Land and Environment Court

New South Wales

Medium Neutral Citation:	**Ironstone Community Action Group Inc v NSW Minister for Planning and Duralie Coal Pty Ltd [2011] NSWLEC 195**
Hearing dates:	9-13 May 2011, 18 May 2011, 27 June 2011, 1 July 2011
Decision date:	10 November 2011
Jurisdiction:	Class 1
Before:	Preston CJ
Decision:	1. The appeal is upheld. 2. Approval is granted under s 75J of the Environmental Planning and Assessment Act 1979 to the project application referred to in Schedule 1, and on the conditions referred to in Schedule 2 to 5, of the approval in Annexure A. 3. The exhibits may be returned.
Catchwords:	APPEAL: - objector appeal against Minister's decision to approve extension of open-cut coal mine - impact on threatened species and biodiversity - adequacy of biodiversity offset strategy - impact on water quality and water flow - impact on Giant Barred Frog in nearby river - health impacts from emission of fine particles (PM2.5) - noise impacts from mining operations and coal trains - dust emissions from coal trains - adequacy of avoidance and mitigation measures in relation to these impacts - amended and additional measures required - approval granted on conditions
Legislation Cited:	Environment Protection and Biodiversity Conservation Act 1999 (Cth) Environmental Planning and Assessment Act 1979 Pt 3A, s 75, Sch 6A Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011 Land and Environment Court Act 1979 s 37(1) National Parks and Wildlife Act 1974 s 69B Threatened Species Conservation Act 1995

Cases Cited:	Australians for Sustainable Development Inc v Minister for Planning [2011] NSWLEC 33 Gerroa Environment Protection Society Inc v Minister for Planning and Cleary Bros (Bombo) Pty Ltd (No 2) [2008] NSWLEC 254 Hilltop Residents Action Group Inc v Minister for Planning [2009] NSWLEC 185; (2009) 171 LGERA 247 Rivers SOS Inc v Minister for Planning [2009] NSWLEC 213
Category:	Principal judgment
Parties:	Ironstone Community Action Group Inc (Applicant) NSW Minister for Planning (First Respondent) Duralie Coal Pty Ltd (Second Respondent)
Representation:	Mr A G Stafford (barrister) (Applicant) Ms C C Spruce (barrister) (First Respondent) Mr A E Galasso SC with Mr M S Henry (Second Respondent) Environmental Defender's Office (Applicant) Legal Services, Department of Planning (First Respondent) Blake Dawson (Second Respondent)
File Number(s):	10090 of 2011

Judgment

Nature of case and outcome

1 Duralie Coal Mine is an existing open cut coal mine about 10 kms north of Stroud. Development consent for the mine was granted by the New South Wales Minister for Planning in August 1999. The mine has been operating since 2003.

2 On 9 October 2008, the owner and operator of the mine, Duralie Coal Pty Limited, applied for, and was granted on 26 November 2010, under Part 3A of the *Environmental Planning and Assessment Act* 1979 (â€œEPA Actâ€), approval to extend the existing open pit in a northerly

direction to recover additional coal; to increase annual production; to expand the approved irrigation area; to increase the number and total area of final voids; to rehabilitate the site; and to provide an offset area for biodiversity purposes (â€œthe Duralie Extension Projectâ€).

3 Ironstone Community Action Group (â€œICAGâ€), a local community organisation, opposed the Duralie Extension Project and appealed under s 75L of the EPA Act against the determination of the Minister for Planning to grant approval. The appeal involves a merits review of the Ministerâ€™s determination to grant approval to the Duralie Extension Project. The Court determines, on all of the evidence before it, the preferable decision as to whether to refuse or to approve the project application and, if to approve, the conditions of approval. The Court does not have jurisdiction to review on the merits the original decision of the Minister to grant development consent to the existing Duralie Coal Mine. The Courtâ€™s jurisdiction is limited to a merits review of the proposed extension to the existing coal mine only. This limitation on jurisdiction of the Court is important because much of the opposition of the local community is to the operation of the existing coal mine; they want the existing coal mine to close. However, the Court does not have jurisdiction to review the grant or the terms of the development consent for the existing coal mine or to order the closure of the existing coal mine. The Court can only review the acceptability of the proposed Duralie Extension Project.

4 Recognising the limitation on the Courtâ€™s jurisdiction on the appeal, ICAG identified four main reasons for the Court to refuse approval to the Duralie Extension Project:

(a) there has been an inadequate assessment of the impact of the Duralie Extension Project on particular threatened species of fauna and flora and biodiversity generally and the proposed biodiversity offsets are inadequate to mitigate these impacts;

(b) there has been an inadequate assessment of the water quality impacts;

(c) there will be an unacceptable risk to the Giant Barred Frog, a threatened species; and

(d) there will be unacceptable health impacts from small-sized particulate matter ($PM_{2.5}$) generated by the Duralie Extension Project.

5 Objectors from the local community raised additional reasons concerning the unacceptable impacts of noise from ongoing mine operations and from transportation of coal by rail to the Stratford Coal Mine and of dust from the transportation of coal by rail.

6 I have determined that approval should be granted to the Duralie Extension Project, subject to extensive conditions, which provide for greater and more certain conservation of threatened species and biological diversity in the area, protection of water quality, control of particulate emissions, mitigation of noise generated by the mine and noise and dust generated by the transportation of coal by train. These conditions go further than those imposed by the Minister for Planning in his approval of 26 November 2010. The conditions adopt a precautionary approach. They address the concerns raised of inadequacy of assessment by requiring more comprehensive, detailed and on-going assessment of impacts on threatened species, biodiversity, water quality and particulate emissions; set performance standards; require a stepwise approach to implementation, monitoring and adaptive management; and require greater transparency and accountability. These safeguards will, with a higher degree of probability, deliver a stronger link and an appropriate balance, at the landscape level, between the orderly and economic use of the mineral resource, yielding economic and social benefits including export revenue and royalties and direct employment, and the protection and conservation of the areaâ€™s biodiversity and environment.

7 I have been assisted in the hearing of the appeal by Acting Commissioner Smith, under s 37(1) of the *Land and Environment Court Act* 1979 (â€œthe Court Actâ€).

The site and surrounding area

8 The Duralie Coal Mine is located about 10 kms north of Stroud and about 35 kms south of Gloucester. The Bucketts Way, a regional road, is to the west and the North Coast railway line is to the east of the mine. The site is in the Mammy Johnsons River catchment, and is bounded by

the Buckleys Range to the east and Lawlers Range to the west. The area surrounding the site has been extensively cleared for pastoral-based agriculture with limited areas used for intensive poultry farming. There are remnants of native vegetation scattered throughout the area, including patches on the site, with the most significant areas of bushland being on the ridgelines to the east and west of the site.

9 The Mammy Johnsons River flowing along the eastern boundary of the site receives tributary flows from creeks draining the site. One of these tributaries is Coal Shaft Creek. Another is an unnamed tributary to the north of the site. Mammy Johnsons River in turn flows into the Karuah River.

The existing Duralie Coal Mine

10 The Duralie Coal Mine was granted development consent by the Minister for Planning in 1999, and started production in 2003. The development consent (DA 168/99) was modified by the Minister for Planning on 28 October 2009. The current development consent is due to expire in March 2012.

11 Under the development consent, Duralie Coal is allowed to extract up to 1.8 million tonnes of run-of-mine (â€œROMâ€) coal per year, operating 24 hours per day. Currently, open pit mining is in the Weismantel coal seam. ROM coal is loaded by excavator into haul trucks from the open pit and transported to the coal handling area (including a rotary breaker) at the main infrastructure area. The bulk of the ROM coal is tipped directly into a 200 tonne dump hopper. ROM coal is occasionally stored for short periods on the ROM pad for operational reasons. Sized ROM coal from the rotary breaker is transferred by conveyor to the 2,250 tonne coal loadout bin for loading into train wagons. Oversized ROM coal reject material (eg overburden roof rock and floor rock) from the rotary breaker is periodically trucked to the waste rock emplacement for management as potentially acid forming overburden material (Environmental Assessment Duralie Extension Project, Exhibit M2, s 2.1.1).

12 A dedicated train, with the coal laden wagons, transports ROM coal on the North Coast railway to the Stratford Coal Mine about 20 kms to the

north of the Duralie Coal Mine for further processing. At the Stratford Coal Mine, ROM coal is unloaded and processed in the Stratford Coal Mine, Coal Handling and Preparation Plant. Product coal from Stratford Coal Mine is then transported by rail to the Port of Newcastle for export and domestic customers (Environmental Assessment, s 2.1.2).

13 In summary, the Duralie Coal Mine comprises:

Â· an open cut pit, which is gradually moving to the north;

Â· a waste emplacement area, which is located to the south of the open cut pit;

Â· an infrastructure area, which has direct access to the Bucketts Way, a regional road to the west of the mine;

Â· a rail siding, which is located adjacent to the infrastructure area and joins the North Coast railway line to the south of the waste emplacement area; and

Â· an extensive water management system, which includes several large dams and use of water through irrigation in designated irrigation areas (Director-General of Planningâ€™s recommendation to the Minister for Planning in Exhibit M1, Volume 2, p 1257).

