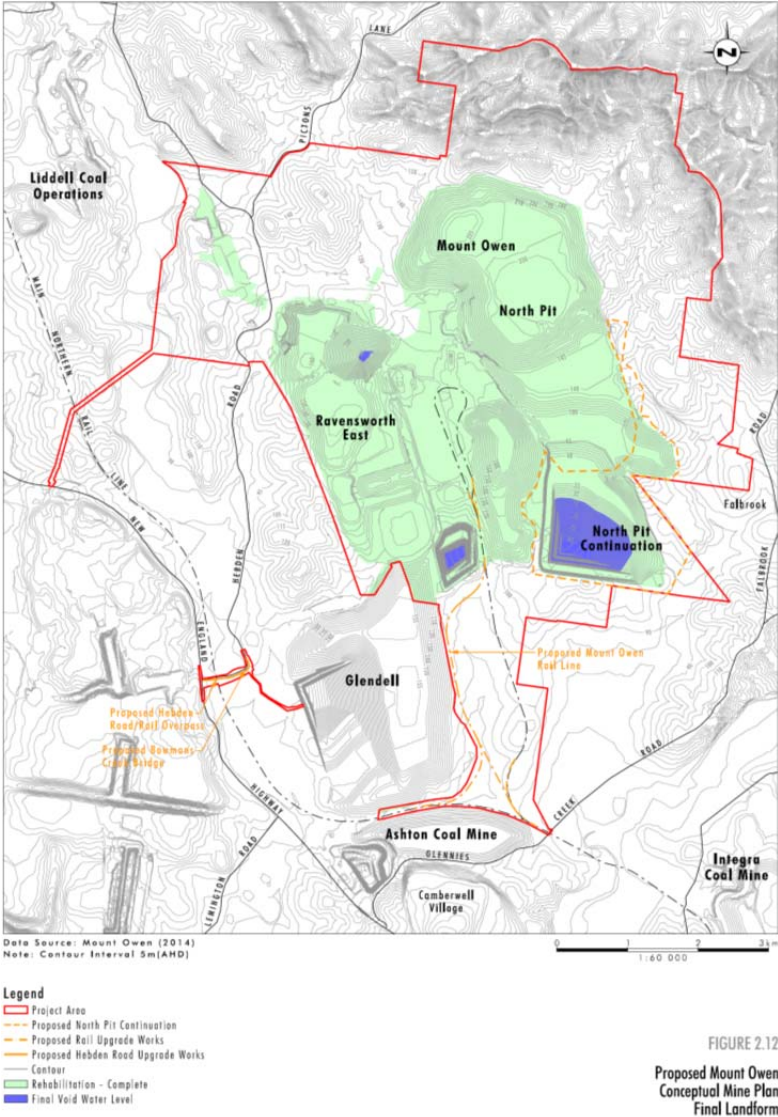
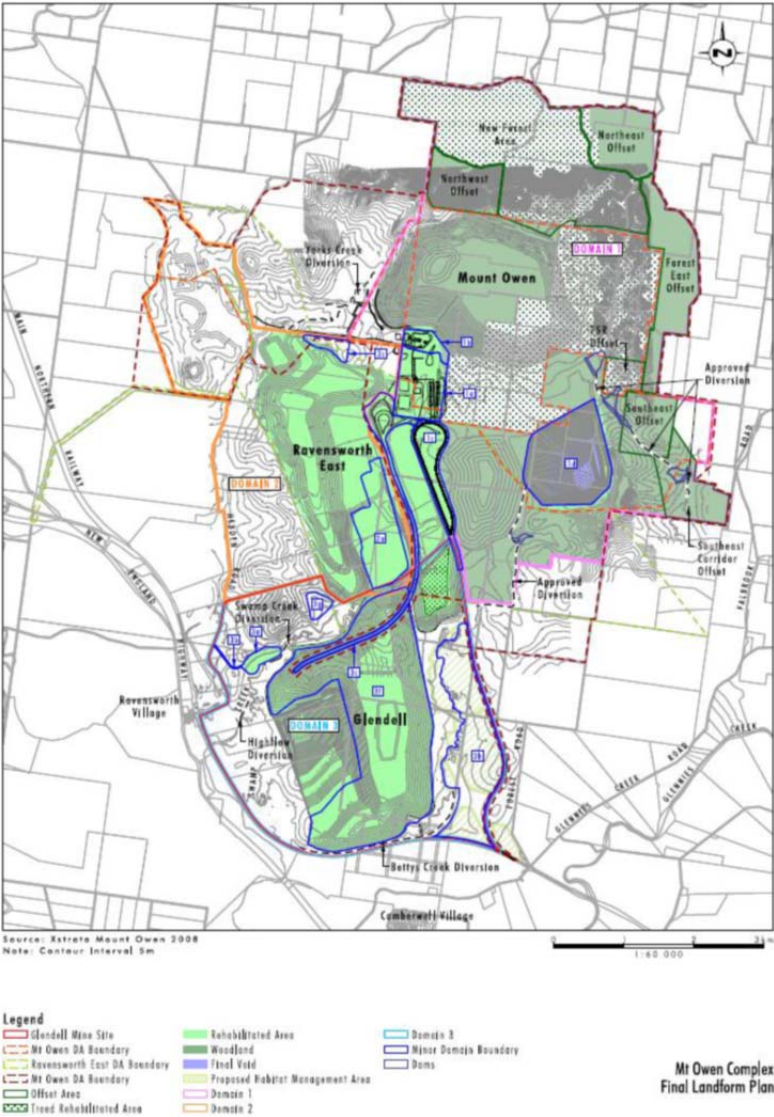
### ***Final Landform***

The Department acknowledges that the conceptual landform shown in **Figure 10** provides a sound basis for the development of a final landform for the site, and recognizes that Glencore has committed to refine this landform as part of the final mine closure plan. In addition, the Department recognizes the significant benefits that the proposed woodland rehabilitation corridors would provide towards improving biodiversity outcomes, especially for threatened fauna, in the medium to long-term.

However, the Department considers that there are opportunities to improve rehabilitation outcomes at the mine by reviewing the location of the post-mining areas designated for future agricultural use and biodiversity outcomes and aligning these areas more closely to the gradients of the final landform. This would allow for the establishment of increased woodland rehabilitation on steeper slopes with limited agricultural potential and focus the proposed establishment of agricultural pasture species on large areas of flat or gently undulating land that is better suited to support economic grazing activities.

Several government agencies including DPI Water, OEH and DoE commented on the proposed final landform and rehabilitation plans in their submissions on the project. Broadly speaking, these agencies requested further clarification of the conceptual final landform as it relates to surface water flows, water licensing, the finality of future land uses and offset requirements. In addition, DRE proposed a range of conditions to appropriately manage these aspects of the project.





**Figure 10: Comparison of approved and proposed final landforms**  
(NB: Figure on left sourced from the Mount Owen Complex Landscape Management Plan - dated September 2014)

While the RTS broadly responded to these matters, the Department believes that Glencore could address some residual issues and strengthen the final landform outcomes by confirming the final location of woodland rehabilitation areas and providing additional upfront detail about how it would incorporate micro-relief and void minimization measures into its conceptual final landform design.

These additional measures would improve the certainty around long-term biodiversity outcomes and the creation of a landscape that would be more sympathetic with the surrounding natural topography. To this end, the Department has requested that Glencore undertake a review to investigate potential opportunities to improve the final landform and rehabilitation plans for the site, prior to determination. This review would focus on a number of key outcomes, including the need to:

- create a stable, free-draining and natural looking final landform;
- minimise the number and volume of water storages in the final landform to ensure they can be appropriately licensed;
- minimise the size and number of final voids, to the extent this is reasonable and feasible;
- consider opportunities and constraints to the feasibility of future land use options; and
- rehabilitate disturbed areas with an appropriate mix of grassland and woodland areas.

Glencore's response to this request committed to incorporate micro-relief in the detailed mine plans under DRE's Mining Operations Plan, if the project is approved. This response also provides a visual example of the type of micro-relief that could be achieved and also makes several improvements to the previous mine plan. However, the Department considers that Glencore's commitment to micro-relief should be reflected in the requirements of the consent, including in respect of scope and design parameters.

Glencore has also argued that backfilling the three proposed voids would significantly increase capital costs of the project and would potentially require the re-handling of overburden from the rehabilitated Western Out of Pit dump, which would prolong air quality and noise impacts from the project. Glencore considers that these additional expenses and project impacts do not warrant the limited benefits to be derived from backfilling these voids. This is especially the case for areas of the North Pit void that would be forested and generally hidden from public viewpoints and private residences.

Nevertheless, Glencore has provided several indicative concessions to the final landform surrounding the North Pit void that would improve its conformity to the surrounding landscape, and has a strong desire to use the final voids at Ravensworth East as future tailings emplacement areas for several of its mines in the greater Ravensworth area. To this end, the Department notes that Glencore has recently submitted a modification for the first stage of its proposed Greater Ravensworth Tailings Management Strategy, which would involve filling the approved West Pit tailings emplacement at the Ravensworth East mine.

Given most final voids become permanent features in the landscape, the Department believes the size and depth of post-mining voids should be minimised to the greatest extent possible. In this particular case, the Department accepts that the final depth of the North Pit (180 m) is likely to be a significant constraint on Glencore's ability to completely backfill the final void. However, the Department believes that Glencore should provide further justification for the retention of the North Pit void in the final landform and evidence of any opportunities to make this void more sympathetic to the surrounding landscape (such as a less linear final highwall).

Conceptually, the long term consolidation of tailings streams in the Ravensworth East voids could provide sufficient material to significantly reduce or remove both voids from the final landscape, and provide both operational and environmental benefits for Glencore's operations in the greater Ravensworth area through a more efficient and focused approach to tailings management. However, given this strategy is subject to a separate assessment process and considering the volume of overburden material Glencore is seeking to move under this project, the Department believes that further consideration should be provided to other reasonable and feasible options to minimise the size of the BNP and RERR Pit voids, prior to the application being determined.

Following a review of the post-mining uses of the final landform, Glencore has proposed to expand the woodland rehabilitation corridor along the west of the Ravensworth East Mine, to reflect existing rehabilitation efforts and maximise the beneficial use of this steeper sloping land. Furthermore, Glencore's response indicates the slopes of the proposed BNP void would be largely unsuitable for grazing and as such, the Department intends to seek further information regarding the potential to establish a northern habitat corridor over this area (as described above), prior to determination.

## Conclusion

Overall, the Department accepts that the proposed final landforms have been designed to incorporate macro-relief, address relevant safety considerations (eg the stability of highwall batters) and provide a mix of future agricultural and conservation land uses. Additionally, the Department acknowledges Glencore's commitments to micro-relief this landform to achieve a more natural appearance, license surface water runoff and use its best endeavors to minimise the number and extent of final voids.

The Department is also satisfied that the proposed grassland rehabilitation areas would provide for a range of appropriate future land uses on the site and that the proposed woodland corridors would provide a significant contribution towards long-term biodiversity conservation outcomes. To improve the likelihood of these rehabilitation outcomes being achieved, the Department has recommended a range of rehabilitation objectives for the project (see **Table 5**).

With these objectives in place, the Department is confident that the site could be rehabilitated to meet current best practice measures for the mining industry in NSW and that the project could be managed to achieve appropriate final landform and rehabilitation outcomes.

While there remains some uncertainty regarding the micro-relief of the final landform and post-mining uses for the final voids at the Mount Owen Complex, the Department and DRE are satisfied that sufficient information has been provided to inform the preliminary assessment of the application. Furthermore, the Department notes that Glencore will be providing further information on these matters prior to any final determination on the application.

