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David Kitto
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NSW Department of Planning
GPO Box 39
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Dear David

Re: Ravensworth Operations Project (PA 09_0176) – Proposed Refinements to Project and Conservation Offset Areas

Ravensworth Operations Pty Limited (Ravensworth Operations) has proposed two significant offset areas as part of the Ravensworth Operations Project (the Project) to mitigate and offset the unavoidable impacts associated with the Project. Ravensworth Operations have undertaken a review of the proposed Ravensworth North Offset Area (RNOA) and Hillcrest Offset Area as part of the detailed design phase of the Project.

This review of the proposed conservation offset areas has resulted in an overall increase the area of the RNOA relative to the proposed RNOA outlined in the Environmental Assessment (EA) for the Project (February 2010) and the Response to the Submissions report (May 2010). A key driver for the proposed increase in area of the RNOA has been a detailed review of the proposed disturbance area associated with the Project, particularly how this relates to the RNOA.

In addition, Ravensworth Operations propose to manage the Hillcrest Offset Area for the conservation and management of Aboriginal heritage and archaeological resources. Ravensworth Operations have commenced consultation with the registered Aboriginal stakeholder groups in relation to the use of the Hillcrest Offset Area for this purpose and to form the basis of further detailed investigations of this area in accordance with the revised Statement of Commitment 6.10.1, outlined in the Response to Submissions dated May 2010.

The purpose of this correspondence is to provide an overview of the outcomes of the detailed review of the proposed conservation offset areas and detail the key aspects of the project design forming the basis of the proposed increases in the conservation offset areas. Furthermore, this correspondence details a number of other project design clarifications that have come to light during the progression of the detailed design phase of the Project since the lodgement of the EA. Ravensworth Operations requests that the Department of Planning (DoP) consider the proposed changes to the Project and conservation offset areas, as detailed in this correspondence, as part of the assessment and determination of the Project.

1. Ravensworth North Offset Area

During the detailed design phase for the Project since the lodgement of the EA, further refinement of the RNOA has been achieved as described in Section 2.1.4 of the Response to Submissions report (May 2010). This refinement relates to the identification of the opportunity for minor expansion of the RNOA area to incorporate significant Aboriginal archaeological sites as well as a reduction in the extent in fragmentation of the RNOA by ancillary infrastructure. These refinements previously increased the RNOA by 11 ha, to a total of 273 ha (refer to Section 2.1.4 of the Response to Submissions report). Further to this revision of the RNOA, Ravensworth Operations have undertaken further review of the RNOA as part of detailed planning for ongoing management of this area. This review has focussed on minimising the fragmentation of the RNOA through the rationalisation of areas

for proposed infrastructure. As a result of this further review, the area of the RNOA has increased by a further 11 ha to a total area of 284 ha (refer to **Figure 1.1**). The increase in the RNOA has resulted in a decrease in area of native vegetation that will be impacted as a result of the Project, refer to **Table 1.1** below.

Table 1.1 (adapted from Table 5.18 of the EA) has been updated to identify the additional areas of native vegetation present within the revised RNOA boundary.

Table 1.1 – Summary of the area of each Vegetation Community that Provides a Direct Ecological Offset for Vegetation Communities Proposed to be Removed as a Result of the Project

Vegetation Community to be Offset	Area in Proposed Disturbance Area (ha)1		Area of Relevant Vegetation Community Offset (ha)				
			Ravensworth North Offset Area		Hillcrest Offset Area[2]	Total	
	Previous (EA)	Current	Previous (EA)	Current	Previous (EA)	Previous (EA)	Current
Central Hunter Box – Ironbark Woodland EEC	473	463	120	124	523*	643	647
Central Hunter Bulloak Forest Regeneration	35	35	34	35	0	34	35
Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC	4	4	0	0	4	4	4
Central Hunter Swamp Oak Forest	38	34	21	24	0	21**	24**
Hunter Valley River Oak Forest	4	4	0	0	0	0	0
River-flat Eucalypt Forest EEC	5	3	19	20	1.6	20.6**	21.6**
Hunter Floodplain Red Gum Woodland EEC	0.2	0.2	0	0	0	0	0
Totals	559.2	543.2	194	203	528.6	722.6	731.6

Notes: EEC = endangered ecological community

* 523 hectares includes 383 hectares of Barrington Footslopes Dry Spotted Gum Forest; and 140 hectares of Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC (PD) which are structurally and floristically similar vegetation communities.

**A total of 47 hectares of riparian vegetation is proposed to be offset by 40 hectares of riparian vegetation within offset areas. An additional 48 hectares of Central Hunter Swamp Oak Forest will remain undisturbed in the Project area along with 23 hectares of Hunter Valley River Oak Forest

1 – Updated area of disturbance associated with detailed review of project design (refer to Section 3).

2 – Hillcrest offset area has not changed since the submission of the EA

In addition, there is a range of existing infrastructure located within the RNOA which will be decommissioned as part of the Project, including the existing 330kV and 66kV transmission lines (refer to **Figure 1.3** of the EA). As part of the decommissioning works there will be a requirement for some temporary disturbance within these areas that will be kept to a minimum. In addition, as part of the construction of project related infrastructure within the RNOA such as water management infrastructure including Emu Creek diversion drainage, will require disturbance with this area. As part of this process, Ravensworth Operations have committed to the incorporation of these temporary disturbance areas (refer to **Figure 1.2**) into the RNOA as part of the Biodiversity Offset Strategy for the Project. Table 5.20 of the EA (p 5.69) has been reproduced and updated as **Table 1.2** below to outline the additional areas to the RNOA.

Table 1.2 – (based on Table 5.20 of EA) – Available Areas for Regeneration and Revegetation Activities in Biodiversity Offset Areas

Vegetation Community	Approximate Area Available for Regeneration / Revegetation			Total (ha)
	Ravensworth North Offset Area (ha)		Hillcrest Offset Area (ha)[1]	
	Previous (EA)	Current		
Central Hunter Box-Ironbark Woodland EEC	70	80	-	80
Barrington Footslopes Dry Spotted Gum Forest			250	250
Central Hunter Ironbark – Spotted Gum – Grey Box Forest EEC			340	340
Dry Gully Rainforest			70	70
River-flat Eucalypt Forest EEC			20	20
Total	**70**	**80**	**680**	**760**

Notes

1- Hillcrest area has not changed since the submission of the EA

2. Hillcrest Offset Area

The *Aboriginal Heritage and Archaeological Assessment* report (Umwelt 2010) for the Ravensworth Operations Project identified that an area centred on Davis Creek – the Ravensworth North Offset Area (RNOA) – would be conserved in recognition of both its Aboriginal cultural heritage and ecological values. This report also identified that the RNOA alone did not conform to the ideals of an Aboriginal cultural heritage offset, as it did not offset the loss of sites of low significance within the stream and slope landforms and did not conserve the broader landform context surrounding the REA86 grinding groove, scarred tree and artefact scatter complex. As detailed in the Response to Submissions Report, the RNOA was increased to ensure the REA86 site complex (grinding grooves, scarred tree and artefact scatter) would be protected from direct impacts resulting from the Project.

To identify additional land that would be suitable for conservation as part of the project's Aboriginal cultural heritage offset, Ravensworth Operations is currently working through an assessment process with Umwelt archaeologists and Aboriginal stakeholders to evaluate the suitability of the Hillcrest Offset Area as a combined biodiversity and Aboriginal cultural heritage conservation area. As discussed in the Ravensworth Operations Project, Response to Submissions Report (RtS 2010), Ravensworth Operations has already committed to the conservation of the Hillcrest Offset Area for biodiversity conservation outcomes due to its established ecological values.

The assessment of the Hillcrest Offset Area as a combined biodiversity and Aboriginal cultural heritage conservation area requires consideration of both the cultural significance of the area to Aboriginal stakeholders, and also the potential for archaeological features and deposits to occur within the area. Since the submission of RtS 2010, Ravensworth Operations has commenced consultation with Aboriginal stakeholders with a registered interest in the Project regarding the cultural values of Hillcrest, which has to date consisted of individual meetings with most registered Aboriginal stakeholders to discuss the property, and two site inspections in October 2010 to view the area and then several preliminary days of inspection of key areas considered likely to be of cultural value or retain archaeological features. Coupled with this consultation process, preliminary landform analysis and review of available archaeological literature has been undertaken to identify the likely range of archaeological features that may occur within the Hillcrest Offset Area, and their likely distribution, content and integrity. Preliminary geomorphic advice has also been sought to identify the likely occurrence of buried archaeological deposits within the Hillcrest Offset Area.

Preliminary results of the above process suggests that the Hillcrest Offset Area may be a suitable Aboriginal cultural heritage offset area, and combined with the RNOA may provide a suitable cultural

heritage offset for the Ravensworth Project. Aboriginal stakeholder consultation to date has identified that Hillcrest could be of high cultural value due to its past Aboriginal use, environmental integrity and wide range of landforms, flora and fauna. Few archaeological features have to date been recorded during the preliminary site inspections, but the potential for Hillcrest to contain a range of archaeological sites has been identified, such as artefact scatters, isolated finds, scarred trees, rockshelter sites and grinding groove sites. Preliminary geomorphic advice also suggests that buried archaeological deposits may occur along some of the creek lines within the Hillcrest Offset Area, and that some of these deposits may have archaeological integrity.

Further assessment of the Hillcrest Offset Area will include continued consultation with Aboriginal stakeholders and liaison with DECCW, and if the property is considered to be an appropriate offset, detailed investigations to identify and record the range of cultural and archaeological features within the area. The results of this ongoing process would be incorporated into the development of the Aboriginal Cultural Heritage Management Plan (ACHMP) for the Project.

As previously discussed, the Hillcrest Offset Area is currently included as part of the biodiversity offset strategy for the Project and should it be deemed an appropriate Aboriginal cultural heritage offset, there is the potential for interactions between works associated with these two offsetting objectives. As outlined **Section 6.2.2.2** of the Ecology Assessment, the Hillcrest Offset Area has been divided into two management areas (north and south), to reflect the different management approaches based on past land use. Much of the Hillcrest Offset Area is expected to naturally regenerate following the reduction and eventual removal of grazing, and it is proposed to remove and/or appropriately manage cattle grazing in areas of high quality derived grassland and the larger woodland remnants. Additionally, southern portions of the Hillcrest Offset Area are subject to severe erosion and degradation in creeks, on slopes and in gullies. Areas proposed for remediation will be fenced to prevent access for cattle and a range of techniques will be employed to remediate the degraded land. As there is potential for these works to impact known archaeological sites, the ACHMP for the project will outline required management strategies for the area.

3. Refinements to Project Design

Since the submission of the EA and Response to Submissions Report (May 2010), the conceptual design of the Project has advanced, in particular in relation to infrastructure design. This has resulted in reduced fragmentation of the RNOA and identified opportunities to increase the area that would be managed for conservation. As noted above, the RNOA has increased from 262 hectares to 284 hectares. The current conceptual design includes all elements as detailed in the Environmental Assessment and some aspects of further consideration of infrastructure design have resulted in minor alterations to disturbance areas to provide sufficient area for required construction activities and operational footprint required for all services and ancillary infrastructure.