14 The Duralie Coal Mine currently operates within mining lease (â€œMLâ€) 1427.

The Duralie Extension Project

15 The Duralie Extension Project involves extending the open cut mining operations at the Duralie Coal Mine within ML 1427 and into the area to the north within Mining Lease Application (â€œMLAâ€) 1. It would extend the current operations by up to 10 years. The Duralie

Extension Project utilises the existing infrastructure of the Duralie Coal Mine, although there would need to be some modifications. The main activities associated with the Duralie Extension Project are:

â€œâ— continued development of open pit mining operations to facilitate a ROM coal production rate of up to approximately 3 Mtpa including:

- extension of the existing approved open pit in the Weismantel Seam to the north-west (ie Weismantel Extension open pit) within ML 1427 and MLA 1; and

- open pit mining operations in the Clareval Seam (ie Clareval North West open pit) within ML 1427 and MLA 1;

â— mining of approximately 114 Mbcm of additional waste rock and progressive back filling of the open pits;

â— ROM coal rail transport movements increased to an annual average of four train movements per day and extension of rail transport hours (7.00am to 2.00am);

â— continued beneficial use of excess water through irrigation (including development of new irrigation areas within ML 1427 and MLA 1);

â— raising of the approved Auxiliary Dam No. 2 to provide significant additional on-site storage capacity to manage excess water on-site.

â— progressive development of dewatering bores, pumps, dams, irrigational infrastructure and other water management equipment and structures;

â— development of new haul roads and internal roads;

â— upgrade of existing facilities and supporting infrastructure in line with increased ROM coal productions;

â— continued development of soil stockpiles, laydown areas and gravel/borrow pits;

â— establishment of a permanent Coal Shaft Creek alignment adjacent to the existing DCM [Duralie Coal Mine] mining area;

â— employment of approximately 135 people for nine years;

â— ongoing monitoring and rehabilitation; and

â— other associated minor infrastructure, plant, equipment and activities.â€

(Environmental Assessment, s ES1.3, p ES-4).

16 The Duralie Extension Project will involve clearing an additional 207 hectares of native vegetation, comprising 87 ha of woodland/forest, 109 hectares of derived grasslands and 11 hectares of cropping land (Environmental Assessment, s ES3.4, p ES-9). The disturbed areas will be progressively rehabilitated. The Duralie Extension Project proposes an offset strategy, which involves conserving, originally, 444 ha of land to the east of the mine (comprising 214 ha of existing remnant vegetation and 230 ha of derived grasslands to be revegetated as woodlands) (Environmental Assessment, s ES3.4, p ES-9). The offset area was subsequently enlarged to about 680 ha (comprising about 290 ha of existing remnant vegetation and 390 ha of derived grasslands to be revegetated as woodlands).

Statutory powers and controls

17 The Duralie Extension Project is classified as a major project under Part 3A of the EPA Act as it is development for the purpose of coal mining (s 75B of the EPA Act). The Ministerâ€™s approval is required to carry out the project (s 75D(1) of the EPA Act).

18 Duralie Coal applied under s 75E(1) for the approval of the Minister under Part 3A of the EPA Act (project application no 08_0203), and submitted on 27 January 2010 the Environmental Assessment required under s 75H(1) of the EPA Act. The Environmental Assessment was publicly exhibited from 8 February 2010 to 22 March 2010. Public submissions were received from the general public, the local community and environmental groups. The submissions raised concerns about the potential water, noise, air quality, blasting and biodiversity impacts of the Duralie Extension Project.

19 In November 2010, the Director-General gave a report on the Duralie Extension Project to the Minister under s 75I(1) of the EPA Act for the purposes of the Ministerâ€™s consideration of the project application for approval. On 8 November 2010, the Director-General recommended the Minister consider the Director-Generalâ€™s Environmental Assessment Report and approve the Duralie Extension Project, subject to conditions.

20 On 26 November 2010, pursuant to s 75J(1) of the EPA Act, the Minister accepted the Director-Generalâ€™s recommendation and approved the carrying out of the Duralie Extension Project on conditions. Notice of the Ministerâ€™s determination was given to Duralie Coal and to objectors.

21 On 7 February 2011, one of the objectors, ICAG, appealed under s 75L(3) of the EPA Act against the determination of the Minister to give approval.

22 Appeals under s 75L are hearings de novo in which the Court has, in addition to any other functions and discretions the Court would otherwise have, all of the functions and discretions which the Minister had in determining the project application (s 39(2) and (3) of the Court

Act). The Court determines whether, on the merits based on the evidence before it, the preferable decision is to grant or to refuse approval to the carrying out of the project.

23 The Ministerâ€™s power to approve or refuse a project application under Part 3A of the EPA Act, and so the Courtâ€™s functions on an appeal under s 75L(3), is in s 75J of the EPA Act. The section provides so far as is relevant:

> â€œ(1) If:
>
> (a) the proponent makes an application for the approval of the Minister under this Part to carry out a project, and
>
> (b) the Director-General has given his or her report on the project to the Minister,
>
> the Minister may approve or disapprove of the carrying out of the project.
>
> (2) The Minister, when deciding whether or not to approve the carrying out of a project, is to consider:
>
> (a) the Director-Generalâ€™s report on the project and the reports, advice and recommendations (and the statement relating to compliance with environmental assessment requirements) contained in the report,
>
> â€¦
>
> (3) In deciding whether or not to approve the carrying out of a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved. However, the regulations may preclude approval for the carrying out

of a class of project (other than a critical infrastructure project) that such an instrument would otherwise prohibit.

(4) A project may be approved under this Part with such modifications of the project or on such conditions as the Minister may determine.

(5) The conditions of approval for the carrying out of a project may require the proponent to comply with any obligations in a statement of commitments made by the proponent (including by entering into a planning agreement referred to in section 93F).â€

24 Section 75R, referred to in s 75J(3), provides in part:

â€œ(2) Part 3 and State environmental planning policies apply to:

(a) the declaration of a project as a project to which this Part applies or as a critical infrastructure project, and

(b) the carrying out of a project, but (in the case of a critical infrastructure project) only to the extent that the provisions of such a policy expressly provide that they apply to and in respect of the particular project.

(3) Environmental planning instruments (other than State environmental planning policies) do not apply to or in respect of an approved project.â€

25 In this case, the effect of s 75R(2) and (3) is that the Great Lakes Local Environmental Plan 1996 (â€œGreat Lakes LEPâ€), which would otherwise apply to the site, does not apply to or in respect of the Duralie

Extension Project. The effect of s 75R(2) and (3) is also that State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (â€œMining SEPPâ€), and in particular cl 12 of the Mining SEPP which specifies relevant matters for a consent authority to consider in determining a development application for consent for development for the purposes of mining, do not apply to the exercise of power under s 75J(1) of the EPA Act to approve the carrying out of the Duralie Extension Project. I so held in *Rivers SOS Inc v Minister for Planning* [2009] NSWLEC 213 at [76]â€“[112]. In so concluding I differed from the view reached by Biscoe J, with respect to the applicability of a different State environmental planning policy to the exercise of the power under s 75J(1), in *Hilltop Residents Action Group Inc v Minister for Planning* [2009] NSWLEC 185; (2009) 171 LGERA 247 at [65]â€“[67]. In *Australians for Sustainable Development Inc v Minister for Planning* [2011] NSWLEC 33 at [215], however, Biscoe J reconsidered his view in *Hilltop* in light of my different view in *Rivers SOS* and concluded that, in light of the terms of s 75R(2), State environmental planning policies do not apply at the approval stage (although he remained of the view that the Minister cannot grant approval to carry out an unlawful development): at [214]. I remain of the view that the Mining SEPP, and cl 12 of the Mining SEPP in particular, do not apply to the approval of a project application under Part 3A to carry out a project for the purposes of mining.

26 Nevertheless, the Minister, and hence the Court on appeal, may (but is not required to) take into account the provisions of the Mining SEPP and the Great Lakes LEP (s 75J(3) of the EPA Act).

27 ICAG submitted that the Court should, in the exercise of its discretion, take into account the relevant parts of cls 2, 12 and 14 of the Mining SEPP. These are:

> â€œ2 The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:
>
> (a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and

(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and

(c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.

12 Before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

(a) consider:

(i) the existing uses and approved uses of land in the vicinity of the development, and

(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and

(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and

(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and

(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).

14(1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

(a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,

(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,

â€¦â€.

28 ICAG also submitted that the Court should take into account the aims of the Great Lakes LEP in cl 2 and the aims of the Rural 1 Zone of the Great Lakes LEP set out in cl 8.

29 I do not consider I should, in the exercise of the discretion under s 75J(3) of the EPA Act, take these provisions, in their terms, into account as relevant considerations. However, the matters raised in the provisions are topics that will be discussed in general and weighed in the balance in determining the project application.

30 Finally, I note that after the hearing concluded and judgment was reserved, Part 3A of the EPA Act was repealed by the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act* 2011 which commenced on 1 October 2011. Nevertheless, Part 3A continues to apply to the Duralie Extension Project because the project falls within the definition of â€œtransitional Part 3A projectsâ€ in Schedule 6A of the EPA Act (see cl 2(1)(a) of Schedule 6A). Part 3A of the EPA continues to apply to transitional Part 3A projects (see cl 3(1) of Schedule 6A). Accordingly, the Courtâ€™s powers on this appeal under s 75L(3) remain the same, including under ss 75J and 75R, as if Part 3A had not been repealed.