**Table 5: Rehabilitation objectives**

<b>Feature</b>	<b>Objective</b>
Mine site (as a whole)	<ul style="list-style-type: none"> <li>• Safe, stable and non-polluting</li> <li>• Final landforms designed to incorporate micro-relief and integrate with surrounding natural landforms</li> <li>• Constructed landforms maximise surface water drainage to the natural environment (excluding final void catchments)</li> <li>• Minimise long term groundwater seepage zones</li> <li>• Minimise visual impact of final landforms as far as is reasonable and feasible</li> </ul>
Final voids	<ul style="list-style-type: none"> <li>• Designed as long-term groundwater sinks and to maximise groundwater flows across back-filled pits to the final void</li> <li>• Minimise to the greatest extent practicable:               <ul style="list-style-type: none"> <li>○ the size and depth of final voids</li> <li>○ the drainage catchment of final voids</li> <li>○ any high wall instability risk</li> <li>○ risk of flood interaction.</li> </ul> </li> </ul>
Rehabilitation areas and other vegetated land	<ul style="list-style-type: none"> <li>• Restore at least 1740 ha of self-sustaining woodland ecosystems in accordance with the rehabilitation plan.</li> <li>• Establish areas of self-sustaining:               <ul style="list-style-type: none"> <li>– aquatic habitat, within any diverted and/or re-established creek lines and retained water features;</li> <li>– habitat for threatened flora and fauna species; and</li> <li>– wildlife corridors, as far as is reasonable and feasible</li> </ul> </li> </ul>
Agricultural land	<ul style="list-style-type: none"> <li>• Rehabilitate grassland areas identified in the rehabilitation plan as having the potential for future agricultural use to a sufficient agricultural capability to support grazing</li> </ul>
Creek diversions and realignments	<ul style="list-style-type: none"> <li>• Flows to mimic pre-development flows for all flood events up to and including the 1 in 100 year ARI</li> <li>• Incorporate erosion control measures based on vegetation and engineering revetments</li> <li>• Incorporate structures for aquatic habitat</li> <li>• Revegetate with suitable native species</li> </ul>
Surface infrastructure	<ul style="list-style-type: none"> <li>• To be decommissioned and removed, unless DRE agrees otherwise</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Ensure public safety</li> <li>• Minimise the adverse socio-economic effects associated with mine closure.</li> </ul>

Consequently, the Department is satisfied that the final landform and rehabilitation outcomes of the project are appropriate and that the completion criteria and post-mining land use goals could be managed to the satisfaction of DRE under a Rehabilitation Management Plan for the complex.

## 6.6 Water Resources

The EIS includes surface water and groundwater assessments investigating the potential impacts of the project on water resources, the environment and downstream water users. Glencore responded to submissions from the public, the EPA and DPI Water that raised issues relating to water licensing, on-site water management and surplus water discharges (via off-site transfers). In addition, Glencore provided a separate response to the IESC's advice on providing greater certainty about the predicted impacts, especially on baseflow to Glennies Creek and potential GDEs. The Department also obtained further clarifications from Glencore on predicted spill quantities, modelled salinity of final voids and water quality monitoring data presented in the RTS.

### 6.6.1 Surface water

The Mount Owen Complex is situated across two major surface water catchments (Bowmans Creek and Glennies Creek) which drain in a southward direction to the Hunter River. Bowmans Creek runs in a general north-south direction, hugging the western boundary of the mine complex and including the sub-catchments of Stringybark, Yorks, Swamp and Bettys Creeks. Glennies Creek is located to the east and southeast of the mine and includes the sub-catchment of Main Creek, which flows around the eastern boundary of the complex. Glennies Creek is highly regulated due to the presence of Glennies Creek Dam, located upstream of the mine site. The tributaries of Bowmans Creek and Glennies Creek are ephemeral streams.

It is important to note that the existing catchment has been significantly modified due to historic mining operations, which are not limited to Mount Owen's current operations. This includes diversions to both Swamp and Bettys Creeks, reductions in catchment areas and flow volumes. Consequently, many of the tributaries in the vicinity of mining operations are highly modified watercourses.

#### *Existing water management system*

Glencore operates a coordinated water management system (WMS) at the Mount Owen Complex, which allows for the management of water across the Mount Owen, Ravensworth East and Glendell mines. This WMS forms part of Glencore's existing Greater Ravensworth Water Sharing Scheme (GRWSS), which allows Glencore to manage water supply and demand across several of its operations including the Ravensworth Underground Mine, Liddell Coal Mine and the Ravensworth surface operations, which include Ravensworth North and Narama open-cut mines and the former open-cut and underground Cumnock Mine.

The project is predicted to experience water deficits between Years 1 and 5 of the project, and would generate a water surplus towards the end of mining (Year 10). Supplementary water would be sourced as necessary from off-site mine storages under the GRWSS or else extracted from Glennies Creek under existing water access licences. Both DPI Water and the Department are satisfied that water supplies could be suitably managed by Glencore during the life of the mine.

#### *Catchment areas*

The project would involve changes to the final approved landforms associated with mining in the North Pit Extension Area, BNP and RERR Pit. This would result in reductions to the Main, Swamp and Bettys Creek catchments, and an increase in the Yorks Creek catchment area (see **Table 6**). No change is predicted to the approved final catchment area of Stringybark Creek.

**Table 6:** Local creek catchment changes

<b>Catchment</b>	<b>Pre-mining (Ha)</b>	<b>Area in 2012 (Ha)</b>	<b>Approved final landform (Ha)</b>	<b>Area in Year 5 (Ha)</b>	<b>Proposed final landform (Ha)</b>
Yorks	1,230	1,580	1,660	1,800	1,920
Swamp	2,380	410	1,440	390	1,230
Bettys	1,810	660	960	700	780
Stringybark	1,290	1,220	1,300	1,300	1,300
<b>Bowmans (total)</b>	<b>25,055</b>	<b>22,010</b>	<b>20,390</b>	<b>21,590</b>	<b>20,520</b>
Main	2,000	2,480	2,620	2,430	2,470
<b>Glennies (total)</b>	<b>52,335</b>	<b>50,265</b>	<b>50,405</b>	<b>50,215</b>	<b>50,255</b>

As seen in **Table 6**, Swamp and Bettys Creeks have highly modified systems, with both creeks having been diverted around previous mining operations and subjected to significantly reduced catchment areas. Given the ephemeral nature of these waterways, Glencore believes the proposed reduction in long-term catchment area between the approved and proposed final landforms represents a relatively small incremental impact, given that the associated reductions in flow would be less than natural

variations in the seasonal and annual flow regimes in this region. Glencore also expects a negligible impact on flows in Bowmans and Glennies Creek as the reduction to the total contributing catchments in each is less than 1%.

The IESC accepted that the risk of impacts to Bowmans Creek and its tributaries would be unlikely to vary from those of existing mining operations, but considered there was limited hydrological, geomorphological and ecological data to support the conclusions regarding impacts on Glennies Creek. In its response, Glencore argued that this additional data was unnecessary, as Glennies Creek is a modified system with strictly regulated flows controlled by the Glennies Creek Dam. Further, the proposed maximum reduction in the Glennies Creek catchment is only 0.1%, during Year 5 of the project. Once rehabilitated, the final landform would be almost identical to the current catchment area and would be more closely aligned with the pre-mining catchment than would actually be the case for the approved final landform (see **Table 6**).

The Department acknowledges that the project would marginally reduce the Swamp and Betty's Creek catchment areas relative to the approved final landform, but accepts the findings of the Surface Water Assessment that the project is unlikely to cause unacceptable impacts to these systems over the long term. In addition, the project is considered unlikely to result in measurable impacts to flows in Bowmans and Glennies Creeks or detrimental impacts on downstream surface water users.

### ***Flooding***

The Surface Water Assessment identified that the peak flow rates, velocities and depths in Main Creek during the project would be equivalent to those associated with the approved final landform. As such, they would not materially alter the likelihood of flood events relative to the existing mine. However, the proposed increase in the long-term catchment area for Yorks Creek is expected to result in increased downstream flooding, with likely implications for existing and proposed road crossings.

To minimise these impacts, Glencore has designed and proposed a range of mitigation measures, including the provision of offline detention and flow conveyance works, as well as the installation of warning signage along affected sections of Hebden Road. Glencore has identified that these measures would minimise the effect of increased peak flows for 99% of probable flood events in Yorks Creek or downstream in Bowmans Creek, in any given year. Despite these measures, up to 400 mm of water is predicted to extend some 480 m upstream of the proposed Hebden Road bridge over Bowmans Creek under the 1% AEP event. These water levels would affect Glencore-owned land and three parcels of Government-owned land, but would not affect any privately-owned properties. Glencore has provided additional information to demonstrate that the project would only result in a very small, incremental impact on the three vacant parcels of Government-owned land.

In addition to the above, Glencore has proposed to implement mitigation measures including scour protection to the bed of Bettys Creek beneath the proposed rail bridge. With these measures in place, the Department is satisfied that the proposed changes to catchment areas and construction of the proposed creek crossings and bridges would not impact flood levels on privately-owned properties.

Glencore has proposed to use a dirty-water dam for the offline detention of flows in Yorks Creek. The Department considers that this dam should be remediated prior to its use for this purpose to ensure that contamination of clean water flows is avoided. This is proposed to be included as a requirement for the mine's Water Management Plan.

### ***Impacts on surface water quality***

The risk of potential impacts to surface water quality is currently managed under the Mount Owen Complex WMS and Glencore's GRWSS. While the EIS states that the project would operate as a 'nil discharge' site, both the Department and DPI Water noted that it also identified that surplus clean water would continue to be returned to the environment under existing discharge arrangements and that some sediment dam overflows may occur during extreme weather events.

To address this apparent discrepancy, Glencore provided further clarification in its RTS. This additional information confirmed that under normal weather conditions there would be no discharge of water to the environment from the project. Any surplus water would be transferred off-site as part of the GRWSS and discharged in accordance with existing consent conditions, EPL requirements and the rules of the Hunter River Salinity Trading Scheme (HRSTS) from mines in the Ravensworth surface operations site or Liddell Coal Mine.



However, under high rainfall conditions, the design capacity of the mine's sediment dams could be exceeded and overflow into either the WMS or local watercourses including Swamp, Yorks and Bettys Creeks. Given the seemingly large volume of potential spills to the surrounding environment predicted in the EIS (see **Table 7**), the Department sought further information to assess the potential implications for water quality and sediment loads.

**Table 7: Predicted spills from sediment dams under the project**

<b>Scenario</b>	<b>Average number of spills/year</b>	<b>Average spill volume (ML)</b>	<b>Maximum spill volume (ML)</b>
Year 1 (2016)	2	527	4,116
Year 5 (2020)	2	534	4,173
Year 10 (2025)	2	478	3,765

Glencore confirmed in its RTS that half of the mine's 18 sediment dams would spill to the WMS, therefore limiting the amount of sediment-laden water that may potentially enter the environment. As a result, much lower quantities would be spilled to local watercourses with average quantities expected to be around 114-128 ML/year and maximum quantities of up to 902-1,034 ML/year. The Department notes that Glencore has designed all of its sediment dams to manage runoff from the 5 day, 95<sup>th</sup> percentile event, which exceeds the minimum 5 day, 90<sup>th</sup> percentile design criteria required under *Managing Urban Stormwater: Soils and Construction Volumes 1 and 2E – Mines and Quarries Guideline* (the 'Blue Book'). Furthermore, the mine's coal-contact water storage system is designed to higher standards and can accommodate rainfall from the 1% AEP 24-hour storm event.

Water quality monitoring undertaken during an overflow event in April 2015 identified that, with the exception of Total Suspended Solids (TSS), all water quality parameters were within the site specific trigger values. Despite elevated TSS near the sediment dam, this did not translate into an exceedance of the site specific trigger values downstream in Bowmans Creek. This indicates that, under high rainfall conditions, there was sufficient runoff in the broader catchment to dilute the sediment-laden water discharged to the environment during the monitored overflow event.

For these reasons, the Department considers that Glencore's WMS would effectively manage risks to surface water quality from sediment-laden water and that it would not be reasonable to require any further measures to mitigate against the likelihood of spills during extreme weather events. Nevertheless, the Department recommends that performance measures are established to ensure that Glencore continues to design all dams to appropriate standards (ie in accordance with the Blue Book) so as to avoid any unnecessary discharges of sediment-laden water to the environment.

With regards to seepage and surface water runoff from the site, the EIS included a geochemical analysis which identified that, given the majority of overburden and interburden materials would be non-acid forming, potentially sodic and dispersive weathered material could be managed. Glencore has proposed a program to monitor the water quality of seepage and runoff to check for potential acid-rock drainage and mobilisation of metals. The Department is satisfied that, with the incorporation of appropriate monitoring and response measures in the Water Management Plan, these aspects of the project have a low risk of causing off-site water quality impacts.

None of the proposed final voids are predicted to result in the flow of poor quality groundwater to nearby alluvial aquifers or downstream surface water environments. Importantly, while the BNP is predicted to fill with water and flow to the RERR Pit, both the North Pit and RERR Pit are expected to act as long-term groundwater sinks. Accordingly, no inter-aquifer flows are predicted and ongoing monitoring would continue to be undertaken to manage any potential risks to surface water quality.