3.1 Disturbance Footprint

As discussed, the detailed design phase of the Project has been progressing since the submission of the EA and Response to Submissions Report (May 2010). As a result of detailed design activities, the disturbance footprint provided in **Figure 3.1** (reproduced from **Figure 5.21** of the EA) of the EA has been revised. The revised disturbance footprint is presented on **Figure 3.2**. The revised disturbance footprint includes the expansion of the RNOA as detailed above and a reduction in proposed areas for disturbance in the northern portion of the out of pit overburden emplacement area and in the south western portion of the Project Area, refer to **Figure 3.2**. The revised disturbance area also includes additional disturbance associated with additional access tracks required for the construction of the 330kV transmission line, further details regarding these are provided in **Sections 3.2.4**, **3.2.7** and **3.2.8** respectively.

The total area of the disturbance footprint identified in the EA was 2501 ha with the total area of the revised disturbance footprint being 2508 ha. Although it is noted that the revised disturbance area has increased by approximately 7 ha, as discussed in **Section 1**, total impacts to native vegetation communities within the Project Area have reduced from 559.2 ha to 544.2 ha, a reduction of 15 ha, primarily associated with the increase of the RNOA. Further details on specific impacts associated with the revised disturbance footprint are primarily associated with ecology and Aboriginal cultural heritage, which are further discussed in **Section 4**.

3.2 Infrastructure Modifications

3.2.1 Alternative MIA location

Further detailed design has resulted in the identification of a preferred location for the proposed temporary Mining Infrastructure Area (MIA). As detailed in **Section 2.6.4** of the EA, during the initial stages of the Project, it was proposed that temporary facilities be constructed to enable ongoing Narama operations and to manage any disruption from the Project's construction activities associated with the proposed upgrade of the existing MIA.

During the detailed design phase of the Project, an alternate location for the temporary MIA was identified. Ravensworth Operations now propose to construct the temporary MIA south of the existing workshop and office facilities (refer to **Figure 3.3** and **3.4**). The revised location for the temporary MIA provides increased operational efficiencies and synergies due to its proximity to the existing workshop and office facilities. The revised location for the temporary MIA is within the proposed Ravensworth North Pit, an area of previously identified impact assessed as part of the EA. Relocation of the temporary MIA facility will not result in additional disturbance outside of disturbance areas assessed as part of the Environmental Assessment. All management commitments outlined in the Environmental Assessment for the temporary MIA would be undertaken by Ravensworth Operations.

3.2.2 Cumnock Borefield

Section 5.6.1.6 of the EA outlines that the former Cumnock underground mine workings currently provide, and will continue to provide important water storage capacity for Xstrata mining operations within the Greater Ravensworth area, including Ravensworth Operations. Further, as detailed in the EA, a series of bore pumps were proposed to be installed above the southern end of the former Cumnock underground workings to extract water from the workings, replacing the existing single bore pump. Each pump within the borefield will extract water at a rate that will minimise the entrainment of settled solids from within the former underground workings.

Throughout the detailed design phase of the Project, Ravensworth Operations have identified a preferred location for the Cumnock Borefield in the northern portion of the Cumnock underground workings adjacent to the RNOA (refer to **Figure 3.2**). This revised location for the borefield was based on operational issues associated with the current borefield location. These operational issues relate to structural issues within the underground workings causing issues with the rate at which water is able to be pumped and pump life.

3.2.3 Equipment Lay down Areas

Hardstand areas for construction equipment lay down and storage were initially planned to be located within the upgraded MIA east of the Ravensworth West Pit and the temporary MIA, now located south of the existing workshop and within the Ravensworth Coal Terminal (RCT) area.. Ravensworth Operations now propose to locate an additional dedicated construction equipment lay down area on the old airstrip adjacent to the existing Lemington Road and to the north-east of the proposed workshop and offices facilities refer to **Figure 3.2**. During detailed design, it was determined that the areas planned for equipment lay down and storage would be unlikely to provide sufficient space for a major lay down area. Additionally, the location of the lay down and storage area to the old airstrip provides improved access and a centralised location for the equipment lay down area without the need for substantial civil works.

3.2.4 Access Roads

The detailed design process has identified the need for access roads to facilitate the construction of the 330kV transmission line. These proposed access roads are located on existing roads and tracks however they are located outside of the Project Area identified in the EA (refer to **Figure 3.2**). Post the submission of the EA, further geotechnical work has been completed identifying locations for the proposed transmission towers within the proposed 330kV easement. Additional roads, identified on **Figure 3.2** are required to allow for suitable access to during the construction of the 330kV transmission line.

These roads will require minor disturbance works as a result of grading activities to provide access for equipment to construct the 330 kV transmission line. Properties where these roads are located have been included in an updated schedule of lands provided as **Appendix 1** to this letter.

3.2.5 Realignment of 66kV transmission line

During the preparation of the EA, the existing 66 kV transmission line in the northern extent of the Project Area was identified as requiring relocation. The transmission line is an Energy Australia managed line that extends from an existing substation in the northern extent of the Project Area and travels south across the existing RUM pit top area. The line provides power to other surrounding mining operations including Coal & Allied's Hunter Valley Operations to the west. The proposed relocation of this transmission line is to minimise potential interactions with ongoing operational activities at RUM, the proposed bridge over the New England Highway and the proposed northern overburden emplacement area. The revised alignment has been determined in consultation with Energy Australia to achieve the best long term outcome for both parties.

At the time of submission of the EA, Ravensworth Operations proposed to construct a 66kV "loop" around the outer edge of the Ravensworth North Pit, (refer to **Figure 1.3** of the EA). Further work with regards to electrical reticulation as part of detailed design has determined that this "loop" will no longer be required and therefore Ravensworth Operations will not be constructing the 66kV "loop".

Ravensworth Operations, with Energy Australia, have made a slight amendment to the proposed realignment of the Energy Australia 66 kV transmission line to the west of the RNOA (refer to **Figure 3.3**).

3.2.6 Use of alternative MIA for construction offices

As outlined in **Section 2.6.2** of the EA, should detailed mine planning indicate the viability of accessing these resources, Ravensworth Operations would construct a new mine infrastructure area to the north of Davis Creek (refer to **Figure 3.3)**. The proposed mine infrastructure area has been positioned to enable ready access to existing coal handling infrastructure and to minimise impacts upon archaeological sites and ecological values identified at Davis Creek.

All construction and operational details associated with this MIA remain as per the EA. Ravensworth Operations now plan to use this as primary construction offices for the duration of the construction period, whilst maintaining the flexibility to also utilise the existing workshop and office facilities during the construction phase.

3.2.7 330kV Transmission Line RUM Dam Conservation Area

As a result of further infrastructure design, it has become clear that it is not possible to avoid impact to the planned Ravensworth Underground Mine (RUM) Dam Conservation Area. Proposed impacts relate to the need for a 330 kV transmission tower to be located in the north-eastern portion of this area, and other minor impacts associated with ancillary works associated with the transmission line and proposed conveyor/associated access road from the proposed Ravensworth raw coal stockpile to RCHPP/RCT. The RUM Dam Conservation Area was planned to meet the commitments associated with a modification to DA104-96 and Condition 5 of Aboriginal Heritage Impact Permit 2384 in relation to the need to 'establish an Aboriginal Heritage Conservation Area (AHCA) to mitigate the loss of Aboriginal cultural heritage that would result from the destruction of Aboriginal objects' listed under that consent. Condition 5 lists specific requirements for the establishment of the area, but does not tie the requirement to a particular parcel of land, apart from the land being upon 'land owned, managed or leased by Resource Pacific and may be within or outside the Newpac No.1 Colliery Mine lease.' RUM has recently submitted a draft Aboriginal Cultural Heritage Management Plan to DECCW. DECCW has encouraged RUM to confirm measures to ensure that the area can be appropriately protected from construction/development impacts, the mechanism for in-perpetuity conservation, and to provide evidence of support for the proposal from the local Aboriginal stakeholders.

The proposed RUM Dam conservation area is relatively inaccessible due to its location in relation to the Highway and mining related infrastructure and is located within the a broader disturbed context (Greater Ravensworth). Therefore, RUM will be undertaking additional consultation with registered stakeholders to discuss the potential for an alternative location for the offset area to be established, consistent with the requirements outlined in condition 5 of the Section 90 permit, as discussed above.

This consultation, as required by DECCW, will be undertaken in an integrated manner with Ravensworth Operations and will outline the potential for the proposed offset area to be relocated. It is proposed that a higher value, integrated outcome may be achieved by consideration of this commitment in the context of the Hillcrest Offset Area, as part of current Ravensworth Operations consultation for the ACHMP for the entire Complex.

3.2.8 Revision of Project Area

Ongoing liaison between Xstrata and Coal and Allied has identified that a small portion of the Project Area in the vicinity of the Hunter River pump, has been inadvertently identified as being on the south-eastern side of the Hunter River on land owned by Coal and Allied. Ravensworth Operations has amended the Project Area in this location to exclude the property owned by Coal and Allied, in addition the property has been removed from the schedule of lands provided in **Appendix 1**.

3.3 Transportation of Ravensworth Operations Complex Coal to the Ravensworth Coal Handling and Preparation Plant (RCHPP)

Ravensworth Operations operates the Narama and Ravensworth West mines with mining activities at Narama approved in 1991 (DA 135/90) and Ravensworth West approved in 1998 (DA 165/97).

Ravensworth Operations operates the existing approved Narama and Ravensworth West mines as a mining complex (Ravensworth Operations Complex) and have ongoing supply contracts with Macquarie Generation for domestic power generation (refer to **Figure 3.5**). The Ravensworth Operations Complex includes the shared use of the following infrastructure (refer to **Figure 3.5**):

- ROM coal stockpile and coal crushing plant;
- overland coal conveyors;
- workshop and administration infrastructure; and
- various water management structures and ancillary works.

Operating mining as a single complex provides for a range of synergies and benefits through shared infrastructure and equipment and the ability to achieve flexibility in the mining operations to service ongoing commercial agreements. All coal extracted from the Ravensworth Operations Complex is transported via internal haul roads to the Ravensworth Operations Complex ROM coal stockpile and coal crushing facility. Coal is placed on the ROM coal stockpile in preparation for crushing and transportation when it cannot be fed directly to a 5000 tonne storage bin then to Macquarie Generation Bayswater and Liddell Power Stations, approximately 9 kilometres to the north-west via existing coal conveyors.

As part of this project, it is proposed that a small portion (approximately 70 metres) of conveyor infrastructure previously approved will be reinstated to allow for the transport of Ravensworth Operations Complex coal to the RCHPP and hence available for export. This section of conveyor infrastructure (M21 conveyor), was approved under the Nardell underground mine (now known as Ravensworth Underground Mine (RUM)), (DA104/96) consent and therefore no approval or modification of existing approvals is required to reinstate the M21 conveyor. The M21 conveyor links directly to Macquarie Generation's conveyor infrastructure currently used by Ravensworth Operations to transport Ravensworth Operations Complex coal to the domestic market.

The reinstatement of the M21 conveyor will be completed by Ravensworth Operations in accordance with the requirements as detailed in the *Environmental Impact Statement for Nardell Underground Coal Mine (1996)* and the Nardell consent (DA104/96), previously approved by the Department of Planning.