The issues on appeal

31 ICAG identified four main issues:

Â· *Biodiversity*: there has been an inadequate assessment of the impacts of the Duralie Extension Project on particular threatened species and biodiversity in general and the proposed biodiversity offsets do not compensate for these impacts.

Â· *Water quality*: there has been an inadequate assessment of the Duralie Extension Project on water quality.

Â· *Giant Barred Frog*: the Giant Barred Frog, a listed threatened species, is at risk if water quality changes as a result of the Duralie Extension Project.

Â· *Health impacts from $PM_{2.5}$ particulate emissions*: emissions of particulate matter of $PM_{2.5}$ size from the Duralie Extension Project pose a risk to human health.

32 The local community raised a number of other issues, but of relevance to the Duralie Extension Project are:

Â· *Noise*: there will be unacceptable noise impacts from mining operations for the Duralie Extension Project and from the additional transportation of coal by rail to the Stratford Coal Mine.

Â· *Dust*: there will be unacceptable dust impacts from the uncovered train wagons transporting coal to the Stratford Coal Mine.

33 I will deal with each issue.

The evidence on the appeal

34 ICAG provided expert evidence from Mr Brendan Ryan, ecologist; Dr Ian Wright, water quality specialist; Dr David Newell, herpetologist; and Dr Peters, respiratory health specialist.

35 ICAG also called evidence from 13 objectors who gave evidence at Gloucester Court House on 12 May 2011. The objectors were: Mr Tony Tersteeg (Johnsons Creek Conservation Committee); Ms Amanda Albury (resident and President of Rivers SOS); Ms Janet Jonas (resident of Wards River); Mr Bruce Oâ€™Connor (resident of Wards River); Ms Rachael Wallbank (resident and farmer on Karuah River); Ms Diana Stephenson (Indigenous representative); Mr Brian Eastoe (Stroud Branch of the NSW Farmers Association); Mr Garry Smith (resident of Gloucester); Mr Graeme Healy (Chairperson, Barrington-Gloucester-Stroud Preservation Alliance); Dr Steve Robinson (retired psychiatrist and resident, Gloucester); Mr Kevin Johnson (oyster farmer, Karuah); Mr Adrian Callaghan (resident, Karuah River); and Mr Ron McLachlan (Econetwork, Port Stephens).

36 The Minister did not call any expert evidence.

37 Duralie Coal called expert evidence from Dr David Goldney, ecologist; Dr Barry Noller, toxicologist; Dr Arthur White, herpetologist; Professor David McKenzie, respiratory health specialist; Dr Nigel Holmes, air quality specialist; Dr Frans Kalf, hydrologist; and Mr Lindsay Gilbert, water quality specialist.

38 The Court conducted an on-site inspection of the Duralie Coal Mine, the area of the Duralie Extension Project, part of the proposed offset area and surrounding areas on 12 May 2011.

39 Extensive documents were tendered and have been considered including the project application, the Environmental Assessment and supporting studies and information, public and government submissions, departmental consideration of the project application including the Director-Generalâ€™s Environmental Assessment Report to the Minister, the Ministerâ€™s approval of the Duralie Coal Mine, the Ministerâ€™s approval of the Stratford Coal Mine, amongst other documents.

Biodiversity issue

40 The resolution of the biodiversity issue involves three components:

1. What vegetation communities and habitat of threatened species of terrestrial fauna and flora will be cleared or otherwise impacted by the Duralie Extension Project?

2. What mitigation measures are proposed by the Duralie Extension Project?

3. Will the likely impacts of threatened species and biodiversity be adequately mitigated by the mitigation measures proposed?

Vegetation and habitats to be cleared

Vegetation communities to be cleared

41 The Duralie Coal Mine and Duralie Extension Project are located in a locality that has been extensively cleared for agriculture, leaving fragmented areas of remnant native vegetation of a diversity of age classes. The Duralie Extension Project will disturb 207 ha of land, comprising 87 ha of remnant native vegetation communities, 109 ha of derived grasslands and 11 ha of cropping land. The vegetation communities were classified and numbered as part of the Environmental Assessment. The 87 ha of remnant native vegetation to be cleared involves:

Â· 61 ha of vegetation community 1: Spotted Gum â€“ Red Ironbark â€“ Thick-leaved Mahogany Forest (having dominant species of Spotted Gum (*Corymbia maculata*), Red Ironbark (*Eucalyptus fibrosa*), Thick-leaved Mahogany (*E. carnea*) and Tallowwood (*E. microcorys*));

Â· 2 ha of vegetation community 2a: Spotted Gum â€“ Grey Ironbark â€“ Thick-leaved Mahogany Forest (having dominant species

of Spotted Gum (*Corymbia maculata*), Grey Ironbark (*Eucalyptus siderophloia*), Narrow-leaved Ironbark (*E. crebra*), Tallowwood (*E. microcorys*), Grey Gum (*E. canaliculata*) and Thick-leaved Mahogany (*E. carnea*));

Â· 20 ha of vegetation community 3: Red Gum Grassy Woodland (having dominant species of Forest Red Gum (*Eucalyptus tereticornis*), Grey Box (*E. moluccana*) and Grey Ironbark (*E. siderophloia*));

Â· 3 ha of vegetation community 4: Grey Gum â€“ Red Gum â€“ Apple Riparian Forest (having dominant species of Grey Gum (*Eucalyptus canaliculata*), Rough-barked Apple (*Angophora floribunda*), White Mahogany (*E. acmenoides*) and Forest Red Gum (*E. tereticornis*));

Â· 1 ha of vegetation community 7: Stringybark â€“ Paperbark Forest (having dominant species of White Mahogany (*Eucalyptus acmenoides*), Thick-leaved Mahogany (*E. carnea*) and Prickly-leaved Paperbark (*Melaleuca nodosa*)) (Environmental Assessment, Appendix E, s E4.1, p E-56 and see also Table E-6, p E-29).

42 None of the vegetation communities to be cleared fall within the descriptions of any of the listed endangered ecological communities under the *Threatened Species Conservation Act* 1995.

43 Dr Goldney contends that the patches of the vegetation communities to be cleared for the Duralie Extension Project are mostly regrowth woodland and forests. These have lower conservation values than the forests that were present in the pre-European landscape. Dr Goldneyâ€™s assessment of the conservation values of the land to be cleared includes:

> â€œ4.1 The ecological status of the Project land has changed significantly since European settlement in the second half of the 19th C. The land on the valley floor has historically been cleared of its pre-existing woodland and forests driven by timber getting and the creation of dairy farms that proved to be non-sustainable. Farming is now mainly confined to grazing

with limited cropping. Historic clearing extended across much of the nearby ranges. Small pockets of old growth persist in the valley floor and in the nearby ranges but not within the Project area. Hence the patchy regrowth that is now extant across the catchment is predominantly regrowth interspersed with secondary grasslands and scattered individual trees.

4.2 Regrowth woodlands and forests are in forest formation, that is they are particularly dense, with tree densities up to 400-1000 per ha. The age of this regrowth varies considerably from 10 to 50 years. Regrowth timber within the Project area varies from 10â€“40 years with the majority around 20 years old. Hence we have a patchy landscape with small to medium sized remnant patches interspersed with secondary grasslands and a scattered tree-scape. The remnant patches tend to be habitat homogenous rather than heterogeneous which tends to favour a particular suite of vertebrate species that can exploit the habitat niches made available by this patchy succession and to exclude species that are unable to exploit the available habitats.

4.3 The regrowth that has occurred (plant succession) within the Project area is mainly due to the exclusion of grazing when the land was purchased by DCM. The associated extant protected and threatened species that are woodland and forest dependent are mainly the result of relatively recent species incursions from adjoining landscapes rather than from pre-existing extant remnant populations.

4.4 Since the regrowth woodlands and forests are relatively young (ie typically less than 40 years old) they tend to have a lower number of hollows, lower number of stag trees (dead upright hollow timber) and lower abundance of forest-woodland floor mature logs with and without hollows, when compared with mature woodland and forest. This in itself limits the number of hollow dependent species. The widespread forest

formations with limited log cover also significantly limits suitable habitat for many reptiles particularly away from woodland/forest edges.

4.5 The pre-European creek lines have also been significantly degraded and critical ecosystem thresholds have been exceeded.

4.6 All major ecosystem cycles (carbon, water and nutrients) have been significantly and adversely impacted at point and landscape scales, as has solar energy interception.

4.7 Under no circumstances can the Project area be considered a pristine quality conservation area, although it is not without conservation values that are described in the EA and is in the process of demonstrating significant self initiated recovery. That is there is evidence that system resilience in this landscape still remains at a level where self recovery is possible in contrast for the need for restoration intervention.

4.8 The reality is that the Project area is a very degraded but self-recovering landscape, but nevertheless one with inherent conservation values, albeit significantly lower than were present in the pre-European landscape.