#### **Downstream surface water users**

Glencore owns the vast majority of land adjacent to the watercourses affected by the project, with the notable exception of one parcel of land on Yorks Creek which was formerly owned by the Electricity Commission of NSW and has since reverted to Crown land, and two parcels of land on Bettys Creek which are owned by the Water Conservation and Irrigation Commission (now DPI-Water). In addition, while two private landowners have access to Main Creek downstream of the development, neither landowner is a registered user of this water source and the project is not expected to result in any material impacts to downstream flows in these areas of Main Creek. Nonetheless, a condition of consent has been recommended to provide a compensatory water supply to any affected landowner.

Flood mitigation works in Yorks Creek are expected to reduce the peak level and duration of floods and would therefore benefit downstream water users. No impacts are predicted to irrigation, domestic and stock water licences for Bowmans Creek, held by Ashton Coal downstream of the mine site.

### **Water licensing**

Glencore proposes to source water for its operations from on-site rainfall runoff, groundwater inflows to mining areas, transfers from the GRWSS and supplementary supplies from Glennies Creek. The Mount Owen Mine currently holds 1,056 high security entitlements and 858 general security entitlements under the *Water Sharing Plan for the Hunter Regulated River Water Source 2004* (Hunter Regulated WSP) for the extraction of water from Glennies Creek. No additional surface water licences are required for the project.

DPI Water's initial submission on the project raised concerns with the long-term licensing of numerous dams proposed for the final landform. Glencore's RTS considered that the licensing of these dams would be dependent on the final ownership of the land and licensing arrangements in force at that time. However, neither the Department or DPI Water were satisfied that this response provided adequate certainty that Glencore would hold sufficient licences from the Jerry's Water Source to account for this future take. Consequently, DPI Water requested that Glencore clarify how it would account for the volume of water to be held in these dams or modify its final landform to ensure that it could comply with available surface water licences.

Glencore has since confirmed that it has signed a binding agreement to purchase the nearby Integra Underground Mine, including a number of water access licences. Glencore is therefore of the view that its existing water licences within the Jerry's Water Source, combined with the licences for the Glennies Water Source to be acquired with the purchase of the Integra Underground Mine and the harvestable rights associated with its Mount Owen landholdings, would be sufficient to account for dams constructed in the final landform.

On the basis of this information, the Department considers that Glencore may no longer be required to develop a strategy for securing additional water licences for the proposed final landform. Nevertheless, the Department will consult further with DPI Water as part of its final assessment of the project, and ensure that the additional information provided by Glencore adequately accounts for potential future water take and that the recommend conditions accurately reflect the need for Glencore to hold sufficient water licences to account for the project's water take.

### **Performance measures, monitoring and management**

To minimise potential risks to surface water quality associated with increased TSS and Total Dissolved Solids (TDS) levels following sediment dam overflows under high rainfall conditions, the Department has recommended a performance measure requiring all sediment dams to be designed in accordance with the Blue Book.

The following conditions are also recommended to be included in the consent:

- remediate the dirty-water dam prior to its use for Yorks Creek offline flow detention to avoid potential contamination of clean water flows;
- prepare and implement a Water Management Plan which includes a program to monitor seepage and runoff to check for potential acid-rock drainage and mobilisation of metals; and
- provide compensatory water supplies to any affected water user downstream of the site.

The Department has also recommended that Glencore update and revise its existing *Surface Water Monitoring Program* and *Surface Water and Groundwater Response Plan* under a new consolidated Water Management Plan for the mine complex. These updated plans would need to include continued monitoring of pH, EC, TDS and TSS in sediment dams and downstream creeks and a program to monitor potential acid-rock drainage and mobilisation of metals from seepage and surface water runoff, as proposed in the geochemical assessment appended to the RTS.

DPI Water requested that if the project is approved, Glencore be required to consult with DPI Water regarding the content of its Water Management Plan, clarify all flows and transfers between clean and dirty water dams, and ensure there are no inconsistencies in the use of these dams under the WMS.

### **Conclusion**

The project would result in some incremental changes to the existing Swamp and Bettys Creek catchment areas; however the associated change in flow volumes would remain within existing seasonal variations and are expected to have negligible environmental effects. While the increased catchment area and flow volumes in Yorks Creek would see an increase in downstream flood events, these increased flows are not excessive and would not impact on any privately-owned properties.

The Department acknowledges that the overflow of sediment dams in high rainfall events may result in localised TSS exceedances; however these would be diluted by the increased clean water flows in the conditions under which such spills would occur. Overall, the Department believes that Glencore has proposed a range of suitable mitigation, management and monitoring measures in its EIS and RTS. With these measures in place, the Department considers that the risk of impacts to surface water quality is low and that the project could be suitably managed through recommended performance measures and conditions of consent.

### **6.6.2 Groundwater**

The EIS's Groundwater Impact Assessment was based on a regional groundwater model undertaken by Jacobs Pty Ltd, and peer reviewed by Dr Noel Merrick. In line with the IESC's advice, Glencore in its RTS improved the accuracy of the model in predicting spatial extent of drawdown. This resulted in a small decrease in the predicted extent of drawdown in the Main Creek alluvium.

The groundwater environment surrounding the project is characterised by two main aquifer systems, comprising the shallow unconfined alluvial aquifers of Bowmans and Glennies Creeks (and their associated tributaries) and the hard rock aquifer associated with the Permian coal measures.

Water quality in the shallow alluvial aquifers surrounding the project is generally classified as being fresh to brackish. While the alluvial aquifers of Main and Bettys Creek are considered less productive due to their ephemeral nature and limited extent, the downstream alluvial aquifers of Bowmans and Glennies Creek are both highly productive water sources. Conversely the fractured and porous rock water source associated with the deeper hard rock aquifer is considered as less productive as it contains poorer (brackish to saline) water quality and provides low yields.

#### ***Drawdown in hard rock aquifers***

Historical and current mining at Mount Owen and other operations in the region affect the hard rock aquifer by intercepting and depressurising the target coal seam. Operations at Mount Owen currently extract coal to the base of the Hebden Seam while the nearby Integra Underground Mine has approval to extract coal from the Middle Liddell Seam down to the Hebden Seam. This leads to a general drawdown in regional groundwater levels, which in turn affects groundwater flows near the surface and alluvial aquifers.

The project would involve depressurisation in the hard rock aquifer due to mining in the BNP, RERR and North Pit Extension Area. The most significant drawdown of up to 165 m in the Bayswater Seam would occur due to mining in the RERR Pit and North Pit Extension Area. This drawdown would peak at the end of the mine life when the North Pit Extension Area reaches its final pit depth at the Bayswater Seam. As this drawdown is predicted to be generally limited to the project area, the Department accepts the claims in the EIS that no groundwater users are likely to be affected.

#### ***Drawdown in alluvial aquifers***

Depressurisation of the hard rock aquifers is predicted to result in drawdown in the alluvial aquifers of Main and Bettys Creek due to the proximity of mining to these watercourses. Glencore has sought to minimise impacts on the Main Creek alluvium through project design, including a 450 m setback from the edge of the open-cut pit to the high bank of the creek. This significantly exceeds the minimum 200 m setback required under the *NSW Aquifer Interference Policy* (AIP). In addition, the final void has been located away from the alluvial aquifer of Main Creek, thereby reducing the potential effects of long-term groundwater drawdown. As seen in **Table 8**, the predicted drawdown in Bettys Creek and the great majority of Main Creek is less than 2 m (see **Figure 11**).

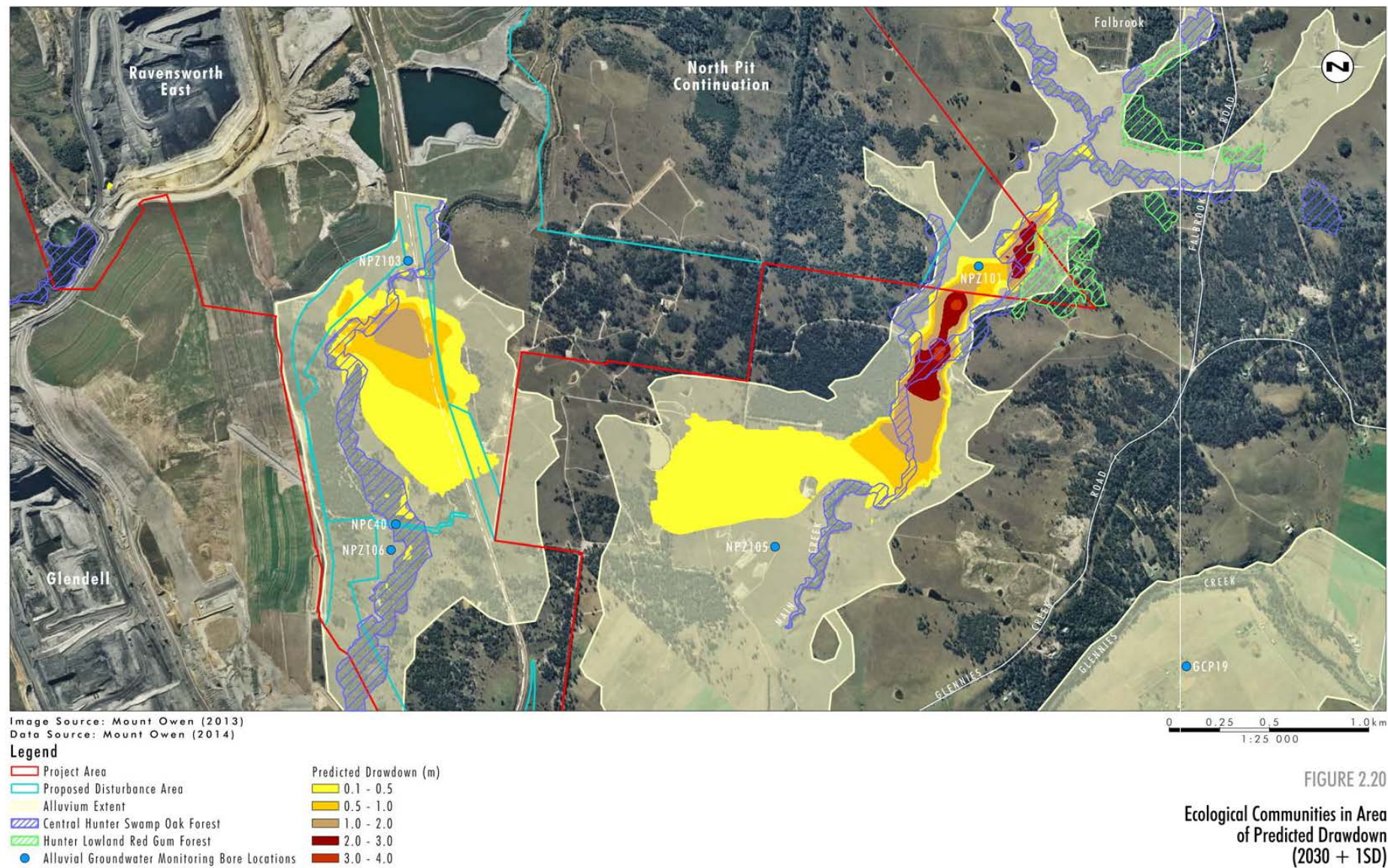


Figure 11: Predicted worst-case drawdown in shallow alluvial aquifers of Bettys Creek and Main Creek and groundwater dependent ecosystems



**Table 8:** Predicted drawdown in Main Creek and Bettys Creek

Alluvial Aquifers	Predicted Drawdown (Area in ha)					Total
	0 – 0.5 m	0.5 – 1m	1 – 2 m	2 – 3 m	3 – 4 m	
Main Creek	21.93	15.46	10.28	4.16	0.34	52.17
Bettys Creek	54.25	18.92	5.33	0.00	0.00	78.50
Total	76.18	34.37	15.61	4.16	0.34	130.66
Percentage of drawdown area	58%	26%	12%	3%	< 0.3%	100%

Nevertheless, the project would result in a small 4.5 ha area of the Main Creek alluvial aquifer experiencing drawdown greater than the 'minimal impact' criteria of 2 m identified under the AIP. Additionally, open-cut mining would result in de-watering of the underlying hard rock aquifer and generate flux (leakage) from the alluvial aquifers of Main and Bettys Creek. Glencore has considered that the project would have negligible impacts on alluvial aquifer systems on the basis that:

- drawdown is limited to small, upper reaches of the Main and Bettys Creek alluviums;
- none of the Bettys Creek alluvium and only 4.5 ha of the Main Creek alluvium would experience drawdown of more than 2 m (ie exceeding the Level 1 impact criteria in the AIP);
- no high priority GDEs or culturally significant sites have been identified within 40 m of areas with predicted drawdown and riparian vegetation is not likely to be affected;
- peak leakage from alluvial aquifers due to depressurisation is predicted to be less than 10% of the mean annual rainfall recharge to these systems, but up to 15% under dry conditions;
- no drawdown is predicted to occur within the highly productive Bowmans and Glennies Creek alluvial aquifers; and
- the predicted losses of baseflow relative to the total flows in Bowmans and Glennies Creek are negligible, being 0.6% and 0.3%, respectively.