All coal mined from the Ravensworth Operations Complex (Ravensworth West and Narama) is currently transported to the domestic market for use in Macquarie Generation's two power stations, Liddell and Bayswater via existing transport infrastructure. Commercial agreements between Ravensworth Operations and Macquarie Generation has identified that there will be a surplus of coal

that will not be transported to Macquarie Generation for domestic use. Ravensworth Operations have since identified the opportunity to transport this coal to the RCHPP for processing and subsequent delivery to the export market. The transportation of Ravensworth Operations Complex coal to the RCHPP and the export market is considered to be the most efficient use of coal mined from the Ravensworth Operations Complex as it will use existing infrastructure and provide for flexibility in ongoing operations. Ravensworth Operations are seeking to allow Ravensworth Complex coal to the RCHPP for export.

4. Overview of Impact Assessment and Management

Potential impacts associated with the proposed modifications outlined in **Section 3**, considered to require further assessment than provided in the EA primarily relate to ecology and Aboriginal cultural heritage. It is considered that the modifications would not result in additional impacts to those assessed as part of the EA for other environmental aspects, as the modifications result in similar construction and operational activities to those described in the EA. In areas where these modifications result in surface disturbance outside of the areas identified in the EA, potential impacts to ecology and Aboriginal cultural heritage have been identified below.

4.1 Ecology

As discussed in **Section 3.1**, the disturbance area has slightly increased from 2501 ha to 2508 ha. Notwithstanding this, the RNOA has increased from 262 ha as outlined in the EA to 284 ha. Moreover the total impact to native vegetation communities within the revised disturbance area has reduced from 559.2 ha to 544.2 ha primarily as result of an increase of the RNOA. The increase in the RNOA coupled with the reduction in the total disturbance footprint and the reduction of total impacts to native vegetation communities within the disturbance area is a positive outcome for the Project.

The revised disturbance footprint will result in the removal of one individual weeping myall (*Acacia pendula*) adjacent to the Ravensworth North Pit (refer to **Figure 4.1**). Although it is likely that this individual was planted based on disturbance history, it has been considered to conform to the description of the endangered population as there is no firm evidence to suggest that it has been planted. An assessment of significance has been completed with the result indicating that the removal of one individual of weeping myall (*Acacia pendula)* would not be significant (refer to **Appendix 2**).

Additionally, since the submission of the EA, Umwelt has taken the opportunity to undertake further assessment based on additional research and learnings specifically relating the green and golden bell frog. Additional research has primarily related to gaining a better understanding of how best to determine potential core habitat that is likely to be used by the green and golden bell frog.

Two primary potential habitats were identified in the Project Area, being ephemeral drainage lines and artificial dams. Based on the intuitive habitat assessment the extent of potential core green and golden bell frog habitat located within the Project Area was delineated by applying a 500 metre radius buffer around all dams mapped as having potential high quality habitat based on known habitat parameters. These dams and ephemeral drainage lines were considered to provide potential breeding habitat for the species. Core habitat is defined as habitat in which the species could potentially shelter, breed or move through with a reasonable frequency. A 500 metre radius buffer around potential breeding sites (high quality dams) was chosen to represent potential core habitat requirements, as the species is known to range over variable distances for foraging, shelter and dispersal between proximate habitats. This is considered to comprise a very conservative estimate of the potential core habitat for the species in the Project Area. **Figure 4.2** identifies the areas within the Project Area that comprise potential core habitat for the species. Dams considered to provide potential moderate and low quality habitat, are not included in the estimation of potential core habitat.

The Project will reduce the area of potential land available to be occupied by the population of this species by approximately 287 hectares. This is based on potential habitat that has been modelled around dams that support potential high quality habitat, it is not base on any extant records of the green and golden bell frog. In addition, a further 66 hectares of potential habitat surrounding moderate quality dams would also be reduced, although this is not regarded as being likely to contribute to potential core habitat. This reduction in area will result from the direct removal of potential habitat as part of the Project. The known green and golden bell frog habitat will not be impacted as a result of

the Project, rather it will be conserved in perpetuity within the RNOA. To meet all of its life cycle requirements the green and golden bell frog requires a complex mosaic of habitats including permanent breeding habitat such as dams, ephemeral areas for breeding and dispersal, woodland and grassland for foraging and shelter opportunities and micro-habitats such as fallen logs, rocks and sometimes disused industrial waste. However, the way in which the green and golden bell frog uses habitat in the field is poorly understood despite advances in knowledge regarding habitat preferences (Goldingay 2008). Known habitat areas and other high, moderate and other available habitat areas for this species in the study area are shown on **Figure 4.2**.

As outlined in **Table 1.1** and discussed in **Section 3.1**, total impacts to native vegetation as a result of the Project will be reduced by approximately 15 ha primarily as a result of the increase in the RNOA. Although the total disturbance footprint has increased by approximately 8 ha these increases have resulted in additional impacts to areas offering reduced habitat qualities, namely derived grassland, planted areas, and rehabilitation (woody vegetation and pasture). It is considered that this minor increase will not substantially change impacts to potential habitat of threatened species to that assessed as part of the EA. Moreover, it is considered that management and monitoring measures outlined in the EA will be appropriate to manage impacts to habitat resources as a result of the revised disturbance area.

4.2 Aboriginal Cultural Heritage

As discussed, ongoing detailed design work for the Project has revised the Project's disturbance footprint, with implications for identified Aboriginal cultural heritage sites and areas discussed below.

The Ravensworth Operations Project EA identified that the proposed mining expansion would directly impact 173 Aboriginal archaeological sites within the Project area – or 46.6% of all known sites. These sites comprised of 93 artefact scatters (one only partially impacted), 78 isolated finds, 1 scarred tree and 1 artefact scatter/scarred tree. Revision of the Project design now identifies that the proposed mining expansion would directly impact 181 archaeological sites within the project area (refer to **Figures 4.3** and **4.4**)– or 48.8% of all known archaeological sites – which comprise of 99 artefact scatters (one only partially impacted), 80 isolated finds, 1 scarred tree and 1 artefact scatter/scarred tree. **Table 4.1** summarises the overall change to the Project's proposed impact on known Aboriginal archaeological sites; which identifies that the Project would impact less than half of the known sites within the Project area boundary if approved, which is still consistent with the key findings of the EA.

Table 4.1 – Summary of Revised Impact Assessment to Known Archaeological Sites

Total number Aboriginal archaeological sites		371
EA impact assessment	No. impacted archaeological sites	173 or 46.5%
	No. sites within formal conservation areas	42 or 11.3%
	No. other sites managed in-situ	157 or 42.3%
Current impact assessment	No. impacted archaeological sites	181 or 48.7%
	No. sites within formal conservation areas	58 or 15.6%
	No. other sites managed in-situ	133 or 35.8%

Note: REA88 is both partially impacted and partially conserved, so is counted twice in above calculations

Of the 181 known archaeological sites now impacted by the proposed mining expansion, 153 sites were previously identified as impacted in the EA and the remaining 28 sites were formerly listed as not being disturbed by the project and managed in-situ or protected. It is also noted that 20 sites that were formerly identified as impacted by the EA now fall outside the project impact area and can be managed in-situ for the 29 year life of the mine; which may include culturally sensitive management measures such as fencing and erosion control works, if considered appropriate and necessary. The refined project design also enables the number of known Aboriginal archaeological sites to be protected within formal conservation areas to be increased by 4.3%, from 42 to 58 sites, through recent adjustments to the boundary of the Ravensworth North Conservation Area (RNOA). Among

these additional sites is REA40, an Aboriginal scarred tree, a site of both high cultural value and moderate archaeological significance.

Tables 4.2 and **4.3** below compare the key attributes of the known archaeological sites that occur within and beyond the Project's disturbance footprint, being site type and archaeological significance. As outlined, there is a 2.15% increase in impact to known archaeological sites by the refined project design; all of which are artefact scatters or isolated finds, which increase in impact by 2.6% and 1.4% respectively. Impact remains unchanged for all other site types. **Table 4.3** also identifies that although the majority of all impacted sites (93%) are of low or low to moderate archaeological significance, there is a slight increase of impacted sites in the moderate to high archaeological significance categories – which has increased from six to nine sites, or 3.4% to 4.9% of all sites. Sites with higher archaeological significance are characterized by higher integrity and research potential, which is likely to have a direct influence on management requirements for each. Preparation of the Aboriginal Cultural Heritage Management Plan (ACHMP) will include ongoing liaison with DECCW and Aboriginal stakeholders with a registered interest in the Project to determine the management requirements of all additional sites now impacted as a result of the revised disturbance footprint, which could range from surface artefact collection to subsurface testing and salvage excavation.

As noted in **Section 3.2.7**, the revised disturbance footprint will also have a direct impact on the planned RUM Dam Conservation Area (RUMDCA) – a 4.4 hectare area to the north of the New England Highway. As discussed in **Section 3.2.7**, considering the difficulties associated with protecting this small area within an area dominated by mining related activities, RUM proposes to reconsider the location of this conservation area. It is proposed that a higher value, integrated outcome may be achieved in accordance with condition 5 of Permit No. 2384 by consideration of this commitment in the context of the Hillcrest Offset Area, as part of current Ravensworth Operations consultation for the ACHMP for the entire Complex.

Table 4.2 – Revised Impact to Known Archaeological Site Types

Site Type	EA Impact Assessment 2009			Revised Impact Assessment 2010		
	Within Impact Area	Outside Impact Area	% Impact	Within Impact Area	Outside Impact Area	% Impact
Isolated Find	78	61	56.12	80	59	57.55
Artefact Scatter (Open Camp Site)	93	132	41.33	99	126	44.00
Scarred Tree	1	3	25.00	1	3	25.00
Engraving Site	0	1	0.00	0	1	0.00
Massacre Site	0	1	0.00	0	1	0.00
Artefact Scatter and Scarred Tree	1	0	100.00	1	0	100.00
Artefact Scatter, Scarred Tree and Grinding Grooves	0	1	0.00	0	1	0.00
Total	**173**	**199**	**46.51**	**181**	**191**	**48.66**

Note: REA88 is partially impacted in both the 2009 and 2010 impact assessments, so is counted twice, bringing total site numbers to 372.

Table 4.3 – Revised Impact by Archaeological Significance

Archaeological Significance	EA Impact Assessment 2009			Revised Impact Assessment 2010		
	Within Impact Area	Outside Impact Area	% Impacted	Within Impact Area	Outside Impact Area	% Impacted
Low	155	156	49.84	159	152	51.13
Low-Moderate	12	9	57.14	11	10	52.38
Moderate	1	12	7.69	3	10	23.08
Moderate-High	4	1	80.00	4	1	80.00
High	1	6	14.29	2	5	28.57
Unknown	0	15	100	2	13	13.33
Totals	**173**	**199**		**181**	**191**	

Notes: REA88 is partially impacted in both the 2009 and 2010 impact assessments, so is counted twice, bringing total site numbers to 372. Archaeological significance was not assessed for 15 previously recorded sites when added to the AHIMS register, and the significance of each cannot be established from existing records. The two sites of unknown significance within the impact area consist of one isolated find located along Emu Creek and one small artefact scatter (<10 artefacts) located 150m from Bayswater Creek. Based on this information, archaeological significance and research potential is not likely to be high.