4.9 Furthermore the current recovering ecological system present within the Project area is widespread and well represented across the Mammy Johnsons River catchment.â€ (Goldney Report, Exhibit D4, paras 4.1â€“4.9)

44 Mr Ryan acknowledged the degraded nature of the area to be impacted by the Duralie Extension Project but contended that the remnant native vegetation had high conservation values. Mr Ryan considered that the assessment of the quality of habitat and populations of threatened species in the Environmental Assessment was hampered

by the lack of more comprehensive and targeted surveys in the project area and in the offset area (Ryan Report, Exhibit A2, paras 7â€“11). Mr Ryan contended in oral evidence that classification of areas to be cleared as regrowth distorts the assessment of biodiversity values as it implies recent disturbance and consequently reduced habitat value. Mr Ryan noted that the Environmental Assessment records that 611 hollows were identified in 184 trees in the study area. Mr Ryan said that he had observed, during the Court inspection on 12 May 2011, a significant number of larger trees with hollows. Mr Ryan contended the proposed extension to mining would remove habitat for a number of threatened species and could lead to local extinction of some threatened species, given the lack of information showing otherwise (Ryan Report, Exhibit A2, paras 1â€“2). Mr Ryan also contended that the failure to undertake surveys of the biodiversity values of the land classified as derived grasslands to be disturbed by the Duralie Extension Project distorted the assessment of overall biodiversity values in the area to be impacted (Ryan oral evidence).

Habitat of threatened fauna species observed on the site to be cleared

45 The particular concern expressed by Mr Ryan was that the vegetation communities to be cleared for the Duralie Extension Project comprised habitat of threatened species of fauna and flora.

46 Dr Goldney and Mr Ryan agreed that the vegetation communities to be cleared in MLA 1 and ML 1427 have been recorded as providing habitat for five threatened species of birds (the Swift Parrot, Grey-crowned Babbler, Brown Treekeeper, Speckled Warbler and Varied Sittella) and one threatened species of marsupial (the Squirrel Glider). Dr Goldney contends, based on his view that the area to be cleared is primarily regrowth, that the threatened species using remnant vegetation in the project area as habitat are mainly a result of relatively recent species incursions from the adjoining landscape rather than from pre-existing, extant remnant populations.

Swift Parrot

47 There has been one sighting of the Swift Parrot in 2008 in a remnant patch in the north of MLA 1 in vegetation community 1 (Spotted Gum â€“ Red Ironbark â€“ Thick-leaved Mahogany Forest). This is the only sighting of the Swift Parrot in the Gloucester Valley. This vegetation patch contains foraging habitat (winter feeding) but not breeding habitat for the Swift Parrot (it nests in Tasmania). Foraging habitat is winter flowering eucalypts, with a preference for Red Ironbark. Communities 1, 2aâ€“2d, 3, 4 and 6 comprise foraging habitat for the Swift Parrot, containing various winter flowering eucalypts. Of these vegetation communities, the area to be cleared in MLA 1 includes vegetation communities 1, 2a, 3 and 4. However, the surrounding lands and the revised offset areas contain all of the vegetation communities 1, 2aâ€“2d, 3, 4 and 6, and hence foraging habitat. Dr Goldney expressed the view that other winter flowering eucalypts in these areas, such as Spotted Gum, although not necessarily preferred species, nevertheless could provide adequate foraging in winter. Dr Goldney stated in oral evidence that the initial offset area contains a significantly larger area of foraging habitat than the area to be cleared in MLA 1.

48 Mr Ryan expressed the view that removal of 61 ha of vegetation community 1, being the vegetation community in which the single sighting of the Swift Parrot in the Gloucester Valley occurred, may represent a significant threat to the Swift Parrot as vegetation community 1 was not initially proposed to be included in the initial offset area. After Mr Ryan expressed this opinion, the offset area was expanded to include, amongst other areas, a nearby patch of vegetation community 1 of approximately 63 ha, adjacent to ML 1427 and MLA 1, as well as expanded areas of vegetation communities 2aâ€“2d (about 171 ha) and vegetation communities 3, 4 and 6 (about 31 ha in total).

49 It is also to be noted that the Duralie Extension Project required, and was granted, approval under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth) (â€œEPBC Actâ€). Conditions 12â€“15 of the approval under the EPBC Act require Duralie Coal to take action to ensure protection of the Swift Parrot. Specifically, Duralie Coal must permanently protect and secure 177 ha of Swift Parrot habitat in an offset area (Condition 12(b)). It must also prepare an â€œOffset Management Planâ€ to be approved by the Commonwealth Minister, which, among other things, provides a detailed description of the Swift Parrot habitat in the offset area; states management actions to protect and enhance that Swift Parrot habitat; sets out a monitoring plan including the undertaking of ecological surveys to assess the success of

the management measures against identified milestones and objectives; sets performance measures and reporting requirements against identified objectives, including trigger levels for corrective actions, and actions to be taken to ensure performance measures and objectives are met; and requires reports to be submitted to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities identifying the management actions undertaken, the outcomes of those actions and any need for improvement (Conditions 13 and 19). Duralie Coal must implement the approved offset management plan and any changes to it must be approved by the Commonwealth Minister (Condition 14). The offset area must be protected in perpetuity (Condition 15).

50 In these circumstances, the clearing of winter foraging habitat of the Swift Parrot for the Duralie Extension Project is unlikely to adversely impact the Swift Parrot.

Grey-crowned Babbler (Eastern subspecies)

51 There have been two sightings of the Grey-crowned Babbler in or near MLA 1, one in derived grassland and the other in the remnant patch of vegetation community 1. Both locations will be cleared and mined for the Duralie Extension Project. There are numerous sightings for the Grey-crowned Babbler through the Gloucester Valley and particularly around the township of Gloucester.

52 Dr Goldney and Mr Ryan agree that the Grey-crowned Babblers sighted in MLA 1 are a colony but disagree as to whether they are a population in their own right. Mr Ryan states that the Grey-crowned Babblers recorded in the project area were the only known population in the locality and no others have been recorded locally (Ryan Report, Exhibit A2, paras 28 and 29). This is incorrect. There have been widespread sightings of Grey-crowned Babblers throughout the Gloucester Valley.

53 Dr Goldneyâ€™s opinion was that the colony is very likely part of a meta-population (a population within a larger population) and not a population in its own right. The limited extent and nature of the existing habitat available within the project area supports the observation that there is likely to be only one colony present within the project area. The

widespread sightings throughout the Gloucester Valley support the observation of a meta-population. I accept Dr Goldneyâ€™s findings that the Grey-crowned Babblers in MLA 1 are a colony within a meta-population in the Gloucester Valley.

54 Dr Goldney was further of the view that the removal of the derived grasslands and regrowth open woodland/forest as part of the Duralie Extension Project would not necessarily cause the loss of this colony. Dr Goldney said that similar habitat to that proposed to be removed is widespread in the Gloucester Valley and is likely to be readily accessible to the colony if it is displaced by the Duralie Extension Project. Dr Goldney concludes that the Grey-crowned Babbler is very unlikely to be adversely impacted by the Duralie Extension Project (Goldney Report, Exhibit D4, para 8.22).

55 I accept Dr Goldneyâ€™s findings and conclusion as to the unlikely adverse impact of the Duralie Extension Project on the Grey-crowned Babbler.

Brown Treecreeper

56 A single pair of Brown Treecreepers were sighted on one occasion in the remnant patch of vegetation community 1 in MLA 1. Both Dr Goldney and Mr Ryan (in oral evidence) agreed that these birds were likely to be vagrant or associated with dispersal phenomena. Dr Goldneyâ€™s reasons for so concluding were:

â€œâ— The species is typically a communal species found in groups of eight to twelve birds;

â— While it is predicted to occur in the Karuah Manning CMA subregion it had not previously been located within the sub region;

â— The closest BioNet record is approximately 90 km west of the Project area;

â— The species does not appear to be resident within the

Project area nor has it been found breeding there. Further the presence of a single pair is indicative that this is very unlikely to be a breeding pair;

â— An important habitat component is appropriately sized fallen timber that is in short supply within the Project area;

â— Further, much of the regrowth woodland forest habitat within the Project area is sub-optimal since tree densities are too high and ground feeding niche space too limited;

â— Dispersal movements are a relatively common occurrence for this species; and

â— The weight of evidence is that this species cannot maintain viable populations in remnants smaller than 200 ha (the largest remnant within the Project area is about 45 ha).â€

(Goldney Report, Exhibit D4, para 8.21).

57 Dr Goldneyâ€™s opinion is that the sighting of the Brown Treecreeper was a one-off observation which does not present a viable population. Dr Goldneyâ€™s conclusion is that a local population of the Brown Treecreeper is very unlikely to be adversely impacted by the Duralie Extension Project (were a resident of the population found to be present) (Goldney Report, Exhibit D4, para 8.21).

58 I do not accept Mr Ryanâ€™s earlier expressed view in his written report that the loss of vegetation in which the only sighting of the Brown Treecreeper was recorded was â€œhighly significantâ€ (Ryan Report, Exhibit A2, para 27). I instead accept Dr Goldneyâ€™s findings and conclusion as to the unlikely adverse impact of the Duralie Extension Project on the Brown Treecreeper.