The IESC's advice on the project noted that the predicted groundwater drawdown could influence the environmental outcomes for overlying surface water environments. In this regard, the IESC identified that the assessment of Bowmans and Bettys Creeks was adequate, but requested further consideration of the ecological stream habitat and aquatic fauna of Main and Glennies Creeks. Accordingly, the IESC suggested that Glencore provide a comprehensive description of the riparian, in-stream and alluvial habitat for fauna and flora, including but not limited to maps of the vegetation communities present in affected riparian and shallow groundwater areas, sampling of GDEs (including stygofauna and hyporheic fauna), an in-stream aquatic fauna survey and aquatic habitat assessment.

In response to the IESC's request, Glencore refined its groundwater model and drawdown predictions. This refinement identified that an area of around 44.35 ha of *Central Hunter Swamp Oak Forest* GDE (or 3.6% of the estimated regional extent of 1,217 ha) would be potentially affected by drawdown of the Main Creek alluvium. However, only 4.4 ha (0.36% of the estimated regional extent) of this GDE is expected to experience drawdown in excess of 2 m (see **Table 8** and **Figure 11**).

With respect to aquatic fauna surveys, the RTS identified that the project would reduce the catchment area of Main Creek by 2% in the short term and would establish a long-term catchment area similar to the current catchment area. Importantly, the Main Creek catchment area would remain larger than the pre-mining catchment area over the life of the project but flow volumes in the creek would remain within the natural variation for this ephemeral system.

The RTS states that, given the project would not materially affect the catchment area, water tables or persistence of pools in Main Creek, the project would not cause any material impacts to aquatic fauna or habitats. In addition, Glencore has argued that, given Glennies Creek is located further downstream from the project and flows in this creek are regulated by the operation of Glennies Creek Dam (located upstream at Lake St Clair), the project would be expected to have negligible impacts to aquatic fauna and habitat in Glennies Creek.

The Department acknowledges that both Main and Bettys Creeks have been previously affected by mining activities at the Mount Owen Complex. The nearby Integra Underground Mine also extracts coal from longwall panels beneath Main Creek. However, the predicted impacts of the project on Main and Bettys Creeks are generally within the minimal impact criteria of the NSW AIP, and exceedances are limited to a small area within Main Creek where the channel narrows.

Overall, the Department is satisfied that the predicted groundwater drawdown from the project is unlikely to significantly impact nearby GDEs or riparian communities located outside the proposed



disturbance area, beyond that of the existing approved operations. Accordingly, the Department is of the view the predicted drawdown impacts to alluvial aquifers are acceptable.

### **Final Voids**

Following the completion of mining, groundwater levels and pressures within the affected area would gradually recover, but the final voids would continue to act as groundwater sinks. The BNP would gradually fill to 37 m AHD after which water would flow back into the hard rock aquifer. These flows are likely to reach the RERR Pit over time. The BNP would not receive significant groundwater inflows, but rather, would fill with water from a small surface runoff catchment and rainfall recharge. Aside from an initial spike in salinity due to a low water level, the BNP has been modelled to remain at a relatively consistent salinity level of 1,000 microsiemens/centimetre ( $\mu\text{S}/\text{cm}$ ) into the future. It would therefore discharge higher quality water into the hard rock aquifer than it already contains.

The North Pit and RERR final voids would act as groundwater sinks. Modelling has projected the water quality in these two pits would slowly decrease over 200 years post-mining with the North Pit reaching 3,200  $\mu\text{S}/\text{cm}$  while the RERR is expected to increase from 3,200  $\mu\text{S}/\text{cm}$  up to 8,320  $\mu\text{S}/\text{cm}$ . These salinity levels are not expected to exceed ambient levels in the hard rock aquifer, which vary between 5,000 and 15,000  $\mu\text{S}/\text{cm}$ .

### **Interaction between Aquifers**

Past groundwater monitoring indicates that the deeper porous and hard rock aquifers are significantly more saline than the overlying shallow alluvial aquifers. In relation to the likely interactions of these aquifers, Glencore has recognised that there is evidence of upward pressure gradients in areas of the site and recognises there is some potential for upwelling of poorer quality water from the underlying hard rock aquifer to the shallow alluvial aquifers. However, based on the groundwater model and current knowledge of the geological environment, the Groundwater Impact Assessment considers that the potential for material upwelling of saline water is unlikely.

Nonetheless, to address this potential issue, Glencore has committed to continue monitoring salinity across its existing network of shallow and deep groundwater bores and implement adaptive management measures, should any upward migration of saline water be detected above the AIP's Level 1 minimal impact criteria. These adaptive management measures would include responses such as the adjustment of mining and/or dewatering plans to mitigate unacceptable impacts (either predicted or actual) on alluvial aquifers. The Department supports the implementation of the proposed monitoring and adaptive management measures, and believes that relevant trigger levels and management measures should be detailed in a Water Management Plan for the complex.

In making this recommendation, the Department also believes that it is important to note that mining in the Integra Underground Mine may affect the post-mining regional groundwater table and recharge of the depressurised hard rock aquifer. The Department considers that interactions between the two mines should be considered in setting appropriate trigger levels under the Water Management Plan

### **Water Licensing**

Groundwater take is estimated to be less than 500 ML/year on average over the life of the project, with a peak take between 2022 and 2026 of up to 750 ML/year. Glencore currently holds 1,160 ML/year in water access licences for Mount Owen, which is sufficient to accommodate its predicted take from the hard rock aquifer source. Glencore also holds sufficient licences to account for the predicted water take of 6 to 9 ML/year from Bettys Creek within the Jerry's Water Source under the relevant *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*. However, Glencore does not presently hold sufficient licences to account for the predicted maximum water take of 15 to 22 ML/year from Main Creek, under the relevant Hunter Regulated WSP.

DPI Water requested Glencore prepare a strategy to demonstrate that it would be able to secure sufficient water licences to cover the peak groundwater take predicted in future years of mining. As identified above, Glencore has since advised that it has signed a binding agreement to purchase the Integra Underground Mine, together with its water licence entitlements. With these additional water licence entitlements, Glencore has indicated that it would hold sufficient entitlements to account for all predicted groundwater take from both the project and Integra underground operations.

### **Conclusion**

The shallow alluvial and hard rock groundwater aquifers have been and continue to be affected by mining undertaken at Mount Owen and other nearby mines. The project would result in the continued depressurisation of the hard rock aquifer, which is expected to induce leakage from the shallow

alluvial aquifers associated with Main and Bettys Creeks. However, this leakage would represent only 10% (or 15% under dry conditions) of the average annual rainfall recharge expected to these alluvial aquifers. Moreover, the drawdown of the water table would only exceed the AIP's Level 1 minimal impact criteria over a small area of 4.5 ha. The Department accepts this would be unlikely to affect potential GDEs and that Glencore has proposed suitable monitoring and mitigation measures in the unlikely event of vegetation loss.

Overall, the Department is of the view that the project would not result in unacceptable groundwater impacts. Glencore would be required to update its existing groundwater management plan to incorporate appropriate groundwater monitoring of the project area and trigger action response plans to manage any additional groundwater take for the project and any unforeseen interactions between the hard rock aquifer and nearby alluvial systems.

## **6.7 Transport**

The EIS included a Traffic Assessment prepared by Transport & Urban Planning Pty Ltd, which considered the potential impacts of the project on the capacity, efficiency and safety of local and regional road and rail networks. As the project is not seeking to increase existing workforce levels, the key traffic impacts are the continuation of existing operational traffic numbers for an additional 12 years and short term construction traffic associated with the proposed road and rail upgrades.

### **6.7.1 Roads**

The Mount Owen Complex is currently accessed via a dedicated mine access road off Hebden Road (see **Figure 2**). The Mount Owen mine access road provides the primary access for around 920 existing employees and contractors working at the Mount Owen and Ravensworth East mines and site deliveries. A limited number of light vehicles intermittently access the Mount Owen Complex from access tracks off the local road network for specific operational and environmental activities. Current employees and contractors working at the Mount Owen Complex mostly live in Singleton, Maitland or Muswellbrook. These persons generally travel to work along the New England Highway and enter Hebden Road southwest of the mine access road.

The Department considers that there are two key issues regarding likely road traffic generation – the continued use of Hebden Road by the operational workforce and the impact of the temporary construction workforce on Glennies Creek, Forest and Crown Roads. The relevant road authorities in the area are the RMS (New England Highway) and Singleton Council (Hebden, Glennies Creek, Forest and Crown Roads).

#### ***Road traffic generation***

The Traffic Assessment found that the project would not significantly increase traffic impacts relative to existing operations at the Mount Owen Complex, given the project would continue to use the existing Mount Owen and Ravensworth East workforces and access the site via the Mount Owen access road. This assessment also noted that predicted operational traffic levels over the additional 12 years of mining would continue to meet acceptable levels of service for all relevant intersections and roads.

However, the project's construction activities are predicted to result in some additional road traffic impacts, including the proposed Hebden Road upgrades (ie the Main Northern Rail Line overpass 140 m east of the New England Highway and the new Bowmans Creek Bridge 500 m east of the New England Highway), upgrades to mine infrastructure areas and the construction of an additional rail line and northern turn-out to the west of the existing Mount Owen rail line.

Glencore has proposed to use Hebden Road as the primary access for the proposed road and mine infrastructure area upgrades and is also seeking approval to establish an access track off Hebden road to the Glendell mine site, for the sourcing of bulk fill for the upgrade works. Access for the rail line construction areas would occur off Crown Road and Forest Road (via Glennies Creek Road). The majority of these construction works are expected to occur over a 12 month period in Year 1 of the project, with the rail line works extending over a slightly longer 18 month period in Years 1 and 2.

Based on the assumptions in the Traffic Assessment, Glencore has predicted that the Hebden Road and the mine infrastructure upgrades would generate around 40 and 120 light vehicle trips per day, respectively, in Year 1. Construction light vehicle traffic is expected to occur primarily during the periods of 6.00 – 7.00 am and 3.00 – 5.30 pm, and would at times correspond with the operational shift changes at the mine, which peak at 6.00 – 7.00 am and 6.00 – 7.00 pm.

In addition, the construction works would require an additional 25 heavy vehicle trips per day (ie a total of 50 inbound and outbound movements) along Hebden Road, primarily associated with concrete and material deliveries. Unlike the construction workforce traffic, these heavy vehicles trips are likely to be spread evenly over a 10 hour period, with around 2 to 3 trucks arriving and leaving every hour.

Construction of the proposed rail line is predicted to increase traffic on Glennies Creek Road and Forest Road by around 60 light vehicles per day, in Years 1 and 2. As with construction of Hebden Road, the majority of this traffic is predicted to occur at shift change times. In addition to these light vehicles, up to 20 heavy vehicles trips per day (ie 40 inbound and outbound movements) are predicted along Glennies Creek Road and Forest Road. The heavy vehicles would be evenly spread over a ten hour period, with an average of 2 trucks arriving and departing every hour.

Intersection performance modelling was used to analyse the performance and levels of service of the existing road network. Under peak operational traffic demands for the project, the New England Highway / Glennies Creek Road and New England Highway / Hebden Road intersections are both predicted to maintain their existing good levels of service (LoS A-B), with minimal delays and queue lengths. Glencore has identified that, during construction, LoS would temporarily reduce, but would not fall below a LoS C during the 12 month Hebden Road construction period.

Under current road conditions, closure of the Main Northern Rail Line level crossing on Hebden Road (to facilitate train bypasses) can significantly increase road traffic delays and queue lengths, resulting in temporary LoS F at the nearby New England Highway / Hebden Road intersection. To rectify this situation Glencore has proposed a range of road upgrade works, including the construction of a rail overpass, realigned approach along Hebden Road and new dual lane bridge over Bowmans Creek. With these road upgrades in place, the LoS at the New England Highway / Hebden Road intersection would be expected to function at a LoS A-B at all times, for the duration of the project. While LoS modelling has not been provided for the Glennies Creek Road / Forest Road intersection, the Department accepts the conclusions of the Traffic Assessment that this intersection would not be significantly impacted by the construction works.