The EA identified that the Project would directly impact two landforms of archaeological sensitivity – the Bowman's Creek terrace and the Bayswater Creek floodplain. The EA identified the level of impact to each to as 11.28% and 12.48% respectively. Revision of the disturbance footprint now identifies an increase in the level of impact to both landform to 15.42% and 45.82%% respectively, as outlined in **Tables 4.4** and **4.5** below.

Table 4.4 – Revised Impact to Archaeological Landforms

	Sub-Catchment	Stream, creek banks/ footslopes			Flat, floodplain/ terrace		
		Total Area (ha)	Impact Area (ha)	% Impacted	Total Area (ha)	Impact Area (ha)	% Impacted
EA 2009 impact assessment	Bowmans Creek	105.83	9.55	9.02	147.57	19.03	12.90
	Bayswater Creek	85.37	14.31	16.76	34.74	0.68	1.96
	Totals	**191.20**	**23.86**	**12.48**	**182.31**	**19.71**	**10.81**
Current impact assessment[1]	Bowmans Creek	105.83	20.06	18.96	147.57	45.80	31.04
	Bayswater Creek	85.37	43.31	50.73	34.74	11.73	33.77
	Totals	**191.20**	**63.37**	**33.14**	**182.31**	**57.53**	**31.56**

Notes:

1. Percentage impact calculations presented as part of the current impact assessment have been calculated to include a broader construction footprint in addition to the actual infrastructure footprint.

Table 4.5 – Summary of Impact to Archaeological Landforms

	Total Area (ha)	Impact Area (ha)	% Impacted
Bowmans Creek	253.4	39.09	15.42
Bayswater Creek	120.11	55.04	45.82

As discussed in the EA, both landforms are of archaeological sensitivity and of cultural value, with two discrete areas of subsurface testing/salvage proposed for each landform to mitigate the Project's impact. The Bayswater Creek floodplain has also been previously identified to be of high conservation value, as large areas of this landform – both within and beyond the Ravensworth Project area boundary – have been previously impacted by mining activities. It is important to note that the key drive for the change to the impact on the Bayswater landform relates to surface infrastructure and ancillary construction buffer zones and not mining impacts and therefore it is reasonable to expect that impacts to the alluvial subsurface deposits may be less than this assessment. Given the increase in impact to the both landforms, it is likely that additional management measures will be required, such as additional subsurface testing/salvage areas to recover both information and objects prior to disturbance of the area. This issue will be subject to ongoing liaison with DECCW and Aboriginal stakeholders during preparation of the Project's ACHMP.

As outlined in the EA, 29 Aboriginal stakeholders registered an interest in the Project at its outset and have been involved in all stages of the Aboriginal cultural heritage assessment process since that time. Consultation with Aboriginal stakeholders to date has identified that the Ravensworth area is of cultural significance, with many Aboriginal stakeholders expressing concern regarding the high level of impact resulting from the Project; spanning both individual archaeological sites and the broader environment. Continuing liaison with Aboriginal stakeholders for the preparation of the ACHMP will include discussion of the revised impact of the Project and any additional management outcomes required.

5. Additional Management Measures

In addition to all management measures outlined in the EA and the Statement of Commitments, Ravensworth Operations will also adopt the following management measures as part of the Ravensworth Operations Project.

1. Appropriate pre-clearance surveys, specifically targeting the green and golden bell frog would be undertaken annually at each of the potential high quality habitat dams and their immediate environ. Procedures for pre-clearance surveys for the green and golden bell frog will be incorporated into the management plan for the Project, taking into account the outcomes and success rates of similar survey/relocation processes completed at other sites

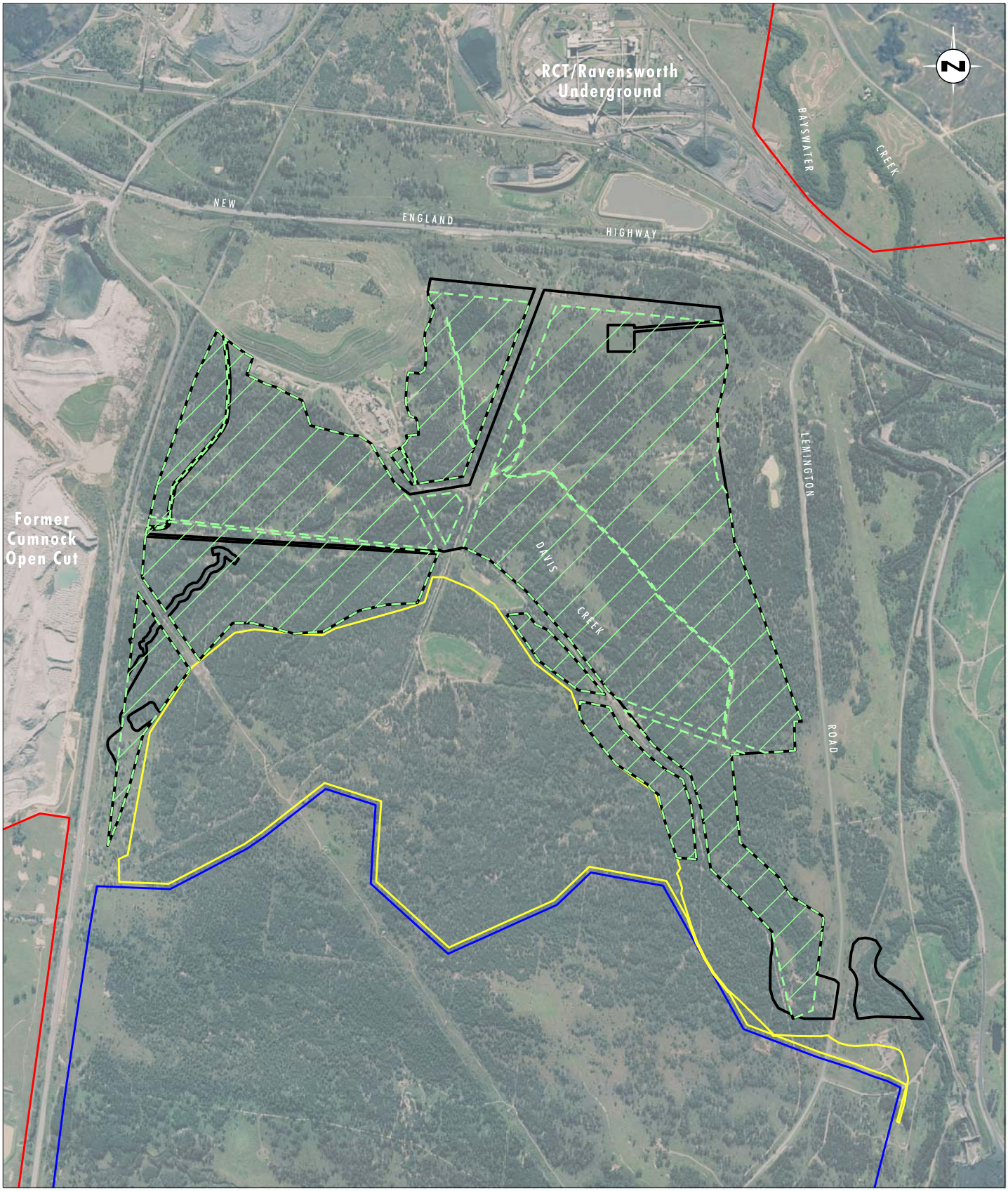
2. Ravensworth Operations will continue to liaise with DECCW and Aboriginal stakeholders during preparation of the ACHMP, including management measures for specific sites relating to the refined project disturbance area and offsetting of associated impacts to Aboriginal cultural heritage. Preliminary indications are that incorporation of the Hillcrest Offset area as part of the Aboriginal cultural heritage offset, would be considered valuable by the Aboriginal stakeholders and the potential to manage this area to enhance cultural heritage values and provide for access and use by the Aboriginal for cultural purposes, will be confirmed as part of the ACHMP. If Hillcrest is not considered appropriate offset area an alternative cultural heritage offset will be negotiated to take account of the abovementioned minor changes to the impact assessment associated with the refinement to project design.

We understand that the key outstanding issue for the project assessment process is in relation to the ecological offsets for the project and as you are aware Ravensworth Operations seek urgent consideration of this matter. As you are aware, Ravensworth Operations and ourselves are keen to meet with DoP and DECCW as soon as possible to seek to resolve the ecological offset issue and to seek progression of project determination as a matter of priority. We can also provide any necessary clarification of the above matters during this process. In this regard, please contact Tim Browne or myself on 49505322, to confirm a time convenient to meet and also if you have any other queries in relation to this matter.

Yours faithfully

Barbara Crossley
Director

enc



Source: Ravensworth Operations 2009

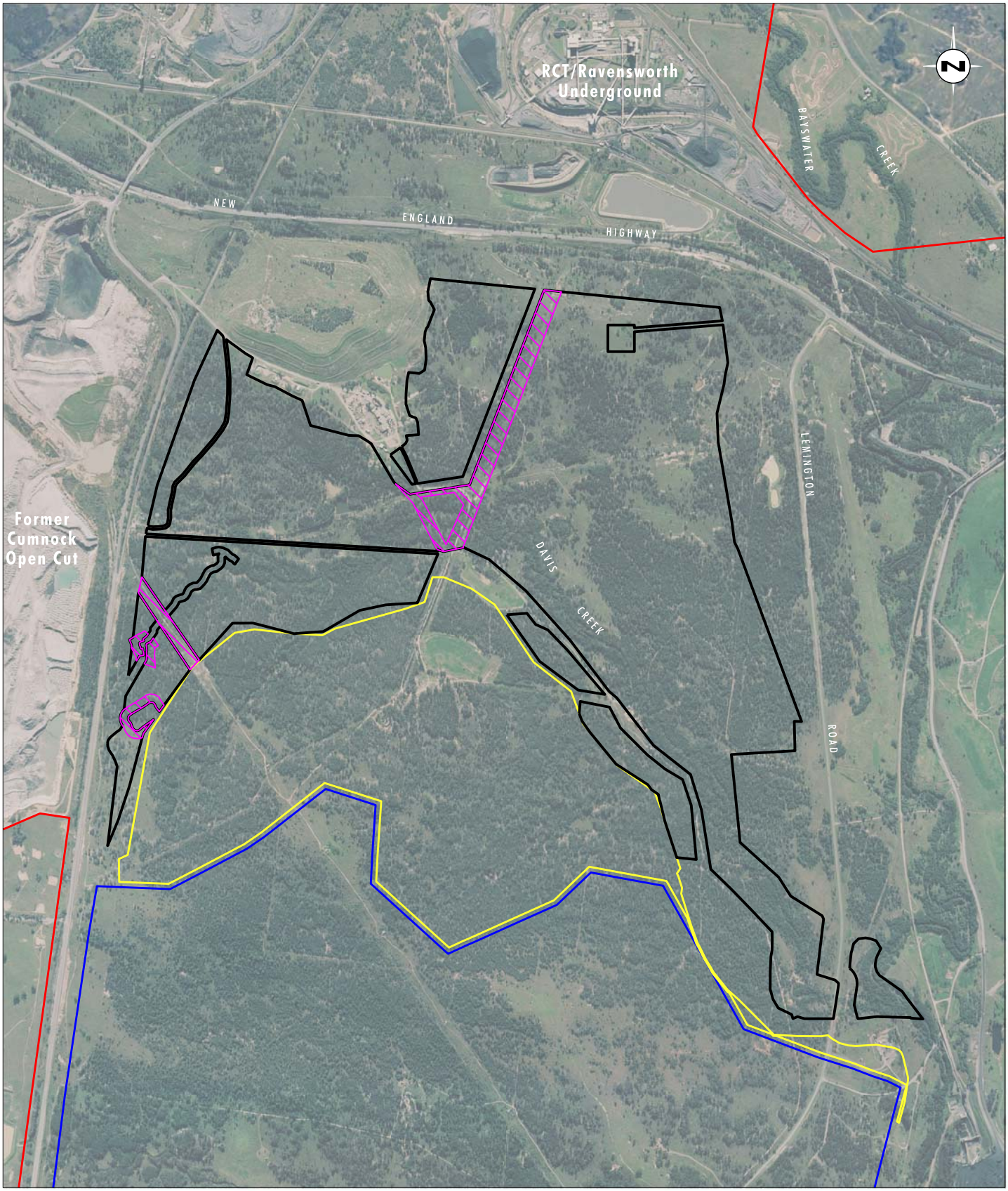
0 0.25 0.5 1.0km
1:20 000

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Ravensworth North Offset Area (EA March 2010)
- Ravensworth North Offset Area