59 The Speckled Warbler has been spotted three times in the remnant patch of vegetation community in MLA 1 and once in ML 1427 at a location that has now been mined for the existing Duralie Coal Mine. The remnant patch in MLA 1 will be cleared and mined for the Duralie Extension Project. The Speckled Warbler has also been sighted in the footslopes of the Buckleys Range in an area now to be conserved as an offset and three other locations in the Gloucester Valley to the north of the project area.

60 Dr Goldney was also of the opinion that the Speckled Warblers in the project area and surrounds were part of a meta-population of species in the landscape and not a population in their own right. The extent and nature of the remnant woodland/forest patches in the project area are sub-optimal for the species to breed and forage successfully. The speciesâ€™ preferred habitat is grassy woodland and it builds its nests on or near the ground. Only some of the regrowth open forest is suitable for foraging and breeding for the Speckled Warbler (Goldney Report, Exhibit D4, para 8.23). Mr Ryan accepted, in oral evidence, that there was an abundance of habitat for the Speckled Warbler in the fragmented landscape surrounding the project area. The widespread availability of similar habitat and the sightings throughout the Gloucester Valley support the observation of Dr Goldney of a meta-population of Speckled Warblers.

61 Dr Goldney also was of the opinion that the widespread availability of habitat similar to or the same as that proposed to be removed and its likely ready accessibility to any individuals displaced by the Duralie Extension Project means that the colony of Speckled Warblers should not be lost. Dr Goldney considered that it is very unlikely that individuals displaced from the project area would be prevented from relocating into suitable nearby habitats due to all available niche spaces already being occupied by incumbent Speckled Warblers (Goldney Report, Exhibit D4, para 8.23). Accordingly, Dr Goldney concluded that the Speckled Warbler is very unlikely to be adversely affected by the Duralie Extension Project.

62 I accept Dr Goldneyâ€™s findings and conclusion as to the unlikely adverse impact of the Duralie Extension Project on the Speckled Warbler.

Varied Sittella

63 There has been one recorded sighting of the Varied Sittella, and Mr Ryan said in oral evidence that he observed 10â€“12 Varied Sittella individuals during his inspection of the site in April 2011 in the remnant patch of vegetation, in the north of MLA 1. This patch is to be cleared and mined for the Duralie Extension Project. The Varied Sittella has also been sighted to the east of ML 1427 near Mammy Johnsons River in a location which will be conserved as a biodiversity offset. There has been one sighting in Buckleys Range and others throughout the Gloucester Valley.

64 The Varied Sittella likes woodland and regrowth areas that are not too dense. Dr Goldney and Mr Ryan agreed that there is habitat from the Varied Sittella in and surrounding the project area.

65 Dr Goldney and Mr Ryan agreed that there would be loss of habitat for the Varied Sittella by clearing for the Duralie Extension Project. They express different views of the impact of such loss of habitat. Dr Goldney expressed the view in oral evidence that the habitat available in the offset areas and surrounding areas offered opportunities for individuals to relocate if clearing was undertaken outside breeding time. Mr Ryan contended in oral evidence that the remnant vegetation in MLA 1 is a high value habitat for Varied Sittella. He questioned the ability of Varied Sittella to relocate from the area to be cleared to the offset area or surrounding areas.

66 I find that the Duralie Extension Project will impact on the individuals of Varied Sittella observed in MLA 1 by clearing of their habitat. The ability of the individuals to relocate to suitable alternative habitat depends on clearing being required to be undertaken outside of their breeding time. The requirement to avoid clearing in the breeding season can be imposed as part of the Vegetation Clearing Plan, a sub-plan under the Biodiversity Management Plan (see Condition 43(d) of revised conditions of approval, Exhibit M8). The revised offset strategy will also conserve and enhance significantly larger areas of suitable habitat for the Varied Sittella than the area to be cleared (see below).

Squirrel Glider

67 There have been four sightings of the Squirrel Glider in or near ML 1427 and MLA 1. The location of the two southern most sightings have subsequently been mined by the existing Duralie Coal Mine. A third sighting was to the west of ML 1427. This is in an area now proposed to be conserved as an offset in the revised offset strategy. The fourth sighting is in the same remnant patch of vegetation community 1 in the north of MLA 1. This patch is to be cleared and mined for the Duralie Extension Project. The Squirrel Glider has also been sighted in various other places throughout the Gloucester Valley, including one in Buckleys Range in an area to be conserved as an offset.

68 Dr Goldneyâ€™s opinion was that the habitat availability within the project area is patchy and suboptimal for the Squirrel Glider. Dr Goldney stated that it is unlikely that the species is continuously distributed across the project area because of the significant habitat limitations. There are significant restraints on population size for the species, the most important likely to be a lack of hollows in regenerating woodland and forest areas, together with a lack of dead standing stag trees, rather than a lack of landscape connectivity. Dr Goldney stated that while the Duralie Extension Project would remove known habitat and potentially displace resident Squirrel Gliders, it is not likely to lead to a local population of this species being placed at risk of extinction. Dr Goldney said that pre-clearance surveys will be implemented for the Duralie Extension Project, the procedures for which will be included in the Biodiversity Management Plan. Any captured Squirrel Gliders will be relocated to nearby suitable sites. Hence, Dr Goldney concluded that a viable population of the Squirrel Glider will not be at risk of extinction by the Duralie Extension Project (Goldney Report, Exhibit D4, para 8.19 and see p E-84 of Environmental Assessment).

69 I accept Dr Goldneyâ€™s findings and conclusions in preference to Mr Ryanâ€™s interpretation, based on a desktop review of the data, that the proposal will remove a very large portion of the known habitat for the species locally and have a significant impact on the species in a local and possibly regional context. Past and existing disturbances, by logging, agriculture, fire and now mining, have already made habitat for the Squirrel Glider in the Duralie Extension Project area patchy and suboptimal and caused the likely number of resident Squirrel Gliders in the area to be low. Although forest/woodland habitat will be cleared in MLA 1 for the Duralie Extension Project, there will still be suitable habitat nearby, including another patch of vegetation community 1 to the west of

ML 1427, which will be conserved in the revised offset area, into which potentially displaced Squirrel Gliders can move, as well as landscape connectivity with more removed areas of suitable habitat. Because the species population is not optimal across the landscape, it is likely that displaced Squirrel Gliders would not be prevented from relocating into suitable habitats due to all available niches already being occupied by incumbent Squirrel Gliders.

Habitat of threatened species observed in locality to be cleared

70 In addition to the threatened species which had been recorded in the vegetation communities to be cleared for the Duralie Extension Project, six other threatened species of fauna (Koala, Brush-tailed Phascogale, Common Planigale, Spotted-tailed Quoll, Powerful Owl and Diamond Firetail) and one threatened species of flora (*Melaleuca groveana*) have been recorded in the vicinity of the Duralie Extension Project area.

Koala

71 The Koala was not observed in the project area during the targeted surveys for the Koala and the assessment of Koala habitat undertaken as part of the Environmental Assessment for the Duralie Extension Project. Database searches indicate two sightings of Koalas to the west of ML 1427 but away from the areas proposed to be cleared, as well as at multiple locations throughout the wider geographical area of the Gloucester Valley.

72 Dr Goldney has adequately answered Mr Ryanâ€™s concerns raised in his written statement as to the assessment of utilisation by the Koala of the locality (Ryan Report, Exhibit A2, para 25). Dr Goldney noted that the Koala was not observed within the project area during the well planned sequence of surveys carried out in space and time, however, past and present traces of Koalas have been observed in the west of the project area. Database searches reveal that the Koala has been recorded in multiple locations in the wider area. Dr Goldney stated that the Koala is a particularly easy animal for an experienced surveyor

to locate by spotlighting and observing traces such as fur, tree scratch marks and characteristic droppings. These survey techniques were used in the assessment (Goldney Report, Exhibit D4, para 8.20).

73 The assessment of Koala habitat undertaken under State Environmental Planning Policy No. 44 â€“ Koala Habitat Protection concluded that there were neither Koalas nor core Koala habitat within the Duralie Extension Project area. On a very conservative estimate, 20 ha of potential habitat would be removed (Goldney Report, Exhibit D4, para 8.20 and p E-107 of Environmental Assessment).

74 Mr Ryanâ€™s â€œinterpretationâ€, without having undertaken field surveys or examining database records showing the widespread sightings of the Koalas in the Gloucester Valley, that the Duralie Extension Project will remove a large proportion of known habitat for the species locally and may effectively sever connectivity east and west of the mine, and that this may represent a significant impact on the species locally and possibly regionally (Ryan Report, Exhibit A2, para 26), is not supported by the evidence, and has been adequately answered by Dr Goldneyâ€™s response.

75 I instead accept the findings and conclusion of Dr Goldney as to the unlikely adverse impact of the Duralie Extension Project on the Koala.

Brush-tailed Phascogale

76 The Brush-tailed Phascogale was sighted in MLA 1 to the west of the area of major surface development for the Duralie Extension Project. Three other sightings have been recorded in ML 1427 within what is now the open pit for the existing Duralie Coal Mine. Three further sightings have been made in the Mammy Johnsons River Valley to the west and south of the Duralie Coal Mine. There are numerous other sightings throughout the wider Gloucester Valley.