Construction of the Hebden Road rail overpass may require temporary closures of the existing level crossing for periods of up to 10 minutes, resulting in a queue of up to 20 - 30 cars (180 m) during the morning peak period. Glencore has argued that these closures (if required) would have relatively low impacts, as queue lengths would not extend back to the New England Highway.

Importantly, neither Singleton Council or the RMS have objected to traffic impacts associated with the project, with both road authorities confirming that the Hebden Road upgrades can be undertaken to meet relevant roads standards. Nevertheless, Council has identified that it does not presently maintain the unsealed Forest Road and noted that the proposed level of usage could create unsafe conditions for construction traffic. Council has therefore requested that Glencore be required to maintain the road during the construction phase and ensure the road is left in a satisfactory condition.

Overall, the Department considers the predicted road impacts to be manageable, subject to the preparation of a Construction Traffic Management Plan prior to the commencement of construction. This plan would need to be prepared in consultation with RMS and Council, and include detailed road designs and specific measures to minimise impacts on the road network.

The Department also supports Council's view that Glencore should be required to provide suitable maintenance for local roads impacted by the project (and in particular Forest Road). The Department understands that these matters will be addressed under a Voluntary Planning Agreement (VPA) for the project and it will therefore provide further consideration of these arrangements in its final assessment report.

### **6.7.2 Rail**

The Traffic Assessment included consideration of potential impacts on the existing rail network associated with the proposed construction of the additional rail line and northern turn-out. Glencore anticipates that about 60 Glencore Rail trains would use this northern turn-out each year to turn around and return west. This would present a minor reduction in train traffic movements and an increase in available train paths along the Main Northern Rail Line between the Mount Owen Mine and the Port of Newcastle.

Construction of the proposed additional rail line would require changes to the existing signal configuration at the point of the proposed turn out and existing connection to the Main Northern Rail Line. Glencore has identified that these changes would not be expected to impact the capacity or

timing of existing train movements along the Line, and has stated that the signal reconfiguration would be undertaken in consultation with the ARTC. In addition, Glencore is proposing to reconfigure the existing rail loop turnout so that loaded trains can exit via the straighter length of the turnout. Glencore states that this would reduce ongoing maintenance costs and extend the life of the turnout.

The ARTC has confirmed with the Department that it is satisfied with the proposed rail loop and haulage arrangements. Specifically, the ARTC has confirmed that Glencore has a valid Access Holder Agreement that provides sufficient contracted capacity to accommodate predicted project coal transport requirements until 23 December 2024, and identified that future coal transport arrangements could be negotiated on a rolling basis for the remaining life of the project.

In addition, the ARTC notes that it has agreed in principle to the installation of a second connection of the existing Mount Owen rail loop with the Main Northern Rail Line that would allow trains to exit the Mount Owen Rail Spur in either a north or south bound direction. ARTC has stated that it would continue to consult with Glencore throughout the project to identify any additional measures required.

A number of public and private level crossings are located between the project and the Port of Newcastle. As the project would not change the existing product coal transport arrangements or train movements, impacts on these crossings would not change from those already approved under the existing Mount Owen consent. As such, the project would not result in increased traffic delays for motorists or emergency services at level crossings, or cause access and safety issues.

With regard to rail capacity, Coal & Allied has objected to the proposed ability of Glencore to convey up to 2 Mtpa of ROM coal to the Liddell CHPP for processing and export. While Glencore currently has approval to process 8 Mtpa of ROM coal (including up to 2 Mtpa from the Mount Owen Mine) at the Liddell CHPP, Coal & Allied's submission states that the existing commercial rail agreements between the two companies only permit Glencore to use Coal & Allied's Newdell Rail Loop to transport coal extracted from the Liddell Coal Mine.

Nonetheless, the Department considers that this proposal has merit, as it would improve usage of the existing Liddell CHPP and rail loadout infrastructure, reduce any potential operational impacts of maintenance downtime at the Mount Owen CHPP and not change the currently approved maximum processing or freight capacity for Liddell Coal Mine.

Glencore's RTS reiterates that the project would not increase the *maximum* coal tonnages permitted to be processed at Liddell CHPP or exported on the Newdell Rail Loop under current approvals. However, given that Liddell Coal Mine has only extracted an average of 6.3 Mt of ROM coal over the past 6 years, the proposed arrangements would increase the likelihood of Glencore using the maximum processing capacity at the Liddell CHPP and associated rail haulage levels on the Newdell Rail Loop.

The Department is of the view that Glencore's future access to and use of Coal & Allied's Newdell Rail Loop is entirely a commercial matter. It is additional to any development consent which may be granted for that use, and that consent (which is for 'development for the purposes of coal mining') is not contingent on landowner consent. Further, the Department considers that the terms of any commercial access arrangements should not be regulated by conditions of consent.

On this basis, Glencore would need to review the terms of its existing commercial arrangement with Coal & Allied and ensure that relevant access agreements are in place, before it transports any coal from the Mount Owen Mine on the Newdell Rail Loop. Irrespective of the outcome of any such agreement, the Department is confident that Glencore could still export its annual coal production via the Mount Owen rail haulage arrangements or by conveyor to the nearby power stations.

### 6.7.3 Conclusion

The Department considers that the traffic and transport impacts outlined in the EIS can be adequately minimised and managed. The Department notes that the project is not seeking to change existing rail haulage arrangements and is satisfied that the project would not materially increase impacts on the rail network. Further, the Department notes that the proposed second connection to the Main Northern Rail Line would need to be constructed at times determined by, and to the satisfaction of, the ARTC.

The Department is also satisfied that predicted road traffic impacts from the project's operation would not materially change relative to those approved for the existing Mount Owen and Ravensworth East mines. However, the Department considers that Glencore should be required to prepare a

Construction Traffic Management Plan to appropriately manage potential road traffic impacts associated with the temporary increases in road traffic during the initial two-year construction period. Finally, the Department understands that Glencore is in the process of negotiating appropriate road maintenance contributions under a VPA with Singleton Council.

## 6.8 Aboriginal Heritage

An Aboriginal Cultural Heritage Assessment (ACHA) was prepared for the project in 2013. In 2014, Glencore increased the area of the proposed North Pit extension by 21 ha and has prepared an addendum ACHA to investigate the potential impacts of this change on two additional Aboriginal heritage sites. The ACHA is supplemented by an Aboriginal Archaeological Values Assessment (AAVA), which provides an assessment of the scientific significance of identified sites. These documents have been informed by consultation with the Registered Aboriginal Parties (RAPs) and Knowledge Holders (KH) and together, provide a comprehensive assessment of potential impacts on Aboriginal cultural heritage.

### Background

The Mount Owen Complex is situated within the traditional country of the Wonnarua people and the Wanaruah Local Aboriginal Land Council (LALC). The region generally has high historical values and high cultural significance to the Wonnarua people. However, the area surrounding the Mount Owen Complex has been significantly modified by historic land clearing for agricultural, mining and forestry activities. The proposed disturbance area is not exempt from such changes, and has been subject to historical clearing for grazing and mining-related impacts including the construction of dams, creek line diversions, sediment and erosion control measures and revegetation measures.

Past mining at the Mount Owen Complex has been undertaken in accordance with an endorsed Aboriginal Cultural Heritage Management Plan (ACHMP) and has included salvage of 18 Aboriginal sites. In addition, Glencore has established the Yorks Creek Voluntary Conservation Area (VCA) for the protection of Aboriginal objects and places. In 2005, Glencore undertook improvement works in the Yorks Creek catchment as part of the Yorks Creek Enhancement Project Area.

### Assessment

A total of 42 sites have been identified within or near proposed disturbance areas (see **Figure 12**). These include 11 artefact scatters (MOCO OS-1 to MOCO OS-11), 25 isolated finds (MOCO IF-1 to MOCO IF-25), three extensions to previously recorded sites (#37-3-0649, #37-3-0611 and #37-3-0600) and three previously recorded sites (#37-3-0611, #37-3-0985 and #37-3-0527). The project would result in direct impacts to 34 sites, of which eight would be partially impacted.

A further eight sites would not be affected due to their location outside of areas of proposed disturbance. The majority of these sites have been assessed to have low significance. Three are considered to have low to moderate significance (MOCO OS-4, extension to site #37-3-0611 and MOCO IF-16). Prior to mining being undertaken, all impacted sites are proposed to be salvaged.

To the greatest extent practicable, the locations of proposed road and rail bridges over Bowmans and Bettys Creeks have been positioned so as to avoid harm to nearby Aboriginal sites or impacts to waterways. Whilst the banks of Bowmans Creek have been previously investigated, the AAVA recommends that the bridge piers to be located within 20 m of the edge of the creek banks are manually excavated to the nearest clay bed, to enable salvage of any unidentified artefacts.

The project would also result in indirect impacts on Aboriginal cultural heritage values and add to the cumulative loss of cultural heritage in the Hunter Valley. To manage these indirect impacts, Glencore has consulted with RAPs to determine appropriate mitigation and management measures, including on-site and off-site cultural heritage management and conservation measures.

During exploration activities in 2012, a potential grave site was identified on the Complex. Archaeological investigations were completed in 2014 by the NSW Police who determined that *“there does not appear to be any disturbance in the soil or any other items located to suggest this area is a grave site”*. Consequently, this matter has not been considered further.

The Department is of the view that extensive archaeological and survey work has been undertaken, including consultation with RAPs and KHs. Aboriginal heritage sites identified within disturbance areas have been classified as being of generally low significance, with some sites of low to moderate significance. Glencore proposes to disturb and salvage these sites and undertake the following mitigation and management strategies, including:



- updating and revising the existing ACHMP to reflect the project;
- establishing an Aboriginal Cultural Heritage Working Group including representatives of Traditional Owner groups, RAPs and the Wanaruah LALC, to work with Glencore on monitoring and managing cultural heritage under the ACHMP;
- developing material for inclusion in mine site induction processes to raise awareness of Aboriginal cultural values;
- salvaging (excavation, analysis and collection) of directly impacted (or harmed) Aboriginal cultural heritage sites in accordance with recommendations of the AAVA;
- constructing a long-term artefact storage facility at the Yorks Creek VCA;
- continuing to work with Aboriginal stakeholders to improve the Yorks Creek VCA, which may involve funding for a new access road, car parking area, artefact storage facility with services (toilets, tables benches) and signage;
- supporting a study of the archaeological values of 50 sites that, while identified in OEH's Aboriginal Heritage Information Management System, are located outside of proposed disturbance area but within the broader project area; and
- implementing a range of off-site conservation measures which aim to support the strong association of RAPs and KHs to the region.



**Figure 12:** Aboriginal cultural heritage sites within or adjacent to proposed disturbance areas

### Conclusion

Both OEH and the Department support the proposed mitigation measures and conservation strategies. The Department has included OEH's recommended conditions of consent together with a further condition to secure Glencore's proposed strategies as part of an updated ACHMP, should the project be granted approval. With these conditions in place, the Department believes that the project would be acceptable with regard to potential impacts on Aboriginal cultural heritage.

### 6.9 Other impacts

The Department is satisfied that the other impacts associated with the proposed project are likely to be minor. Consideration of these other impacts is provided in **Table 9**, below.