FIGURE 1.1

Ravensworth North Offset Area



Source: Ravensworth Operations 2009

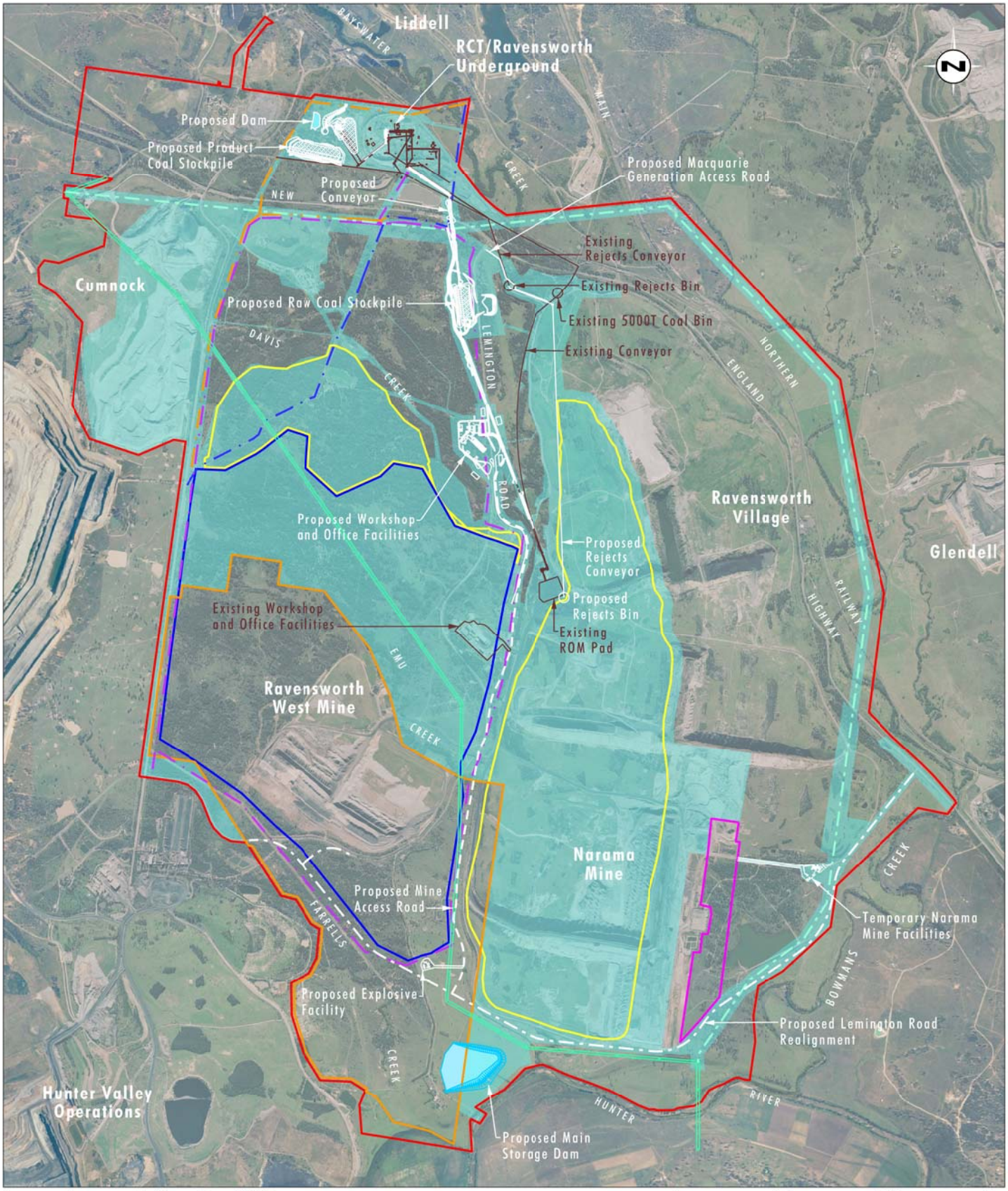
0 0.25 0.5 1.0km
1:20 000

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Ravensworth North Offset Area
- Temporary Disturbance

FIGURE 1.2

Ravensworth North Offset Area with identified Temporary Disturbance Area



Source: Ravensworth Operations 2009

0 1.0 2.0 3km
1:50 000

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extended (subject to separate approval)
- Existing 330kV Transmission Line
- Proposed 330kV Transmission Line
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Existing Infrastructure
- Proposed Infrastructure
- Existing EnergyAustralia 66kV Powerline
- Proposed EnergyAustralia 66kV Powerline
- Ravensworth Operations 66kV Realignment
- Ravensworth West Development Consent Area
- Disturbance Area

FIGURE 3.1

Disturbance Area (EA March 2010)

File Name (A4): EAMODS_V1/2383_796.dgn

Source: Ravensworth Operations 2009

0 1.0 2.0 3km
1:60 000

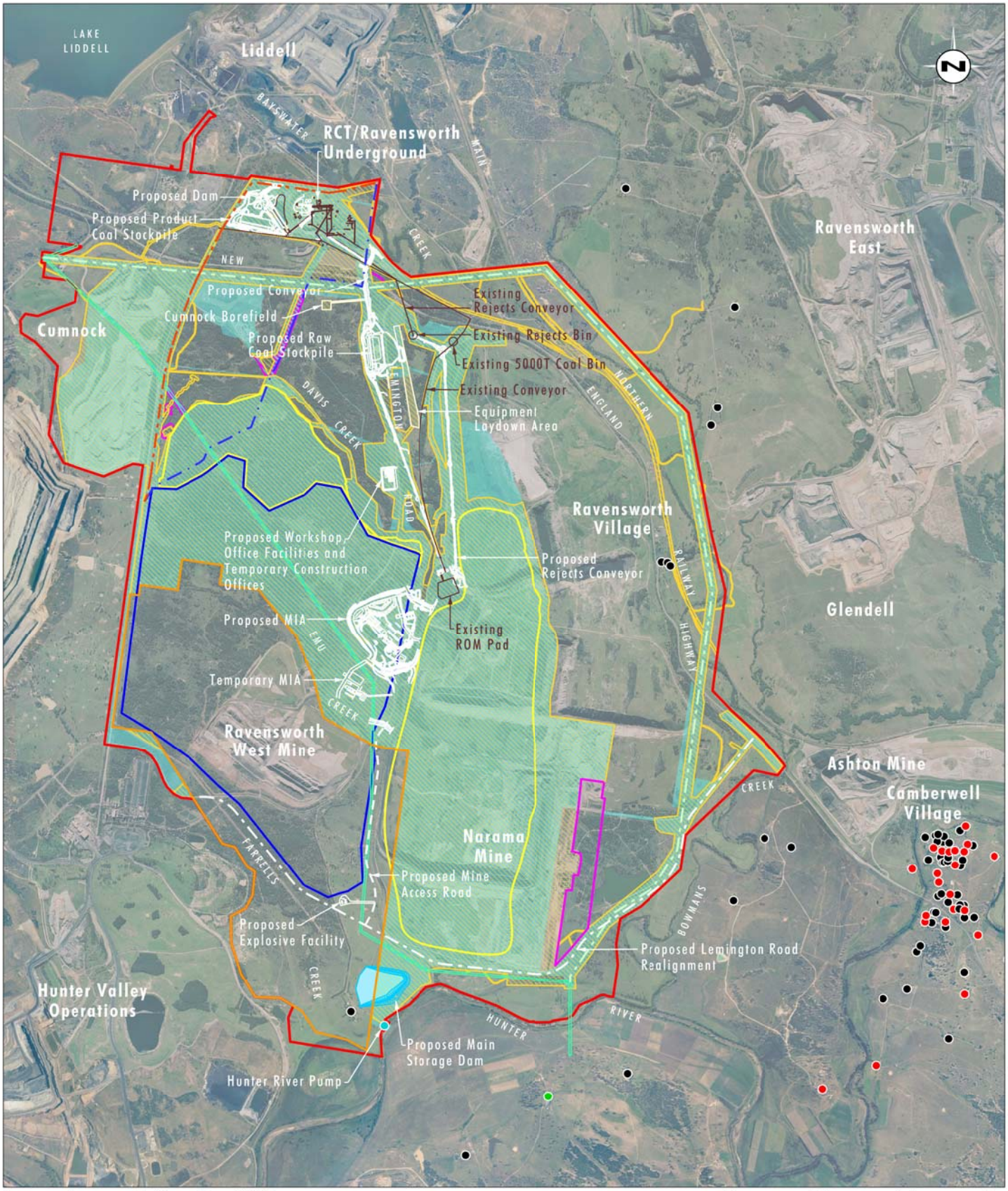
Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extension
- Existing 330kV Transmission Line
- Proposed 330kV Transmission Line
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Existing Infrastructure
- Proposed Infrastructure
- Existing EnergyAustralia 66kV Powerline
- Proposed EnergyAustralia 66kV Powerline
- Mine Owned Residence
- Private Residence
- Private Residence with Agreement
- Ravensworth West Development Consent Area
- Revised Disturbance Area
- Revised Temporary Disturbance Area

FIGURE 3.2

Proposed Revised Disturbance Area (October 2010)

File Name (A4): EAMODS_V1/2383_800.dgn



Source: Ravensworth Operations 2009

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extension
- Existing 330kV Transmission Line
- Proposed 330kV Transmission Line
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Existing Infrastructure
- Proposed Infrastructure
- Existing EnergyAustralia 66kV Powerline
- Proposed EnergyAustralia 66kV Powerline
- Mine Owned Residence
- Private Residence
- Private Residence with Agreement
- Ravensworth West Development Consent Area
- Revised Disturbance Area
- Revised Temporary Disturbance Area
- Disturbance Area (EA March 2010)