77 Dr Goldneyâ€™s opinion was that the Brush-tailed Phascogale was present in low densities, based on the low trapping success and the low availability of known habitat for the species in the project area (because there is a paucity of hollows that can be used for nesting) (Goldney Report, Exhibit D4, para 8.18).

78 Dr Goldney has adequately answered Mr Ryanâ€™s concern, expressed in his written report, as to the survey techniques used to determine the speciesâ€™ presence, distribution and abundance (Ryan Report, Exhibit A2, para 20). Dr Goldney stated that the trapping (using Elliott traps) was undertaken using randomly stratified sampling sites. Dr Goldney noted that while Brush-tailed Phascogale can escape Elliott traps, when they do so it is usually obvious. The fact that Brush-tailed Phascogale was successfully captured in Elliott traps indicates that the original estimate of the species being at low densities within the project area is likely correct (Goldney Report, Exhibit D4, para 8.18).

79 Dr Goldneyâ€™s opinion was that the Duralie Extension Project is unlikely to significantly affect the life cycle of the Brush-tailed Phascogale, known habitat, or connectivity between west and east habitats, since appropriate connectivity is available to the north and south and via the Mammy Johnsons River (Goldney Report, Exhibit D4, para 8.18 and p E-80 of Environmental Assessment).

80 Dr Goldneyâ€™s evidence satisfactorily responds to Mr Ryanâ€™s concerns as to the removal of habitat and severing of connectivity. I accept Dr Goldneyâ€™s findings and conclusion that it is unlikely that a large portion of known habitat for the Brush-tailed Phascogale will be removed or that connectivity between east and west habitats will be completely severed.

Common Planigale

81 The Common Planigale has not been observed in the area of MLA 1 or ML 1427 proposed for the Duralie Extension Project, notwithstanding suitable surveys. The species was recorded once in 2003 by a pre-clearance survey of the footprint of the existing Duralie Coal Mine in ML 1427 but the area has since been mined. There is no other record of a sighting in the Gloucester Valley.

82 Dr Goldney has adequately answered Mr Ryanâ€™s concern, expressed in his written report, as to the survey techniques employed to determine the presence, distribution and abundance of the Common Planigale (Ryan Report, Exhibit A2, para 17). Dr Goldney explained that the techniques used included Elliott traps, hair tubes and analysis of fox

scats for signs of native mammal prey, which techniques are suitable for detecting the Common Planigale. There are also observations made during survey periods (Goldney Report, Exhibit D4, para 8.17).

83 Dr Goldney stated that little suitable habitat now exists across the project area and, where it does exist, it is in discontinuous patches unlikely to be able in themselves to support a viable population of the species. Dr Goldneyâ€™s view was that the species is very unlikely to be present (Goldney Report, Exhibit D4, para 8.17). Mr Ryanâ€™s oral evidence, which was different to his interpretation based only on the data collected and discussed in the Environmental Assessment (Ryan Report, Exhibit A2, para 19), was that the Common Planigale is potentially locally extinct although he could not be sure.

84 I accept Dr Goldneyâ€™s findings and conclusions and find that the Duralie Extension Project will not adversely impact the Common Planigale (if it is present on the site).

Spotted-tailed Quoll

85 There have been no sightings of the Spotted-tailed Quoll anywhere in MLA 1 or ML 1427, despite rigorously designed and implemented surveys for the species (Goldney Report, Exhibit D4, para 8.25). Database searches reveal recorded sightings throughout the Gloucester Valley, including ones to the north, south and west of the project area. Nevertheless, the evidence does not establish that the Duralie Extension Project will adversely affect any population of the Spotted-tailed Quoll in the landscape.

Powerful Owl

86 The Powerful Owl was sighted twice in pre-clearance surveys in ML 1427 at locations now within the open pit of the existing Duralie Coal Mine. The Powerful Owl has not been sighted again in more recent surveys of the project area. It has been sighted further a field in the Gloucester Valley.

87 Dr Goldney stated that the existing habitat within the project area

is generally unsuitable for the Powerful Owl and thus it was not surprising that they were not located during fauna surveys (Goldney Report, Exhibit D4, para 8.24). Within the vicinity of the project area, suitable habitat is mainly confined to the section of Coal Shaft Creek outside the project area and along Mammy Johnsons River. Contrary to Mr Ryanâ€™s belief (Ryan Report, Exhibit A2, para 34), this habitat will not be disturbed by the Duralie Extension Project (Goldney Report, Exhibit D4, para 8.24 and see p E-96 of Environmental Assessment).

88 On this evidence, the Duralie Extension Project is not likely to adversely impact the Powerful Owl.

Diamond Firetail

89 The Diamond Firetail, a threatened species of bird, has been recorded in databases at three locations in the Gloucester Valley, the closest being within 5 kms to the north. Dr Goldney stated that, despite rigorously designed and implemented fauna surveys, the Diamond Firetail was not recorded in the project area (Goldney Report, Exhibit D4, para 8.25). Mr Ryan stated that the Diamond Firetail is known to forage in derived and introduced grasslands and that the clearing of such grasslands for the Duralie Extension Project may represent significant foraging habitat for the Diamond Firetail locally. He requested more detail on the surveys conducted for the species (Ryan Report, Exhibit A2, para 38). However, Mr Ryan did not positively assert that the Diamond Firetail was present in the project area or would be affected by the Duralie Extension Project.

90 I find that it is unlikely that the Duralie Extension Project will adversely affect the Diamond Firetail.

Melaleuca groveana

91 There have been no recordings of the threatened species of the plant, *Melaleuca groveana*, in MLA 1 or ML 1427 or indeed anywhere in proximity to the project area. The only two recorded observations are close in the very upper reaches of a tributary at Mill Creek, to the east of the Buckleys Range (the Duralie Extension Project area is to the west of Buckleys Range).

92 The evidence does not establish that the Duralie Extension Project will have an adverse affect on *Melaleuca groveana* (if it occurs at all in the project area).

Mitigation measures proposed

93 Duralie Coal proposes, and the Ministerâ€™s revised conditions of approval would require, various impact avoidance and mitigation measures in relation to threatened species and biodiversity. These primarily are included in the biodiversity offset strategy. However, there is also an overarching environmental management strategy (required by Condition 1 of Schedule 5 of the revised conditions of approval) as well as a rehabilitation management plan (required by Conditions 55â€“57 of Schedule 3 of the revised conditions of approval) and other measures to avoid or mitigate impacts on biodiversity in other management plans and programs, such as a water management plan (including irrigation management), noise management plan, and an air quality and greenhouse gas management plan (required by Conditions 7, 23, 28 and 29 of Schedule 3 of the revised conditions of approval).

94 The biodiversity offset strategy was originally proposed in Duralie Coalâ€™s Environmental Assessment lodged with the project application. However, during the course of the hearing, and in response to the evidence, the biodiversity offset strategy was enhanced in a number of ways, including: expanding the number and the extent of the offset areas; ensuring greater correlation of the vegetation communities to be conserved in the offset area with those proposed to be cleared for the Duralie Extension Project; including performance standards for the design, implementation and completion of the offset strategy; and including greater specificity in the conditions of approval. These enhancements were reflected in the revised conditions of approval (Exhibit M8).

95 The revised offset strategy involves provision of two types of offset areas:

(a) existing areas of native vegetation to be enhanced through natural regeneration and management for conservation (enhancement areas); and

(b) re-establishment of woodland/open woodland habitat and forest habitat in derived grasslands by selective planting and fencing to allow natural regeneration (revegetation areas).

96 Originally, 444 ha were proposed as an offset area, comprising 214 ha of enhancement areas and 230 ha of revegetation areas (Environmental Assessment, Table 4â€“23, p 4-60). Under the revised offset strategy, 680 ha are proposed as an offset area, comprising 290 ha of enhancement areas and 390 ha of revegetated areas (Table SOC-1 in Appendix 9 Statement of Commitments to the revised conditions of approval, Exhibit M8). These are intended to offset approximately 87 ha of native vegetation communities and 109 ha of derived grasslands to be cleared for the Duralie Extension Project. The table below shows a comparison of the vegetation communities to be cleared compared with the offset areas to be provided.

Comparison of Vegetation Communities to be Cleared/Disturbed by Duralie Extension Project with Offset Areas

Vegetation Communities	**Areas to be Cleared/Disturbed (ha)**	**Initial Vegetation Offset Area (ha)**	**Revised Vegetation Offset Area (ha)**
<u>Existing Remnant Vegetation</u> 1. Spotted Gum â€“ Red Ironbark â€“ Thick-leaved Mahogany	61	â€“	63 (Est)

2. Spotted Gum â€“ Grey Ironbark	2	167	171
3. Red Gum Grassy Woodland	20	10	10
4. Grey Gum â€“ Red Gum â€“ Apple Riparian Forest	3	2	2
5. Cabbage Gum Floodplain Forest (EEC)	0	8	10
6. Riparian Closed Forest (EEC)	0	14	19
7. Stringybark â€“ Paperbark Forest	1	4	4
8. Dry Gully Rainforest	0	1	1
9. Blue Gum Moist Forest	0	8	8
10. Freshwater Wetlands (EEC)	0	0.2	2
Sub-Total	**87**	**214.2**	**290**
Derived Grasslands	120	230	390

TOTALS	**207**	**444.2**	**680**

97 The revised offset strategy can be seen to propose much closer correspondence between the vegetation communities to be cleared and those to be conserved and enhanced in the offset area. Importantly, each of the native vegetation communities in which threatened species have been recorded are now included in the vegetation offsets to be provided. Of importance, an area (estimated to be around 63 ha) of vegetation community 1 is proposed, located south of MLA 1 and west of ML 1427 (see the proposed offset area in Appendix 5 of the revised conditions of approval). This vegetation community was not originally included in the offset strategy. The revised offset strategy also includes additional areas of three endangered ecological communities (10 ha of vegetation community 5, Cabbage Gum Floodplain Forest; 19 ha of vegetation community 6, Riparian Closed Forest; and 2 ha of vegetation community 10, Freshwater Wetlands) (see Condition 40 of Schedule 3 of the revised conditions of approval).