**Table 9: Summary of other issues**

Issue	Potential Impacts	Consideration & Conclusion
Visual	<ul style="list-style-type: none"> <li>The Hunter Valley is characterised by gently undulating forested slopes, farmland and agricultural land uses, as well as power generation and coal mining activities.</li> <li>The visual environment around the Mount Owen Mine is heavily influenced by industrial activities and includes views of active mining areas, rehabilitated lands and mine infrastructure (eg coal conveyers, mine surface facilities, rail lines, coal trains, road traffic and general street signage). Additionally, the Liddell and Bayswater Power Stations and associated high voltage power lines are dominant structures in the regional visual context.</li> <li>Despite the presence of mining activities in the region, many private residences and public areas are sheltered from such views by intervening ridgelines that traverse the area. These natural ridgelines can minimise or block direct views of mining activities and provide for isolated areas characterised by rural landscapes.</li> <li>The EIS's Visual Impact Assessment included an assessment of potential visual impacts at several of the more sensitive receiver locations surrounding the site, including privately-owned residences to the east in Middle Falbrook, the intersection of Middle Falbrook Road and Glennies Creek Road and the intersection of Hebden Road and the New England Highway.</li> <li>This assessment concluded that there were only two privately-owned residences and two public viewing locations that would have views of the proposed mining areas. Importantly, these locations already have views of existing mining operations at Mount Owen.</li> <li>Glencore has proposed to mitigate views of the project by undertaking progressive rehabilitation of the final landform and other areas of disturbance, managing mobile lighting to reduce potential impacts at night and ensuring all fixed lighting complies with AS4282 1995 – <i>Control of Obtrusive Effects of Outdoor Lighting</i>.</li> </ul>	<ul style="list-style-type: none"> <li>The Department is satisfied the visual impacts of the project would be relatively minor, especially when considered in relation to the existing operations.</li> <li>The Department is satisfied that the long-term visual impacts of the project could be suitably minimised through progressive rehabilitation of the final landform.</li> <li>Should private properties with views of the project claim to be significantly impacted, Glencore could undertake further assessment of these properties and, if necessary, implement further site specific and targeted visual mitigation (such as tree screening) under a management plan for the Complex.</li> <li>Given the short duration of visual impacts associated with construction of the Hebden Road bridge and rail alignment, the Department is satisfied that these impacts would be acceptable.</li> <li>The Department intends to recommend standard conditions regulating visual impacts in the development consent.</li> </ul>
Land And Soil Resources	<ul style="list-style-type: none"> <li>While the proposed disturbance area has a history of agricultural use focusing on cattle grazing on rain-fed pasture, this land is currently used as a buffer around the Mount Owen Mine and supports limited cattle grazing.</li> <li>No CIC land occurs in the vicinity of the project.</li> <li>Glencore has lodged a SVC application with the Department to verify that BSAL is not present in any area of the project not subject to a current mining lease.</li> <li>Glencore considers that the project is unlikely to significantly impact agricultural resources at the regional level. However, it has committed to re-establish pasture species in the final landform, to support future dryland grazing and mitigate the effects of the reduction in grazing land proposed under the project.</li> </ul>	<ul style="list-style-type: none"> <li>The Department believes that the predicted agricultural impacts are acceptable.</li> <li>The Department considers there to be merit in re-instatement of agricultural grazing lands in parts of the final landform and considers that establishment criteria should be developed under an updated rehabilitation plan for the Mount Owen Complex.</li> <li>Once the SVC application has been determined, the Department will finalise its assessment of the potential impacts of the project on BSAL.</li> </ul>
European Heritage	<ul style="list-style-type: none"> <li>The EIS includes a specialist assessment of potential impacts on listed heritage items and potential sites of interest within and surrounding the project area.</li> <li>This assessment identified that there were no listed heritage items within the proposed disturbance areas</li> </ul>	<ul style="list-style-type: none"> <li>The Department is satisfied that a suitable investigation into the potential impacts of the project on historic heritage has been undertaken.</li> <li>Many of the existing local and State</li> </ul>

Issue	Potential Impacts	Consideration & Conclusion
	<p>and that those heritage items identified in the broader region would not be impacted by the project.</p> <ul style="list-style-type: none"> <li>The proposed Hebden Road rail overpass upgrade would occur in close proximity to the former Ravensworth Public School (a locally listed heritage item) and the former Ravensworth village (not listed, but potential for archaeological significance).</li> <li>Glencore would undertake surface surveys and, where sub-surface disturbance is proposed, archaeological investigations prior to works occurring in these areas.</li> <li>The potential impacts of blasting activities on heritage items has been considered in Section 6.3.</li> </ul>	<p>listed heritage items have been previously investigated and recorded.</p> <ul style="list-style-type: none"> <li>The Department considers that appropriate measures have been proposed to investigate proposed disturbance areas prior to works commencing.</li> <li>Overall, the Department is satisfied that the project would not result in any material impacts to historic heritage.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>Glencore currently implements a waste management program aimed at avoidance and reduction, re-use, recycling and appropriate removal and disposal.</li> <li>This program would continue to apply to general solid, liquid, hazardous and special waste streams generated by mining operations under the project.</li> <li>Tailings emplacement is proposed to continue within former mining pits at Ravensworth East in accordance with the <i>Mount Owen Tailings Management Strategy</i>.</li> <li>Tailings from the CHPP would be pumped to the southern portion of the West Pit and RERR Pit over the life of the project (from 2014 and 2027 respectively).</li> <li>Glencore is also seeking to construct tailings cells in the North Pit mining area to allow for interim in-pit tailings disposal during dewatering of West Pit and RERR Pit.</li> <li>In addition, Glencore has predicted that tailings from the project would not reach the combined capacity of the West Pit and RERR Pit, and has proposed to utilise these storages to dispose of tailings from other Glencore-owned mines in the area.</li> </ul>	<ul style="list-style-type: none"> <li>The Department is satisfied with the ongoing implementation of Glencore's waste management program based on the hierarchy of waste principles to avoid, re-use, recycle and dispose of waste.</li> <li>On 13 November 2015, Glencore lodged an application to modify the consents for the Ravensworth, Liddell and Ravensworth East coal mines. These three modifications seek approval for the co-emplacement of tailings from all three operations and change the staging for proposed tailings emplacement areas.</li> <li>It is important to note that the potential environmental outcomes and merits of the proposed modifications will need to be considered under a separate assessment before tailings could be sent to the Mount Owen Complex.</li> <li>Nonetheless, the Department acknowledges the potential benefits of consolidating the disposal and management of tailings within approved tailings emplacement areas.</li> <li>The Department is therefore satisfied with the proposed receipt of tailings at the Ravensworth East Mine under the project.</li> </ul>
Hazards	<ul style="list-style-type: none"> <li>The project is seeking to use the existing Mount Owen explosive storage facility and increase the capacity of existing diesel storage and lubrication facilities.</li> <li>Upgrade of these diesel and lubricant storages would be undertaken in accordance with AS 1940-2004 <i>Storage and Handling of Flammable and Combustible Liquids</i>.</li> <li>Glencore would update its existing hazard management system to reflect the project and implement this system to minimise risks to the public and the environment.</li> </ul>	<ul style="list-style-type: none"> <li>The Department notes that the project would not increase the likelihood of off-site hazards and would not materially affect the existing arrangements relating to delivery and storage of explosives, or operational procedures and management measures in place at the Complex.</li> <li>The Department is satisfied the project could be operated to minimise hazard risks to the public and the environment.</li> </ul>
Public Infrastructure	<ul style="list-style-type: none"> <li>As identified in Section 6.7, the project would not increase the levels of road and rail traffic, relative to the current mining operations, but would extend these traffic volumes for an additional 12 years.</li> <li>The construction of a rail turn-around and park-up area is expected to result in a small reduction in movements (around 60 trains (3.6%) per year) on the Main Northern Rail Line between the mine and Port of Newcastle.</li> <li>The construction of the proposed Hebden Road bridge over Bowmans Creek would result in temporary traffic impacts during construction, but would assist in improving long-term traffic flows and safety on this road.</li> <li>Other impacts on public infrastructure are considered in Section 6, with specific consideration of blast overpressure and vibration impacts in Section 6.3 and impacts to the road and rail networks in Section 6.7.</li> </ul>	<ul style="list-style-type: none"> <li>The Department has sought input from Ausgrid and Transgrid in accordance with the Infrastructure SEPP. At the date of this report, no response had been received from either organisation.</li> <li>Overall the RMS was satisfied with the project, subject to the implementation of a Construction Traffic Management Plan.</li> <li>Transport for NSW and the ARTC were also satisfied with the project, provided the rail alignment design and construction was undertaken to the satisfaction of ARTC.</li> <li>Overall, the Department is satisfied that the potential impacts to public infrastructure are short lived and could be appropriately managed through recommended conditions of consent.</li> </ul>
Subsidence	<ul style="list-style-type: none"> <li>As noted in Section 1.2, longwall panels for the Integra Underground Mine underlie the proposed RERR Pit and North Pit Extension Area (see <b>Figure 4</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Overall, the Department is satisfied that likely impacts associated with subsidence from the Integra Mine would be minimal.</li> </ul>

<b>Issue</b>	<b>Potential Impacts</b>	<b>Consideration &amp; Conclusion</b>
	<ul style="list-style-type: none"> <li>While the Integra Mine is currently on care and maintenance, DRE's submission on the project noted that extraction of these longwall panels could cause subsidence impacts on Glencore's surface infrastructure and affect the stability of its open cut highwalls.</li> <li>Consequently DRE recommended that the two mining operations commence negotiations to manage any potential business or safety risks to either operator.</li> <li>The Department believes that, if the project is approved, Glencore should be required to manage its operations to ensure that its personnel are not in or around high risk areas during scheduled subsidence events, and that open cut pits are designed to maintain wall stability and withstand predicted subsidence effects.</li> <li>Furthermore, the Department notes that if the Integra Mine recommences extraction, it would be required to update its Subsidence Management Plan to reflect new surface infrastructure, landforms and operations at the Mount Owen Complex.</li> </ul>	<ul style="list-style-type: none"> <li>Given Glencore's recent acquisition of the Integra Mine, the Department is also satisfied that any potential subsidence impacts on the project could be managed straightforwardly, including through an updated Subsidence Management Plan for the Integra Mine.</li> </ul>
<i>Economics</i>	<ul style="list-style-type: none"> <li>The CBA and EIA included in the EIS concluded that the project would deliver:               <ul style="list-style-type: none"> <li>net benefits totalling \$758 million over its life and generate a benefit cost ratio of 1.3;</li> <li>\$258 million in royalties to the State of NSW (relative to the baseline case);</li> <li>a net benefit to the Singleton community valued at \$306 million;</li> <li>\$1.3 billion contribution to the Hunter Region's Gross Regional Product (GRP), or up to \$1.9 billion to the Gross State Product (GSP); and</li> <li>indirect employment of 1,200 additional full-time equivalent workers, with the majority expected to be employed in the Hunter Region.</li> </ul> </li> <li>The Department has considered Glencore's analysis, advice from DRE on the significance of the resource to NSW and submissions received during exhibition, including from The Australia Institute which raised concerns related to the economic assessment.</li> <li>The Department also commissioned the Centre for International Economics (CIE) to review the CBA and EIA. In summary, the CIE concluded that the CBA had been generally undertaken in accordance with relevant government guidelines and that the project would generate a net benefit to the State and local region.</li> <li>Nevertheless, CIE did identify several areas of the EIA that could be improved through changes or further clarification. These issues related to whether the mining in the BNP should be considered a project benefit, the calculation of air quality impacts and residual value of land, whether more recent studies were available to value impacts and the pricing of carbon pollution.</li> <li>Glencore has provided a detailed response to CIE's review, including further analysis indicating that even if the benefits of the BNP are excluded from the project case and despite double-counting the costs associated with mining in this pit, the project would still provide net benefits of \$518 million (down from \$758 million).</li> <li>Glencore also provided clarification on several other matters raised by CIE, including additional sensitivity analysis, and does not expect these matters to affect the findings of the EIA, that the project would provide a net benefit to the State and local region.</li> </ul>	<ul style="list-style-type: none"> <li>The Department considers these responses to be satisfactory, with the exception of the valuation of air quality impacts. The Department notes that air quality impacts have been costed based on analysis of representative receivers located in Singleton Heights and may not sufficiently account for more nearby receivers identified in the EIS.</li> <li>The Department has already requested that Glencore provide further information on air quality impacts (see <b>Section 6.1</b>). Therefore, the Department believes that Glencore should provide clarification of the costs associated with the predicted air quality impacts, once this additional information has been provided.</li> <li>The Department will then seek a final review by CIE following Glencore's response to the outstanding air quality issues.</li> <li>Notwithstanding this clarification, the additional costs associated with air quality impacts would not change the EIA's overall conclusion that the project would provide a net benefit to the State and local region.</li> </ul>
<i>Voluntary Planning Agreement (VPA)</i>	<ul style="list-style-type: none"> <li>The existing Ravensworth East development consent requires Glencore to provide funding contributions to Council for community facilities (proportionate to the number of employees) and a road maintenance contribution for Hebden Road.</li> <li>Similarly, the existing development consent for Mount Owen requires a range of financial contributions</li> </ul>	<ul style="list-style-type: none"> <li>Given that no VPA offer has been made to date, the Department is unable to assess this matter further at this stage.</li> <li>The Department has requested that Glencore finalise its proposed VPA in time for consideration in the Department's final assessment report, and prior to the final</li> </ul>

Issue	Potential Impacts	Consideration & Conclusion
	<p>including up to \$20,000 per year towards the Hunter Coalfield Flora and Fauna Advisory Committee, \$10,000 per year to study a regional vegetation corridor stretching from Wollemi National Park (NP) to Barrington Tops NP, \$50,000 for the Hunter Aboriginal Cultural Heritage Trust Fund and an enhancement program at Mt Pleasant Public School</p> <ul style="list-style-type: none"> <li>The Department understands that Glencore has commenced discussions with Singleton Council concerning the establishment of a VPA for the project.</li> </ul>	determination by the Commission.