FIGURE 3.3

Proposed Revised and EA Disturbance Area

File Name (A4): EAMODS_V1/2383_804.dgn

Source: Ravensworth Operations 2009

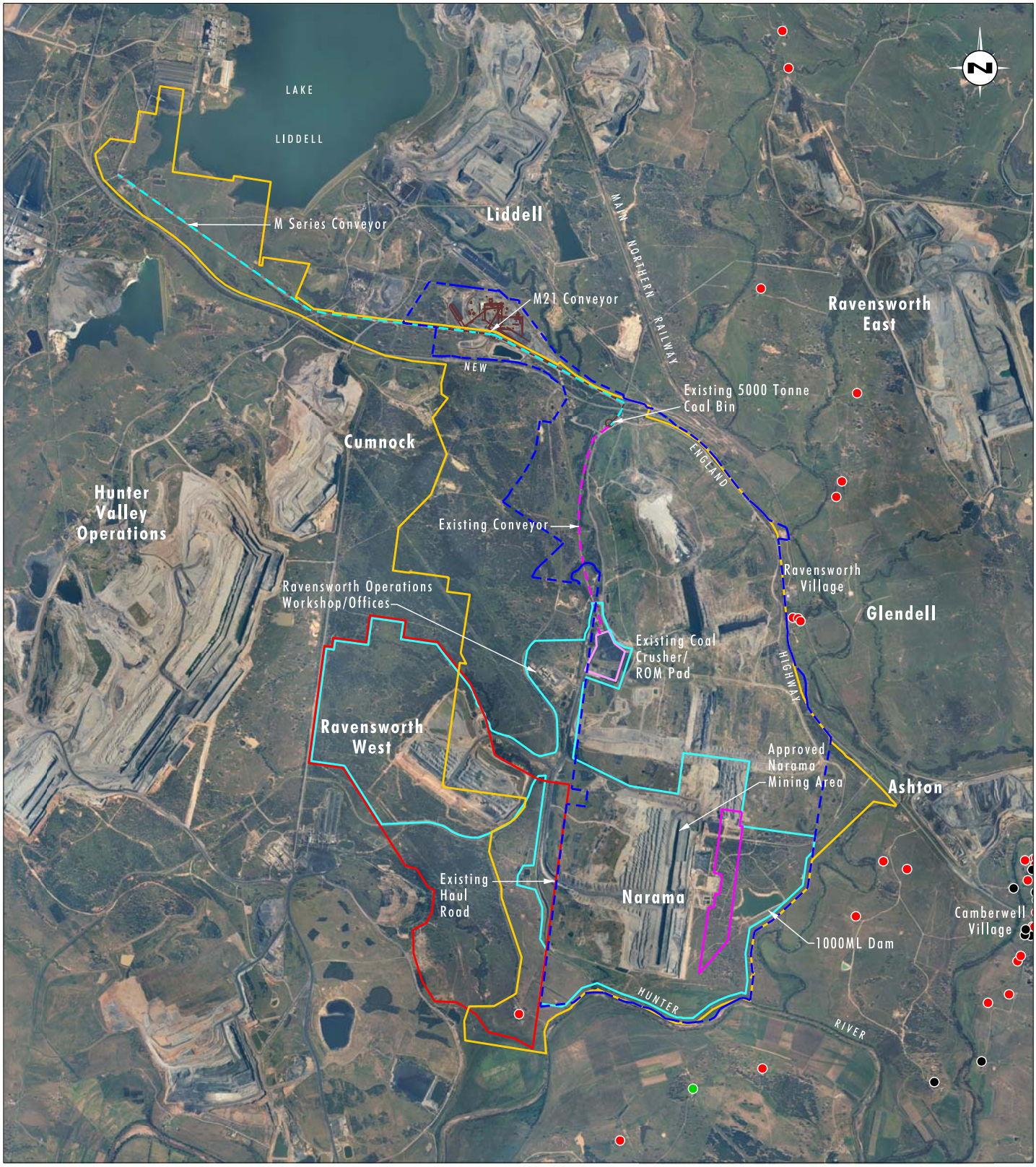
Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extension
- Existing 330kV Transmission Line
- Proposed 330kV Transmission Line
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Existing Infrastructure
- Proposed Infrastructure
- Existing EnergyAustralia 66kV Powerline
- Proposed EnergyAustralia 66kV Powerline
- Mine Owned Residence
- Private Residence
- Private Residence with Agreement

FIGURE 3.4

Revised Ravensworth Operations Project

File Name (A4): EAMODS_V1/2383_805.dgn



Source: Ravensworth Operations 2008

0 1.0 2.0 3.0km
1:70 000

Legend

- DA 135-90 Boundary
- Ravensworth West Consent Boundary
- Ravensworth Operations Complex
- Narama Extended Area
- Ravensworth Underground Mining Operations (DA104-96)
- Private Residence
- Private Agreement in Place
- Mine Owned Residence
- Existing and Approved Coal Handling Infrastructure

FIGURE 3.5

Ravensworth Operations Complex

File Name (A4): EAMODS_V1/2383_801.dgn

Source: Ravensworth Operations 2009, HLA 2001, ERM 1998 and Mt King 2007

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extension
- Existing 330kV Transmission Line
- Proposed 330kV Transmission Line
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Existing Infrastructure
- Proposed Infrastructure
- Existing EnergyAustralia 66kV Powerline
- Proposed EnergyAustralia 66kV Powerline

Threatened Species

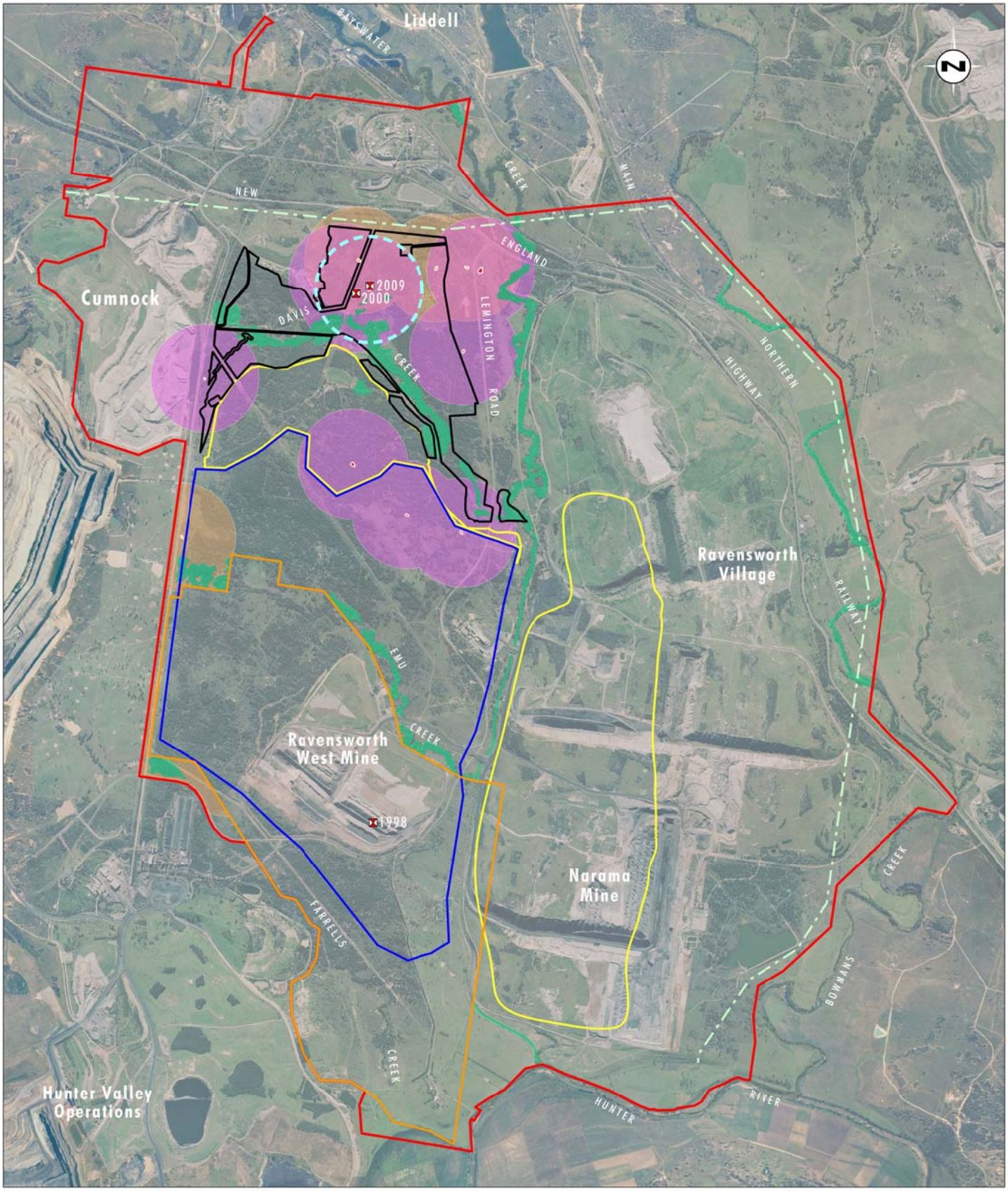
- Hooded Robin
- Grey Headed Flying Fox
- Speckled Warbler
- Grey-crowned Babbler
- Eastern Bentwing-bat
- Little Bentwing-bat
- Brown Tree-creeper
- Green and Golden Bell Frog
- Large-footed Myotis
- Eastern False Pipistrelle
- Masked Owl
- Grey-crowned Babbler Nest
- Scarlet Robin
- Eastern Freetail-bat

- *Acacia pendula*
- *Bothriochloa biloba*
- *Eucalyptus camaldulensis*

FIGURE 4.1

Location of Threatened Species and Endangered Flora Populations

File Name (A4): EAMODS_V1/2383_802.dgn



Source: Ravensworth Operations 2009
Note: [1] and [2] - Based on 500m radius buffer applied to dams with potential high and moderate quality habitat