98 The revised offset strategy also proposed changes to the shape, size and connectivity of the native vegetation communities to be included in the offset area. One example is the additional areas of native forest communities in the northern part of the offset area in Buckleys Range, thus reducing the high boundary or edge to area ratio associated with the narrow finger of remnant vegetation in the northern part of the initial offset area. Another example is the additional cleared lands proposed in the Mammy Johnsons River valley for revegetation, allowing better connectivity between existing native vegetation habitat to the east and the rehabilitation area and native vegetation to the west.

99 The revised offset strategy also provides more specific criteria for the proposed revegetation of the derived grasslands. Condition 33 of Schedule 3 of the revised conditions of approval establishes criteria to be achieved in implementing and completing the offset strategy. The goal is to create 354 ha of revegetation woodland/open woodland habitat areas and 36 ha of forest habitat areas as a â€œself sustaining ecosystemâ€. The methodology for determining a self-sustaining ecosystem is to be to the reasonable satisfaction of the Director-General of Planning. The woodland/open woodland and forest revegetation areas are to provide habitat resources for the threatened species concerned by including specified flora species known to provide habitat resources for

the threatened species (specified in Conditions 35â€“38 of Schedule 3). The revised conditions of approval require Duralie Coal to ensure that the offset area (both the enhancement areas and the revegetation areas):

(a) provide suitable habitat for all of the threatened fauna recorded in the surface development area for the Duralie Extension Project, namely the Swift Parrot, Brown Treecreeper, Speckled Warbler, Grey-crowned Babbler, Varied Sittella and Squirrel Glider; and

(b) include habitat types required by these threatened species, namely woodland/open woodland, forest and riparian forest (Condition 34 of Schedule 3).

100 The proposed conditions of approval then specify particular habitat requirements for each of the threatened species:

â€œ*Swift Parrot / Brown Treecreeper / Grey-crowned Babbler*

35. The Proponent shall ensure that the offset area:

(a) provides appropriate habitat resources for the Swift Parrot, Brown Treecreeper and Grew-crowned Babbler;

(b) contains a total of 174 ha of the following vegetation types:

Â· Spotted Gum â€“ Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast;

Â· Grey Box â€“ Forest Red Gum â€“ Grey Ironbark open forest of the hinterland ranges of the North Coast; and

Â· Sydney Peppermint â€“ Smooth-barked Apple shrubby open forest on coastal hills and plains of the southern North Coast and northern Sydney Basin; and

(c) the revegetation areas within the offset area contains:

Â· Winter flowering eucalypts (such as Spotted

Gum [*Corymbia maculata*], Narrow-leaved Ironbark [*Eucalyptus crebra*], White Stringybark [*Eucalyptus globoidea*]) as habitat resources for the Swift Parrot.

- Â· Species typical of eucalypt woodlands and dry open forest with a grassy understorey, including stringybarks or other rough-barked Eucalypts as habitat resources for the Brown Treecreeper.
- Â· Species typical of open eucalypt woodlands (such as Spotted Gum [*Corymbia maculata*], Red Ironbark [*Eucalyptus fibrosa*], Grey Ironbark [*Eucalyptus siderophloia*] as habitat resources for the Grey-crowned Babbler; and
- Â· Appropriate understorey species (such as tussock grasses).

Speckled Warbler

36. The Proponent shall ensure that the offset area:

(a) provides appropriate habitat resources for the Speckled Warbler;

(b) contains a total of 126ha of Spotted Gum â€“ Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast; and

(c) the revegetation areas within the offset area includes Eucalyptus species, tussock grasses and shrub species as habitat resources for the Speckled Warbler.

Varied Sittella

37. The Proponent shall ensure that the offset area:

(a) provides appropriate habitat resources for the Varied Sittella;

(b) contains a total of 172ha of the following vegetation types:

- Â· Grey Box â€“ Forest Red Gum â€“ Grey Ironbark open forest of the hinterland ranges of the North Coast; and
- Â· Spotted Gum â€“ Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast; and

(c) the revegetation areas within the offset area includes species typical of eucalypt forests and woodlands, especially rough-barked species, smooth-barked gums and Acacia species as habitat resources for the Varied Sittella.

Squirrel Glider

38. The Proponent shall ensure that the offset area:

(a) provides appropriate habitat resources for the Squirrel Glider;

(b) contains a total of 128ha of the following vegetation types:

- Â· Spotted Gum â€“ Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast; and
- Â· Sydney Peppermint â€“ Smooth-barked Apple shrubby open forest on coastal hills and plains of the southern North Coast and northern Sydney Basin.

(c) the revegetation areas within the offset area includes species typical of woodland/forest (such as Spotted Gum [*Corymbia maculata*], Red Ironbark [*Eucalyptus fibrosa*], Grey Ironbark [*Eucalyptus siderophloia*]) as habitat resources for the Squirrel Glider.

39. Hollow bearing habitat features must be introduced into the areas of habitat resources and the revegetation areas identified in approval condition 38.

*Note: For clarity, the total areas included in approval conditions 35 to 38 are not cumulative, whereby the area of habitat resources provided for one of the fauna species identified in approval condition 35 may be the same for all species mentioned in approval conditions 35 to 38.*â€

101 The original offset strategy proposed in the Environmental Assessment contemplated the preparation of a Biodiversity Management Plan. The Biodiversity Management Plan was anticipated to detail measures:

â€œâ— encouraging native regeneration by providing appropriate fencing to exclude grazing from existing treed areas;

â— selective revegetation in derived grasslands by appropriate plantings or seeding using local seed sources;

â— managing weeds and pests;

â— managing fire including mosaic burnings likely needed to optimise species diversity;

â— creating signage of the proposed offset area;

â— restricting vehicular and people access; and

â— monitoring ongoing management performance, habitat quality and diversity, species diversity, landscape resilience and landscape function within the offset, by suitably qualified person(s).â€ (Environmental Assessment, Appendix E, p E-115).

102 The Environmental Assessment proposed that habitat features (such as large hollows and some suitable logs) would be salvaged during vegetation clearance activities and relocated to areas where habitat

enhancement is required (such as in the proposed offset area). Because two roads cross the offset area, the Environmental Assessment proposed the installation of canopy bridges to facilitate crossing by arboreal mammals where there is not existing substantial canopy connection (Environmental Assessment, Appendix E, p E-115).

103 Finally, the Environmental Assessment proposed that the offset area would be independently audited at intervals agreed with relevant authorities. The audits would be conducted by suitably qualified persons to: assess compliance with the management plan; assess the performance of the offset area; review the adequacy of the management measures and monitoring program; and recommend actions or measures to improve the performance of the offset, management plan, or monitoring program (Environmental Assessment, Appendix E, p E-115).

104 By the conclusion of the hearing, there still was not a completed Biodiversity Management Plan. However, the revised conditions of approval (agreed between the Minister and Duralie Coal) specify more explicit requirements for developing and implementing the Biodiversity Management Plan. Condition 43 of Schedule 3 of the revised conditions of approval proposes:

> â€œ**Biodiversity Management Plan**
>
> 43. The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the director-General. This plan must:
>
> (a) be prepared in consultation with OEH [Office of Environment and Heritage] by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
>
> (b) be submitted to the Director-General for approval within 3 months of the date of determination in Land and Environment Court Proceedings No. 10090 of 2011;
>
> (c) describe how the implementation of the Offset Strategy would be integrated with the overall rehabilitation of the site (see below);

(d) include:

Â· implement the offset strategy and provide suitable habitat in the offset area for the threatened species that are recorded in the surface disturbance area; and

- manage the remnant vegetation and habitat on the site (including in the offset area).

Â· detailed completion criteria, as well as performance criteria for measuring the short, medium and long term success of the Offset Strategy;

Â· a detailed description of the measures that would be implemented over the next 3 years to implement the Offset Strategy, including the procedures to be implemented for:

- implementing revegetation and regeneration within the offset areas, including establishment of canopy, understorey and ground cover;
- the introduction of hollow bearing habitat features;
- controlling weeds and feral pests, including the engagement of appropriately qualified contractors;
- managing grazing and agriculture, including provision to exclude livestock grazing from existing treed areas and Endangered Ecological Communities within offset lands;
- controlling vehicular access to minimise the potential for vehicle strike of native fauna;
- bushfire management; and
- a program to monitor and report the effectiveness of these measures and the performance of the offset strategy, with summary reporting to be carried out annually and comprehensive reporting every three years following the independent environmental audit (see condition 8 of Schedule 5).