## 7. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of consent for the project (see **Appendix G**). These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the development;
- prevent, minimise, and/or offset impacts on controlling provisions and matters protected under the EPBC Act;
- ensure standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

The Department notes that the majority of the conditions are typical of what would normally be recommended as best practice for the regulation of a coal mine in NSW. The Department has also incorporated the recommendations of relevant government authorities where applicable and believes these conditions provide a sound basis for managing the various potential impacts of the project.

Importantly, the recommended conditions include a range of strict amenity criteria and performance measures, to protect nearby receivers from the potential amenity impacts of the project. In addition, the Department has recommended a number of conditions that aim to provide protection from any unreasonable impacts on the natural environment and built features, including but not limited to impacts on native fauna and flora, water resources, European and Aboriginal heritage and public and mine owned infrastructure. Each of these matters would be governed by performance measures and specific management protocols to be established under relevant management plans, Mining Operations Plans and EPLs for the site.

The Department has also recommended a range of detailed performance measures for the proposed biodiversity offset and rehabilitation areas. These additional conditions reflect the need to provide greater certainty over Glencore's proposed biodiversity compensation measures and additional details managing the establishment and long-term protection of post-mining woodland rehabilitation and conservation areas.

Finally, the recommended conditions of consent allow the owner of any nearby privately-owned land to request an independent review of the amenity impacts of the project on their property, if they consider that the project is not complying with the consent's relevant criteria. If the review finds that the project is not complying with the criteria, Glencore would be required to modify its operations to ensure compliance.

## 8. CONCLUSION

The Department has assessed the development application, and the various documents submitted to support the application throughout the assessment process. The Department has also obtained independent expert advice on the economic and air quality aspects of the project, and carefully considered the advice provided by NSW Government agencies, DoE and the IESC.

The Department's assessment has concluded that the proposed project represents a logical continuation of the existing Mount Owen and Ravensworth East coal mines and would allow for the efficient recovery of significant coal resources, with fewer environmental impacts than would arise from a greenfields project of the same or similar scale. Importantly, the project would make use of the existing Mount Owen infrastructure and provide a range of significant social and economic benefits to the local region and the State.



With regards to amenity impacts, the Department notes that the project could be managed to comply with relevant blast vibration and overpressure criteria at all nearby private residences and sensitive infrastructure assets. The project would result in a minor increase in noise levels at some nearby receivers, relative to the approved operations and existing noise environment. Consequently, the Department has recommended that two private properties be afforded voluntary acquisition rights and that a further four properties be afforded rights to appropriate noise mitigation measures.

While the EIS concluded that the air quality impacts of the project would be manageable and would meet relevant assessment criteria at most nearby private residences, the Department has requested further clarification of the precise air quality impacts that are likely to arise as a result of the project. This additional information will help to inform the Department's final consideration of the significance of potential air quality impacts and determine whether any additional restrictions or conditions should be imposed on the project to enable the management of these impacts on the community.

With respect to the environment, the Department's assessment found that the proposed biodiversity offset package and rehabilitation works would adequately compensate for the biodiversity impacts likely to arise from the project and would lead to an overall improvement in the quantum and connectivity of woodland communities on the floor of the Hunter Valley in the medium to long-term.

The Department is also satisfied that the project could be managed to account for all water take both during operations and post-mining and would not result in any material impacts on water quality, downstream users or receiving environments, beyond those associated with the existing operations.

The Department acknowledges that there are several outstanding matters that require further attention as part of its final assessment report. Specifically these matters include consideration of likely air quality impacts and management measures, appropriate water licensing arrangements, the distribution of woodland and grassland in the proposed rehabilitated landscape, improved incorporation of micro-relief in the final landform and options to minimise or backfill final voids. Nonetheless, the Department does not expect this additional information to materially change its assessment of the overall merits of the project, but rather assist in determining robust and specific conditions to govern the project.

The Department has therefore drafted a preliminary suite of conditions to govern the operation of the project. These conditions would ensure that any residual impacts of the project are minimised and/or managed to meet appropriate standards and that the proposed biodiversity offsets for the project are managed to achieve the intended long-term biodiversity outcomes. The Department believes these conditions reflect current best practice for the regulation of coal mining projects in NSW.

On balance, the Department believes that the benefits of the project outweigh its costs and that the proposed mine plan strikes an appropriate balance between protecting the environment and local community and realising the significant economic benefits of the project to the region and the State. Consequently, the Department's preliminary findings are that the project is in the public interest and should be approved, subject to conditions (see **Appendix G**).

Following the Commission's review of the project, the Department will finalise its assessment into consideration the Commission's findings. It will then refer the development application for the project to the Commission for its determination. The Department will also make a recommendation to the Commonwealth Minister in its final assessment report.



Howard Reed

Director

Resource Assessments

24.11.15



Oliver Holm

Executive Director

Resource Assessments and Compliance

24/11/15

## **APPENDIX A – ENVIRONMENTAL IMPACT STATEMENT**

Refer to the Department's website:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=5850](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850)

## **APPENDIX B – SUBMISSIONS**

Refer to the Department's website:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=5850](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850)

## **APPENDIX C – RESPONSE TO SUBMISSIONS**

Refer to the Department's website:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=5850](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850)

## APPENDIX D – STATUTORY CONSIDERATIONS

The Department's assessment of the project has given detailed consideration to a number of statutory requirements. These include:

- the objects found in section 5 of the EP&A Act;
- matters relating to threatened species found in sections 5A to 5D of the Act; and
- the matters listed under section 79C of the Act, including applicable environmental planning instruments and regulations, including the effect of the recent repeal of clause 12AA of the Mining SEPP, that came into effect on 2 September 2015.

A summary of these considerations is provided below. Reference should also be made to Section 4 of this report.

### D.1 *Objects of the EP&A Act*

The EP&A Act adopts the definition of ecologically sustainable development (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.”*

In regard to the *precautionary principle*, the Department has assessed the threats of serious or irreversible environmental damage using reasonable worst case scenarios, and is satisfied that there is sufficient scientific certainty to enable the decision maker to weigh up the impacts of the project and determine the development application.

In undertaking this assessment, the Department has noted the material provided by Glencore in its EIS and RTS, has consulted closely to obtain input from key government agencies and has commissioned two technical experts to provide independent advice on the project.

While it is recognised the project would result in a number of impacts of varying significance, the key matters that could cause serious or irreversible environmental damage relate to unmitigated impacts on biodiversity values (including threatened species and EECs) and impacts on water resources.

Importantly, the project incorporates a number of design measures to avoid impacts on these matters to the greatest practicable extent, and mitigate or offset any unavoidable residual impacts. These measures include restricting the proposed disturbance area to remain outside existing conservation areas, designing pit walls to maintain a minimum buffer between open cut mining areas and nearby creeks, and sequencing extraction plans to ensure the final void is located further away from creek lines and GDEs, thereby minimising the duration and extent of drawdown effects on these natural systems. Glencore has also proposed a range of management measures and offsets to compensate for residual impacts on biodiversity matters, including the long-term conservation of over 1100 ha of established, regenerated and rehabilitated woodland.

Finally, the Department notes that the project would need to be operated in accordance with strict conditions of consent, as well as the requirements of an EPL for the site and any necessary licences and approvals related to the take, management and discharge of water. The Department has also requested that Glencore review any reasonable and feasible opportunities to minimise the number and size of remaining voids and provide further justification for the retention of any proposed voids in the final landform, prior to the application being determined.

The Department has assessed all of these matters in detail (see Section 6), and has recommended a range of risk-based performance measures to govern the development and provide appropriate protection for the environment. The Department considers that these conditions reflect best practice for open cut coal mines in NSW and would allow the project to be managed in a manner that would minimise the potential for any serious or irreversible environmental damage.



In regard to *intergenerational equity*, 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 needs for the foreseeable future.

Overall, the Department notes that the project's direct energy use and GHGEs would constitute a very small contribution towards climate change at both the national and global scale. In addition, Glencore has incorporated several measures to mitigate potential GHGEs from the project. Finally, 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.

The *conservation of biological diversity and ecological integrity* has been a fundamental consideration of the Department's assessment of the project. As outlined above, the Department recognises that the project has the potential to impact biodiversity, but is satisfied that these impacts can be mitigated and/or offset to achieve an improvement in regional biodiversity values in the medium to long-term.

Finally, the Department has considered *improved valuation, pricing and incentive mechanisms* in its assessment of the project. The EIS was accompanied by an EIA and CBA that sought to identify, quantify and weigh up the project's costs and benefits based on its full range of environmental, social and economic impacts. In carefully considering these matters, the Department also sought technical advice in the form of an independent review of the economic assessment and CBA for the project, against applicable NSW Government guidelines.

Overall, the independent review by the CIE concluded that these documents were generally adequate to inform the assessment process, but identified several matters that required further clarification. The Department has reviewed Glencore's response to these matters and is generally satisfied that these matters have been adequately addressed, with the exception of the valuation of air quality impacts. The Department has considered these matters further in **Section 6.9**, and is believes that the project would still provide a net benefit to the State and local region.

## **D.2 Threatened Species**

Sections 5A to 5D of the EP&A Act relate to threatened species assessment and management. The Department confirms that its assessment of the project has taken into account the matters listed in these sections in assessing whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats. These matters include the:

- factors in section 5A(2), known as the '7 part test of significance';
- threatened species assessment guidelines<sup>1</sup> identified in section 5A(1); and
- register of critical habitat as identified in section 5B.

In assessing these matters, the Department has had regard to the EIS's Ecological Assessment and the 7 part tests of significance included in Appendix E of that Assessment, 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.

As outlined in Section 6.4 of this report, the project would generate a range of direct and indirect impacts on several listed threatened species and communities (including habitat and foraging resources for a number of threatened species) that would be deemed to be significant in the absence of avoidance, mitigation or offsetting measures. The Department's assessment concludes that the potential impacts of the project could be sufficiently mitigated or compensated for to meet acceptable standards, following the application of the proposed avoidance, mitigation and offsetting measures.

The Ecological Assessment identified that no threatened aquatic fauna or flora were known to occur or likely to occur in the proposed disturbance area. While the nearby Bowmans Creek could provide potential habitat for the endangered population of the Darling River Hardyhead in the Hunter River catchment, surveys undertaken for the project did not record any individuals of this species or any other threatened aquatic species in the proposed disturbance area near the Hebden Road bridge.

<sup>1</sup> Assessment guidelines means assessment guidelines issued and in force under section 94A of the TSC Act or, subject to section 5C, section 220ZZA of the *Fisheries Management Act 1994*, including the *Threatened Species Assessment Guidelines – The Assessment of Significance*, prepared by the then Department of Environment and Climate Change, dated August 2007.

Consequently, the Department is satisfied that the project is unlikely to cause any significant adverse impacts on threatened species and communities listed under the *Fisheries Management Act 1994*.

In undertaking its assessment, the Department has also paid particular attention to several threatened species and communities listed under the EPBC Act. Consideration relating to Matters of National Environmental Significance is provided in Section 6.4 and concurs with the Department's overall finding that the project is unlikely to result in any long-term significant effects on threatened species, populations or ecological communities, or their habitats.

### **D.3 Environmental Planning Instruments**

Under section 79C of the EP&A Act the consent authority is required to consider amongst other things the provisions of relevant environmental planning instruments (EPIs), including any exhibited draft EPIs and development control plans.

The Department notes the consideration of these instruments provided in the EIS, and has undertaken its own consideration of the project against the applicable provisions of relevant EPIs. The key instruments relating to the project include:

- *Singleton Local Environmental Plan 2013*;
- *Hunter Regional Environmental Plan 1989 (Heritage)*;
- *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 (Infrastructure SEPP)*; and
- *SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)*.

#### **Singleton Local Environmental Plan 2013**

The project site is located in the Singleton local government area. All of the proposed mining areas are located on land zoned RU1 (Primary Production) under the *Singleton Local Environmental Plan 2013* (Singleton LEP) and open cut mining is permissible with consent in this zone.

The land required to establish the second rail spur connection to the Main Northern Rail Line and the rail overpass, bridge and associated upgrades to Hebden Road is zoned a combination of RU1 (Primary Production) and SP2 (Infrastructure). The Department notes that the land zoned SP2 relates to the New England Highway classified road corridor and the Main Northern Rail Line railway corridor. The proposed road and rail upgrades are permissible with development consent within these zones.

Additionally, some of the proposed biodiversity offset areas situated outside the project disturbance area, but within the project boundary, are located on land zoned E2 (Environmental Conservation). The proposed environmental protection works are permissible with consent in this zone.