0 1.0 2.0 3km
1:50 000

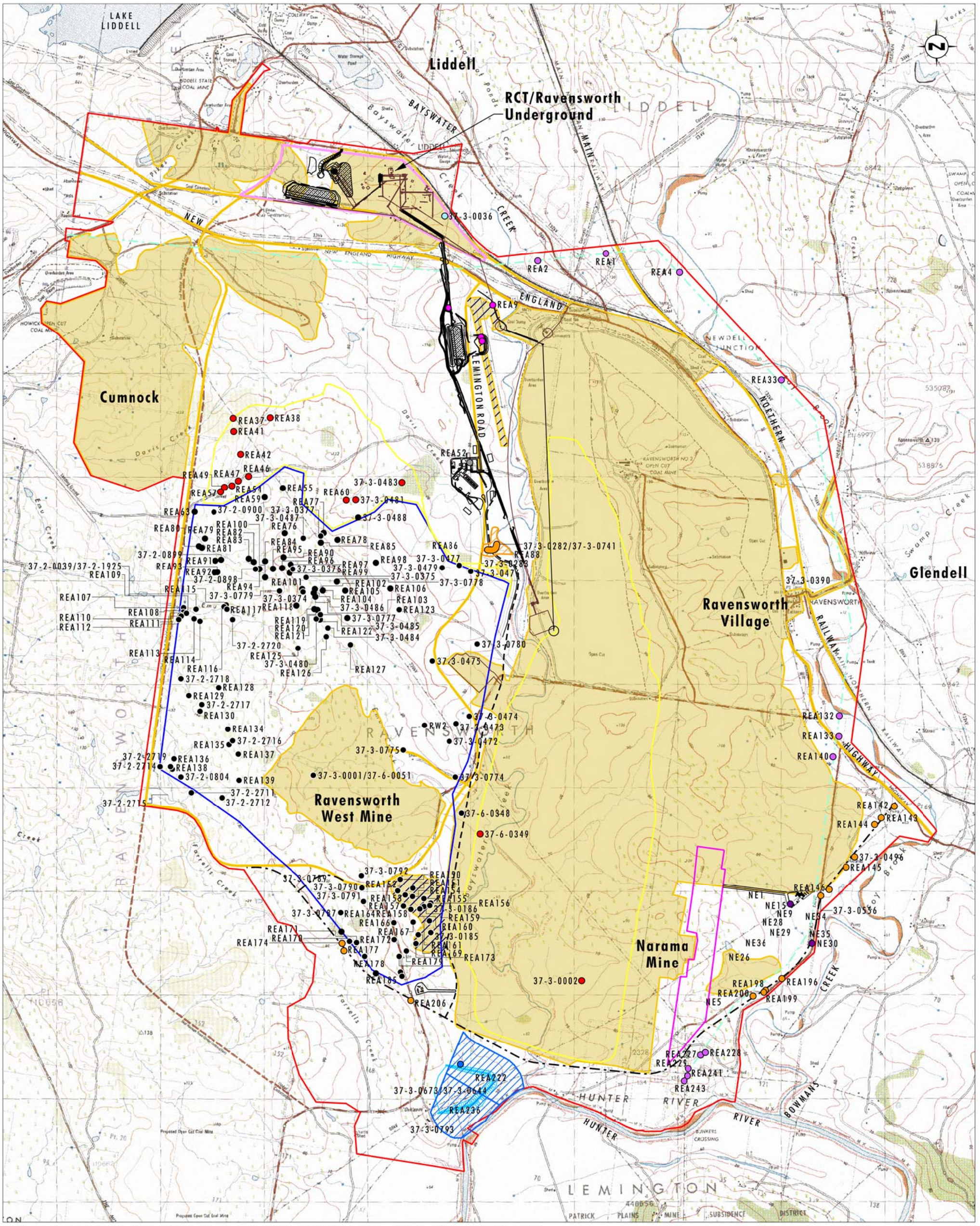
Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Emplacement Overburden
- Ravensworth North Offset Area
- Proposed 330kV Transmission Line
- Known Habitat for the Green and Golden Bell Frog
- Ravensworth West Development Consent Area
- Potential Moderate Quality Habitat for the Green and Golden Bell Frog[1]
- Potential High Quality Habitat for the Green and Golden Bell Frog[2]
- Potential Ephemeral Drainage Line Habitat
- Potential Moderate Quality Habitat
- Potential High Quality Habitat
- Green and Golden Bell Frog

FIGURE 4.2

Known and Potential Habitat for the Green and Golden Bell Frog in the Project Area

File Name (A4): EAMODS_V1/2383_803.dgn



Source: Ravensworth Operations 2009, HLA 2001 and ERM 1998, DECC 2009, Umwelt 2009

0 0.5 1.0 2km
1:35 000

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extended (subject to separate approval)
- Ravensworth Underground
- Proposed 330kV Powerline
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Modified Land
- Partially Modified Land

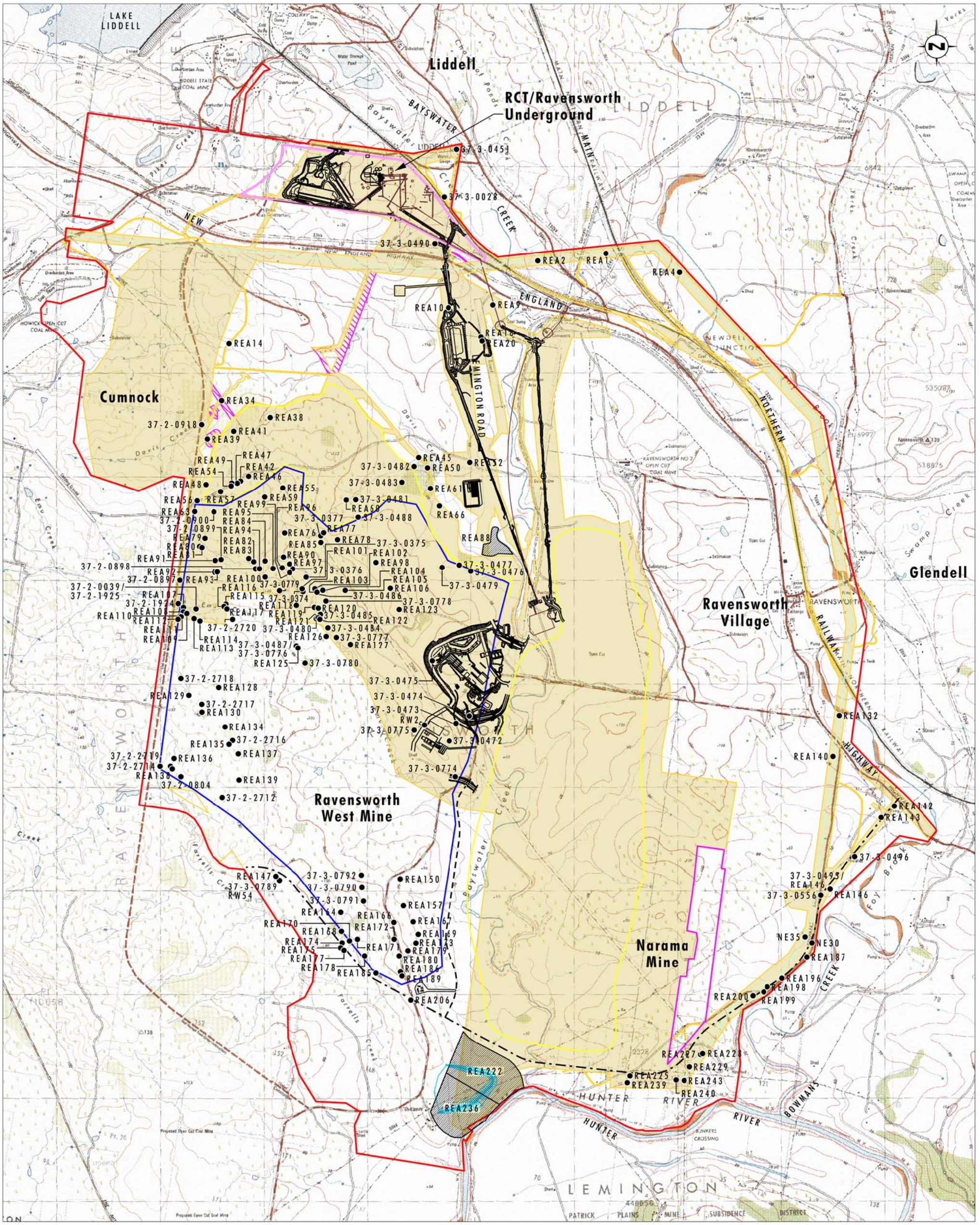
Impacted Archaeological Sites:

- Pit Shell
- Out of Pit Dump
- Coal Terminal
- 330kV Powerline
- Conveyor and Raw Coal Stockpile
- Office and Workshop
- Access Road
- Dam
- Temporary Narama Infrastructure Extent

FIGURE 4.3

2009 Aboriginal Cultural Heritage Impact Assesment

File Name (A3): EAMODS_V1/2383_806.dgn



Source: Ravensworth Operations 2009, HLA 2001 and ERM 1998, DECC 2009, Umwelt 2009

0 0.5 1.0 2km
1:35 000

Legend

- Project Area
- Ravensworth North Pit
- Out of Pit Overburden Emplacement
- Narama Extended (subject to separate approval)
- Ravensworth Underground
- Proposed 330kV Powerline
- Proposed Lemington Road Realignment
- Proposed Mine Access Road
- Revised Disturbance Area
- Revised Temporary Disturbance Area
- Impacted Archaeological Sites

FIGURE 4.4

2010 Aboriginal Cultural Heritage Impact Assesment

File Name (A3): EAMODS_V1/2383_807.dgn

APPENDIX 1

Schedule of Land

Schedule of Land

Ravensworth Operations Project

Lot	DP	County	Parish
1	124977	DURHAM	VANE
1	125406	DURHAM	LIDDELL
1	137381	DURHAM	VANE
1	137382	DURHAM	VANE
1	151176	DURHAM	VANE
1	159786	DURHAM	VANE
1	213065	DURHAM	LIDDELL
1	393657	DURHAM	SAVOY
1	393657	DURHAM	HOWICK
1	403032	DURHAM	LIDDELL
1	534889	DURHAM	LIDDELL
1	561235	DURHAM	VANE
1	645240	DURHAM	LIDDELL
1	658099	DURHAM	LIDDELL
1	738417	DURHAM	LIDDELL
1	747099	DURHAM	RAVENSWORTH
1	747902	DURHAM	RAVENSWORTH
1	774682	DURHAM	VANE
1	776382	DURHAM	LIDDELL
1	780177	DURHAM	SAVOY
1	784446	DURHAM	RAVENSWORTH
1	793886	DURHAM	VANE
1	804150	DURHAM	VANE
1	808431	DURHAM	LIDDELL
1	823148	DURHAM	VANE
1	859924	DURHAM	RAVENSWORTH
1	940619	DURHAM	VANE
1	986496	DURHAM	LIDDELL
1	1089848	DURHAM	RAVENSWORTH
1	1095202	DURHAM	LIDDELL
2	6842	DURHAM	VANE
2	38725	DURHAM	VANE
2	137382	DURHAM	VANE
2	232149	DURHAM	LIDDELL
2	233019	DURHAM	LIDDELL
2	256503	DURHAM	RAVENSWORTH
2	534889	DURHAM	LIDDELL
2	574166	DURHAM	LIDDELL
2	628645	DURHAM	LIDDELL
2	738417	DURHAM	LIDDELL
2	774682	DURHAM	RAVENSWORTH
2	784446	DURHAM	RAVENSWORTH
2	804150	DURHAM	VANE
2	808431	DURHAM	LIDDELL
2	986496	DURHAM	LIDDELL
2	1089848	DURHAM	VANE
3	38725	DURHAM	VANE
3	125406	DURHAM	LIDDELL

Lot	DP	County	Parish
3	137382	DURHAM	VANE
3	213065	DURHAM	LIDDELL
3	232149	DURHAM	LIDDELL
3	561235	DURHAM	VANE
3	662944	DURHAM	VANE
3	747902	DURHAM	RAVENSWORTH
3	774682	DURHAM	RAVENSWORTH
3	784446	DURHAM	RAVENSWORTH
3	859924	DURHAM	RAVENSWORTH
3	1114623	DURHAM	VANE
4	38725	DURHAM	VANE
4	48555	DURHAM	RAVENSWORTH
4	125406	DURHAM	LIDDELL
4	252530	DURHAM	HOWICK
4	747099	DURHAM	RAVENSWORTH
4	774682	DURHAM	VANE
4	776382	DURHAM	LIDDELL
4	808670	DURHAM	LIDDELL
5	38725	DURHAM	VANE
5	48555	DURHAM	HOWICK
5	125406	DURHAM	LIDDELL
5	252530	DURHAM	RAVENSWORTH
5	747099	DURHAM	RAVENSWORTH
5	808670	DURHAM	LIDDELL
5	1077004	DURHAM	VANE
6	38725	DURHAM	VANE
6	125406	DURHAM	LIDDELL
6	808670	DURHAM	LIDDELL
6	1077004	DURHAM	VANE
7	38725	DURHAM	VANE
7	48555	DURHAM	RAVENSWORTH
7	125406	DURHAM	LIDDELL
7	808670	DURHAM	LIDDELL
7	859924	DURHAM	RAVENSWORTH
7	1077004	DURHAM	LIDDELL
8	38725	DURHAM	VANE
8	125406	DURHAM	LIDDELL
8	808670	DURHAM	LIDDELL
8	845360	DURHAM	RAVENSWORTH
8	1077004	DURHAM	VANE
9	38725	DURHAM	VANE
9	125406	DURHAM	LIDDELL
9	1077004	DURHAM	VANE
10	38725	DURHAM	VANE
10	125406	DURHAM	LIDDELL
10	1077004	DURHAM	VANE
11	38725	DURHAM	VANE
11	125406	DURHAM	LIDDELL
11	247943	DURHAM	SAVOY
11	261916	DURHAM	VANE
11	592404	DURHAM	LIDDELL
11	825904	DURHAM	VANE

Lot	DP	County	Parish
11	858172	DURHAM	LIDDELL
12	38725	DURHAM	VANE
12	700554	DURHAM	HOWICK
12	825904	DURHAM	VANE
13	38725	DURHAM	VANE
13	247945	DURHAM	LIDDELL
13	825904	DURHAM	VANE
14	38725	DURHAM	VANE
14	247945	DURHAM	LIDDELL
14	261916	DURHAM	VANE
14	825904	DURHAM	VANE
15	38725	DURHAM	VANE
15	247941	DURHAM	LIDDELL
15	247945	DURHAM	LIDDELL
15	825904	DURHAM	VANE
15	848095	DURHAM	LIDDELL
16	38725	DURHAM	VANE
16	247941	DURHAM	LIDDELL
16	247945	DURHAM	LIDDELL
16	848095	DURHAM	LIDDELL
19	38725	DURHAM	VANE
20	38725	DURHAM	VANE
20	841165	DURHAM	LIDDELL
21	38725	DURHAM	VANE
21	786904	DURHAM	RAVENSWORTH
21	817272	DURHAM	LIDDELL
21	841165	DURHAM	LIDDELL
21	869399	DURHAM	LIDDELL
21	878457	DURHAM	RAVENSWORTH
22	841165	DURHAM	LIDDELL
22	869399	DURHAM	LIDDELL
22	878457	DURHAM	RAVENSWORTH
23	841165	DURHAM	LIDDELL
24	841165	DURHAM	LIDDELL
31	585169	DURHAM	VANE
32	545601	DURHAM	LIDDELL
32	585169	DURHAM	VANE
38	752481	DURHAM	RAVENSWORTH
50	1048492	DURHAM	RAVENSWORTH
51	1048492	DURHAM	RAVENSWORTH
58	752481	DURHAM	RAVENSWORTH
89	752470	DURHAM	LIDDELL
100	700429	DURHAM	LIDDELL
100	858173	DURHAM	LIDDELL
100	868268	DURHAM	LIDDELL
100	1037665	DURHAM	RAVENSWORTH
101	700429	DURHAM	LIDDELL
101	825292	DURHAM	LIDDELL
101	1037665	DURHAM	RAVENSWORTH
122	872131	DURHAM	VANE
129	2328	DURHAM	RAVENSWORTH
130	2328	DURHAM	RAVENSWORTH

Lot	DP	County	Parish
131	2328	DURHAM	RAVENSWORTH
132	2328	DURHAM	RAVENSWORTH
133	2328	DURHAM	VANE
134	2328	DURHAM	VANE
135	2328	DURHAM	VANE
136	2328	DURHAM	VANE
137	2328	DURHAM	VANE
138	2328	DURHAM	VANE
139	2328	DURHAM	VANE
140	2328	DURHAM	VANE
141	2328	DURHAM	VANE
142	2328	DURHAM	VANE
143	2328	DURHAM	VANE
144	2328	DURHAM	VANE
145	2328	DURHAM	RAVENSWORTH
146	2328	DURHAM	RAVENSWORTH
147	2328	DURHAM	RAVENSWORTH
150	752470	DURHAM	LIDDELL
153	2328	DURHAM	RAVENSWORTH
154	2328	DURHAM	RAVENSWORTH
155	2328	DURHAM	RAVENSWORTH
156	2328	DURHAM	RAVENSWORTH
157	2328	DURHAM	RAVENSWORTH
158	2328	DURHAM	RAVENSWORTH
159	2328	DURHAM	RAVENSWORTH
160	2328	DURHAM	VANE
161	2328	DURHAM	VANE
162	2328	DURHAM	VANE
163	2328	DURHAM	VANE
164	2328	DURHAM	VANE
165	2328	DURHAM	VANE
166	2328	DURHAM	VANE
167	2328	DURHAM	VANE
180	858299	DURHAM	LIDDELL
181	1126510	DURHAM	LIDDELL
182	975271	DURHAM	LIDDELL
183	975271	DURHAM	LIDDELL
184	975271	DURHAM	LIDDELL
200	975271	DURHAM	LIDDELL
201	975271	DURHAM	LIDDELL
202	975271	DURHAM	LIDDELL
300	856881	DURHAM	RAVENSWORTH
304	868175	DURHAM	RAVENSWORTH
310	848411	DURHAM	LIDDELL
321	860535	DURHAM	RAVENSWORTH
502	864519	DURHAM	LIDDELL
601	1019325	DURHAM	SAVOY
602	1019325	DURHAM	LIDDELL
1210	878458	DURHAM	RAVENSWORTH
1211	878458	DURHAM	VANE
1241	1007536	DURHAM	RAVENSWORTH

Lot	DP	County	Parish
1242	1007536	DURHAM	RAVENSWORTH
1481	1129164	DURHAM	LIDDELL
3000	1132357	DURHAM	RAVENSWORTH
3001	1132357	DURHAM	RAVENSWORTH
7001	93617	DURHAM	LIDDELL
2A	6842	DURHAM	VANE
A	158063	DURHAM	VANE
Additional Lots Post EA			
2	534889	Durham	Liddell
4	232149	Durham	Liddell
3	232149	Durham	Liddell
32	545601	Durham	Liddell
2	1089438	Durham	Liddell
12	592404	Durham	Liddell
2A	6842	Durham	Vane
2	6842	Durham	Vane
5	1077004	Durham	Vane
1	780177	Durham	Savoy
6	125406	Durham	Liddell
7	125406	Durham	Liddell
8	125406	Durham	Liddell
Hillcrest			
13	752486	Durham	Savoy
3	532671	Durham	Liddell
321	861090	Durham	Savoy
7	6841	Durham	Savoy
8	6841	Durham	Savoy
10	6841	Durham	Liddell
3	233020	Durham	Liddell
138	752470	Durham	Liddell
132	752470	Durham	Liddell
175	752465	Durham	Herschell
147	752486	Durham	Savoy
176	752465	Durham	Herschell
159	752470	Durham	Liddell
1	567124	Durham	Liddell
139	752470	Durham	Liddell
170	752486	Durham	Savoy
311	549456	Durham	Liddell

APPENDIX 2

Assessment of Significance – Environmental Planning & Assessment Act 1979

Assessment of Significance – *Environmental Planning & Assessment Act 1979*

Part 3A of the EP&A Act requires an assessment of significance relating to the potential impacts of the project on listed threatened species, endangered populations or threatened ecological communities (TECs). As a formal assessment method format is yet to be established by the relevant government authorities, an assessment that applies the key principles of the Section 5A assessment is used here to assess the potential for the project to impact on threatened species, endangered populations or TECs within the project area.

An assessment of significance is provided below for the weeping myall (*Acacia pendula*) endangered population with the potential to be impacted by the Project.

Endangered Populations

Weeping myall (*Acacia pendula*) Endangered Population in the Hunter Catchment

The endangered population of weeping myall (*Acacia pendula*) consists of a disjunct population of weeping myall in the Hunter Valley of what were thought to be fewer than 1000 individuals (DECCW 2010) but recent studies suggest that at least several that occurs in the Hunter Valley at the eastern distributional limit of the species' range (DECCW 2010). The trees are erect or spreading 5-13 metres high with a pendulous habit. Their bark is hard, fissured, dark grey to black (DECCW 2010). The species occurs on the western slopes, western plains and far western plains of NSW, and south into Victoria and north into Queensland. This Hunter population is known to occur naturally as far east as Broke, and extends northwest to Muswellbrook and to the west of Muswellbrook at Wybong (DECCW 2010). Examples of this population recorded to date at six locations comprise Jerrys Plains, Edderton, Wybong, Appletree Creek, Warkworth and Appletree Flat. These are within the local government areas of Muswellbrook, Singleton and Upper Hunter (DECCW 2010). Within the Hunter catchment the species typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations. It is not known to occur within any conservation areas (DECCW 2010).

a) Whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

Weeping myall (*Acacia pendula*) has been recorded at four locations within the project area (records near Narama mine are considered as one location). A planted area adjacent to Old Lemington Road, contains a large number of planted weeping myall (*Acacia pendula*) and is estimated to contain 70 to 90 adult plants and 10 to 20 juveniles which are likely to be suckers from adult plants. One juvenile plant within the road reserve may have naturally recruited from the planted adults through seed dispersal. Planted weeping myall are currently not considered to form part of the listed endangered population unless there is evidence of natural regeneration. Since natural recruitment may be occurring within the planted area, the stand is cautiously considered to conform to the description of the *Acacia pendula* Endangered Population. The remaining three locations of weeping myall each refer to one individual. Each individual has been considered to conform to the description of the endangered population as there is no strong evidence to suggest that they have been planted.

The Project will result in the removal of one individual weeping myall located within the revised disturbance area. It is considered that the removal of one individual of weeping myall is unlikely to disrupt other stands of the endangered population within the Project area or the broader Hunter Valley, such that the species comprising the population is likely to be placed at risk of extinction.

b) In relation to the regional distribution of the habitat of the endangered population, whether a significant area of known habitat is to be modified or removed, or isolated from currently interconnecting or proximate areas.

The Hunter population has been recorded at more than 30 locations (as at October 2010), in the Hunter Valley. The Project would result in the removal of one individual weeping myall that does not occur at the extremity (distribution limit) of the Hunter Valley population. The removal of one individual will not increase the existing fragmentation or isolation of the known occurrences of the endangered population within the Project area or the Hunter Valley. Additionally, the project will not result in the modification or removal of a regionally significant area of known habitat for the population and the habitats will not be significantly isolated from currently interconnecting or proximate areas.

c) Whether the endangered population, or its habitat, are adequately represented in conservation reserves (or other similar protected areas) in the region.

The *Acacia pendula* Population in the Hunter Catchment is not adequately reserved in the region.

d) Whether any threatened species, population or ecological community is at the limit of its known distribution.

The population is not at the limit of its distribution in the Project area.

References

Department of Environment, Climate Change and Water (2010) *Threatened Species – species populations and ecological communities of NSW website* (accessed October 2010)