Consequently, all components of the project are permissible with development consent and the Commission may determine the application.

#### **Hunter Regional Environmental Plan (REP) 1989 (Heritage)**

The project is not predicted to materially impact any historic heritage items in the surrounding area (see Section 6.9) and is located a significant distance away from any heritage items listed under the *Hunter REP 1989 (Heritage)*. Consequently, the Department is satisfied that the project can be carried out in a manner generally consistent with the aims, objectives, and the provisions of the Hunter REP.

#### **SEPP No. 33 – Hazardous and Offensive Development**

The Department acknowledges that mining operations at the Mount Owen Complex entail storage and use of hazardous substances, including Class 1 explosive materials. However, having consideration to the dangerous goods licences and management measures in place at the mine, the Department is satisfied the project does not meet the definition of a potentially hazardous industry under SEPP 33.

While the project could be characterised as a potentially offensive industry without the employment of appropriate mitigation measures, suitable mitigation measures have been 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 the land surrounding the project.

With the proposed measures in place, the project is not considered to be potentially hazardous or offensive and a Preliminary Hazard Analysis is not required. Importantly, the Department is satisfied

that the project would not increase risks to public safety relative to the existing operations and would not alter the consequences or likelihood of a hazardous event on the site. Consequently, the project is considered to be consistent with the aims, objectives and requirements of SEPP 33.

#### ***SEPP No. 44 – Koala Habitat Protection***

The Ecological Assessment concluded that the project would not impact any areas of core or potential Koala habitat, as defined under SEPP 44. This is primarily due to flora surveys which identified that preferred feed tree species listed in Schedule 2 of SEPP 44 comprise less than 15% of tree species in the upper and lower strata of the forest and woodland vegetation that occurs in the disturbance area.

However, the Ecological Assessment did acknowledge the potential for Koalas to be present within the disturbance area, primarily due to the presence of some feed trees and historical recordings of individual Koalas within the broader Mount Owen Complex and surrounds.

SEPP 44 aims to conserve and manage Koala habitat to reverse the current trend of Koala population decline. In this respect, the Department undertook detailed consideration of impacts of the project on Koala populations, including the recovery of populations in the longer term (see Section 6.4).

This assessment concluded that the project was unlikely to result in any significant impacts on Koala populations and would eventually lead to improved long-term habitat outcomes, in part given the presence of a small proportion of preferred feed trees in the proposed offset sites and especially following the establishment of woodland vegetation corridors under the proposed rehabilitation plan. The Department has also recommended that these rehabilitation areas incorporate pockets of preferred feed trees to support the movement of Koalas through the woodland rehabilitation corridors.

Overall, the Department is satisfied that the project is generally consistent with the aims, objectives and requirements of SEPP 44.

#### ***SEPP No. 55 – Remediation of Land***

A large proportion of the proposed disturbance area is rural land, which is unlikely to be contaminated. The rest of the project is located on land that is encompassed within the existing Mount Owen Complex.

As with all mining projects, some minor areas of the existing Mount Owen and Ravensworth East mines would require management for the presence of hydrocarbons prior to mine closure (ie areas surrounding fuel storages). Nevertheless, the Department is satisfied that these matters would not constitute a significant or persistent contamination of the site and could be easily managed and/or remediated under the existing or updated conditions of consent and/or the EPL for the site. Accordingly, the Department is satisfied that the proposed project could continue to be appropriately managed and remediated (if necessary) to ensure it is suitable for its existing or future use.

Overall, the Department is satisfied that there is limited risk of any material contamination of the land subject to the application and that the project is generally consistent with the aims, objectives, and provisions of SEPP 55.

#### ***SEPP (State and Regional Development) 2011***

The proposed development is declared to be State significant development under section 89C of the EP&A Act as it is 'development for the purposes of coal mining', which is specified in clause 5 of Schedule 1 of the *SEPP (State and Regional Development) 2011*.

Consequently, the Minister for Planning is the consent authority for the development. However, the development application falls within the Minister's delegation to the Planning Assessment Commission dated 14 September 2011, because there were more than 25 public submissions in the nature of objections. Consequently, the Commission must determine the application.

#### ***SEPP (Infrastructure) 2007***

The Infrastructure SEPP requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. To this end, the Department notified Singleton Shire Council, the RMS, Transport NSW, the ARTC, Crown Lands, Ausgrid and Transgrid about the proposed project. The Department also received advice confirming the NSW Forestry Corporation's satisfaction with the project and the final landform to be established on its land.

While none of these public authorities objected to the project, several made comments on the potential interactions of the proposed development with their nearby infrastructure assets and recommended conditions of consent for the management of these interactions should the project be approved.

The Department has given extensive consideration to the matters raised by public authorities in its assessment of the project (see Section 6). Where appropriate, the Department has incorporated the recommendations made by these public authorities into the recommended conditions of consent at **Appendix G**. The Department is satisfied that the recommended conditions provide appropriate protection for public infrastructure and will continue to seek Ausgrid and Transgrid's endorsement of these conditions, prior to finalising its assessment of the project. Consequently, the Department is satisfied that the requirements of the Infrastructure SEPP have been satisfied.

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

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 development consent). Consequently, the proposed development is permissible with consent under the Mining SEPP, and the Commission may determine the application.

In addition, Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent to undertake development for the purposes of mining. The Department has considered these matters in its assessment of the proposed project and has included a brief summary of these considerations below.

#### ***Significance of the resource (clause 12AA)***

Prior to the repeal of clause 12AA of the Mining SEPP, the Department sought DRE's advice regarding the significance of the 92 Mt coal resource to be extracted under the project. DRE's advice confirmed the proposed project would recover a high quality coal resource that is considered significant at both the regional and State level, provide for the efficient use of existing infrastructure, ongoing local employment (despite the current Statewide trend of job losses in the mining industry) and optimise the recovery of a known coal resource from an area of the Hunter Coalfield with a long history of mining activities.

On 2 September 2015, the NSW Government amended the Mining SEPP to repeal clause 12AA. This removes the explicit provisions of the Mining SEPP that require the consent authority to consider the relative significance of the resource as its 'principal consideration'. Despite this repeal, the Department must (as per previous practice) consider and assess the environmental, social and economic impacts of the proposed development, as required by section 79C of the EP&A Act. The Department considers that the coal resource in question is a significant resource for the reasons identified above, and that this remains material to the assessment of the economic significance of the project.

Consequently, the Department is satisfied that the repeal of clause 12AA does not change the conclusions of the Department's assessment of the project or its recommended conditions.

#### ***Non-discretionary development standards for mining (clause 12AB)***

The Department's assessment has considered the non-discretionary development standards set out under clause 12AB of the Mining SEPP. These standards relate to a range of considerations pertaining to potential noise, air quality, blasting and water resource impacts.

With the exception of air quality, these standards have been fully considered in relevant sections of Section 6. The Department will provide further consideration of relevant air quality standards in its final assessment report (see Section 6.1).

#### ***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 the adjacent Ravensworth State Forest and NSW Forestry Corporation land. In addition, it has considered the potential impacts on downstream water users and potential noise, air quality, transport and visual impacts at nearby private residences, especially in Middle Falbrook. This assessment has been undertaken in consideration of the public benefits of the project, surrounding land uses and measures to avoid, mitigate or minimise any land use incompatibility.

The Department's assessment concludes that the project is unlikely to result in any material impacts on regional water quality or downstream users, and that the mine should be able to be operated to meet acceptable amenity levels for noise and blasting at nearby residences, in line with current NSW

Government policies. The Department will undertake further consideration of the potential air quality impacts of the project in its final assessment report (see Section 6.1). Finally, the Department acknowledges that the NSW Forestry Corporation is satisfied with the proposed final landform and supports the proposed removal of a final void from within the Ravensworth State Forest.

Overall, the Department is satisfied that with the implementation of the recommended conditions, including performance measures and adaptive management, 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 (VLAMP) (clause 12A)*

The Department's assessment has considered the NSW Government's *Voluntary Land Acquisition and Mitigation Policy* (December 2014). With respect to noise impacts, this assessment concluded that two private properties should be afforded voluntary acquisition rights and that a further four properties should be afforded rights to appropriate noise mitigation measures. As previously noted, the Department has requested that Glencore provide a range of further information relating to the air quality impacts of the project (see Section 6.1).

Subject to the provision of this information, the Department will make a final recommendation on the application of the VLAMP, prior to the Commission's determination of the application.

*Compatibility with mining, petroleum and extractive industries (clause 13)*

The Department is satisfied that the project has been designed in a manner that is compatible with, and would not adversely affect, adjacent current or future mining-related activities.

Importantly, DRE has advised that, given the thickness of the interburden between the Mount Owen Mine and the underlying Integra Underground Mine, the project is not expected to result in any significant impacts on the structural integrity of the underlying longwall panels or chain pillars (even in the event that both mines are operated simultaneously). Nevertheless, DRE has recommended that Glencore be required to prepare and implement blast and subsidence management protocols under relevant management plans for the project.

The Department reflected these requirements in its recommended conditions of consent and has also required Glencore to negotiate with the owner of the Integra Underground Mine and develop an agreed personnel evacuation protocol to minimise any potential safety risks in the underground mine during blast events. This protocol would need to be in place before Glencore could undertake blasting within 500 m of the underground workings and should be reflected in an updated Blast Management Plan for the Complex.

*Natural resource management and environmental management (clause 14)*

The Department has recommended a number of conditions aimed at ensuring that the project is undertaken in an environmentally responsible manner, including but not limited to, conditions in relation to soils, water resources, threatened species and biodiversity and GHGs.

*Resource recovery (clause 15)*

The Department has considered resource recovery in its assessment of the project, and is satisfied that the project can be carried out in an efficient manner that optimises resource recovery within environmental constraints. The Department has recommended conditions requiring Glencore 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)*

The Department notes that the off-site transport of coal would primarily involve the haulage of product coal on trains along the Main Northern Rail Line to the Port of Newcastle for export, as well as ROM coal on an overland conveyor to the Liddell Coal Mine for processing and onward transport to nearby power stations. The Department has consulted with the applicable roads authorities and the ARTC in relation to the project and taken these submissions into consideration in its assessment of the project.

*Rehabilitation (clause 17)*

Overall, the Department is satisfied that the proposed final landforms and rehabilitation plans could be undertaken in a manner that would meet contemporary best practice in the NSW mining industry. To strengthen these outcomes, the Department has requested a range of additional information relating to the incorporation of micro-relief in the final landform and the minimisation or removal of final voids.



The Department also believes that the proposed woodland rehabilitation areas would provide important ecological benefits in the medium to long-term, and play an important role in assisting the recovery of several threatened species and populations in the locality.

To this end, the Department has recommended a number of conditions to ensure appropriate rehabilitation of land affected by the project. These include requirements for Glencore to prepare and implement a Rehabilitation Management Plan, incorporate appropriate flora species and complexity in its rehabilitation areas, effectively manage waste and meet a number of rehabilitation objectives, including the need to maintain public safety and ensure that the mine site remains safe, stable and non-polluting.

### Conclusion

The Department is satisfied that:

- the coal resource is significant, both for the Hunter Valley and NSW;
- the project could be managed to comply with the assessed non-discretionary standards in the Mining SEPP;
- the project could be managed to ensure compatibility with other land uses in the area;
- with the implementation of appropriate mitigation, management and compensatory measures, the project would have acceptable impacts on major natural resources in the region, including surface and groundwater resources and the biodiversity values of the site;
- the residual biodiversity impacts of the project would be appropriately offset, leading to an ultimate long-term improvement in biodiversity outcomes;
- the GHGEs of the project could be appropriately minimised;
- the resource recovery of the project is appropriate, as it would maximise recovery of coal and minimise the sterilisation of known coal resources (including those underlying previously disturbed areas), while minimising a range of potential environmental impacts;
- none of the coal produced by the project would be trucked on public roads; and
- the site would be suitably rehabilitated over time to blend in with the surrounding landscape and enhance the biodiversity values of the region.

## **APPENDIX E – AIR QUALITY PEER REVIEW**

Air Quality Peer Review – Todoroski Air Sciences

- Peer Review Report dated 20 November 2015

Refer to the Department's website:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=5850](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850)

## **APPENDIX F – ECONOMICS PEER REVIEW**

Economics Peer Review – The Centre for International Economics

- Peer Review Report dated September 2015

Refer to the Department's website:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=5850](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5850)

## **APPENDIX G – RECOMMENDED CONDITIONS OF CONSENT**