Â· a description of the measures that would be implemented over the next 3 years to manage

the remnant vegetation and habitat on site, including the procedures to be implemented for:

- protecting vegetation and soil outside the disturbance areas;
- rehabilitating creeks and drainage lines on the site (both inside and outside the disturbance areas), to ensure no net loss of stream length and aquatic habitat;
- managing salinity;
- undertaking pre-clearance surveys;
- managing impacts on fauna;
- landscaping the site, and particularly the land adjoining public roads, to minimise visual and lighting impacts;
- collecting and propagating seed;
- salvaging and reusing material from the site for habitat enhancement;
- controlling weeds and feral pests, including the engagement of appropriately qualified contractors;
- controlling vehicular access to minimise the potential for vehicle strike of native fauna; and
- bushfire management;

Â· a Vegetation Clearing Plan (VCP) that must include the following:

- Clear delineation of disturbance areas and restriction of clearing to the minimum area necessary to undertake the approved activities.
- A methodology for recording the approximate size and number of hollow bearing trees to be removed and their replacement with the same number of nesting boxes of appropriate sizing within similar vegetation within the Project site or offset lands.
- A methodology for the management of hollow bearing trees during vegetation clearing to minimize impacts on hollow dependent fauna which may be present.

- provision for a suitably trained or qualified person to the satisfaction of the Director-General to be present during the felling of identified hollow bearing trees to provide assistance with the care of any injured fauna.
- provision for the checking of any animals found and recording of the species, number, condition (age class, pregnant or lactating females etc) and for details to be provided to the National Parks and Wildlife Service and DoP [Department of Planning] within 3 months of the clearing event.
- provision for the annual inspection of the nesting boxes for the life of the mine. An inspection report shall be prepared and include a review of the condition and use of the nesting boxes.

Â· a description of the contingency measures that would be implemented to improve the performance of the offset strategy and the detailed performance criteria that are not being met in any given year; and

Â· details of who would be responsible for monitoring, reviewing, and implementing the plan.â€

105 The revised offset strategy, and the revised conditions of approval, propose a number of measures to secure the long-term conservation of biodiversity. One is the positive duty to implement the offsets in Conditions 33â€“40 and 43 of Schedule 3 of the revised conditions of approval. A second is the negative obligation not to cause any harm to any native flora or fauna in the offset area. Condition 41 of Schedule 3 of the revised conditions of approval provides:

â€œThe Proponent must:

(a) not destroy, damage, remove or harm any native flora or fauna in the offset area; or

(b) not carry out in the offset area or the vicinity of the offset area any activity that may cause, or is likely to result in,

or will or might threaten the viability of, native flora or fauna in the offset area, or threaten the success of the offset strategy; and

(c) ensure that its agents, contractors, licensees and invitees (and use best endeavours to ensure that any other persons) also comply with conditions 48 and 49.â€

106 A third measure is to require Duralie Coal to provide a conservation bond to ensure the offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan (Conditions 44 and 45 of Schedule 3 of the revised conditions of approval).

107 A fourth measure is to require Duralie Coal to provide long-term security for the offset area (Condition 42 of Schedule 3 of the revised conditions of approval). The form of the long-term security is proposed to be to the satisfaction of the Director-General of the Department of Planning and Infrastructure.

Adequacy of mitigation measures proposed

108 The revision of the biodiversity offset strategy, and the submission of revised conditions of approval, address many of the ecology issues debated between Dr Goldney and Mr Ryan. Mr Ryan had been critical of the lack of information in the originally proposed offset strategy, including the lack of a formulated Biodiversity Management Plan; the difference in the vegetation communities and habitats, including the differences in soil landscape and elevation between the area to be disturbed by the Duralie Extension Project and the offset areas; and the offset package not meeting guidelines for improving or maintaining a local biodiversity (summarised in paras 1â€“6 of Ryan Report, Exhibit A2).

109 Dr Goldney defended the original offset strategy and responded to Mr Ryanâ€™s criticisms (Goldney Report, Exhibit D4 generally and Dr Goldneyâ€™s oral evidence). Dr Goldneyâ€™s opinion was that the

original offset area was more than adequate to compensate for the vegetation and habitat to be cleared by the Duralie Extension Project because:

(a) 87 ha of three vegetation types to be cleared within the project area would be offset by 214 ha of remnant vegetation comprising eight vegetation types, including three endangered ecological communities (Goldney Report, Exhibit D4, para 6.2). In this calculation, Dr Goldney has included vegetation community 1 and vegetation community 2a in the area to be cleared and vegetation community 2bâ€“2d in the area to be conserved. In oral evidence, Dr Goldney expressed the view that vegetation communities 1 and 2 provide similar habitat resources for a number of the threatened species and can be considered together.

(b) The largest area of continuous woodland forest in the area to be cleared is 45 ha compared with the initial offset area where the largest continuous woodland and forest area in and adjoining the offset is 1,260 ha. Continuous larger habitat areas such as those that occur within the offset area are generally able to maintain greater species diversity than a landscape typified by the project area, consisting of a series of patchy smaller remnants (Goldney Report, Exhibit D4, para 6.3). The revised offset strategy increases the size of the continuous woodland and forest area included in the offset area.

(c) Significant scope exists for ecological management measures to be implemented within the offset area to optimise available habitats and to increase habitat heterogeneity, such as revegetation measures, supplementation of hollows using nest boxes and increasing on-ground log density by utilising timber from clearing for the Duralie Extension Project (Goldney Report, Exhibit D4, para 6.4).

(d) The offset area contains greater numbers of older regrowth trees (50â€“100 years old) and therefore many more hollows (Goldney Report, Exhibit D4, para 6.5).

(e) Planned restoration within the offset area includes the planting of a wildlife corridor from Buckleys Range to the Mammy Johnsons River and through to the extant woodland-forest on the western side of ML 1427. This habitat corridor would include existing

scattered trees of various ages and small extant remnants. This would enable greater habitat connectivity to be achieved within the offset area than currently exists within the project area and thereby significantly add value to existing local and regional biodiversity outcomes (Goldney Report, Exhibit D4, para 6.6). The revised offset strategy increases the degree of habitat connectivity.

(f) Both the project area and the offset area are situated within the Mammy Johnsons River catchment (Goldney Report, Exhibit D4, para 6.7).

(g) A greater diversity of flora (183 species) has been recorded in the offset area compared with the project area (123 species) and the former are guaranteed long-term protection (Goldney Report, Exhibit D4, para 6.8).

(h) The offset area contains a greater range of habitat types than does the project area and is known to be used by at least seven threatened fauna species including the Giant Barred Frog as well as containing potential habitat for other threatened vertebrate fauna species (Goldney Report, Exhibit D4, para 6.9).

110 As I have noted, by the end of the hearing, the Minister proposed, in consultation with Duralie Coal, that the offset area be considerably expanded in size and shape (see the proposed offset areas in Appendix 5 of the revised conditions of approval). These changes have only improved the offset area. They would increase the benefits identified by Dr Goldney for the original offset area.

111 Dr Goldney further posited that the original offset strategy would improve conservation values in the region, recognising that the area is no longer a pristine pre-European area but rather a disturbed environment:

> â€œâ— The Project is situated within degraded agricultural lands, albeit with some recovery of remnant vegetation being self initiated. (If such land had remained in agricultural production then it is likely that there would be much less regrowth than now exists and ongoing

land degradation would continue to occur). The nature and current condition of such land as occurs within the Project area has been described in section 4 above.

â— The proposed Offset land contains significant areas of degraded and cleared agricultural land where regeneration and/or restoration of a range of local native vegetation communities can occur at an appropriate scale.

â— The proposed Offset contains an existing core of higher value conservation land than that which occurs in the Project area (in this case including three EECs, known threatened species present and with additional potential habitat present for other threatened species) that provide a base conservation matrix that can be progressively connected with other proposed restoration outcomes.

â— The proposed Offset is connected at landscape level with similar and significant areas of woodland and forest.

â— The proposed Offset includes a section of Mammy Johnsons River and degraded tributary creeks all capable of responding to restoration measures to achieve many of the pre-European values but not necessarily all.

â— In the proposed Offset, the combination of valley tops, valley sides, break of slope land, valley floor, floodplain, a component of a major river with a number of tributaries and first order streams, represent a landscape cross-section as well as an ecological unit with much greater conservation potential than exists within the Project area.

â— Significant scope exists for ecological management measures to be implemented within the Offset to optimise available habitats and to increase habitat heterogeneity, such as revegetation measures,

supplementation of hollows using nest boxes and increasing on ground log density by utilising timber from Project clearing.â€

(Goldney Report, Exhibit D4, para 7.1).

112 Again, the revised offset strategy, with the expanded number and shape of areas and improved connectivity, only improves these outcomes identified by Dr Goldney.

113 I consider that the revised offset strategy, with the revised conditions of approval, should go a long way to addressing the impacts of the Duralie Extension Project on biodiversity generally and on the relevant threatened species in the area. I do, however, consider that some additional safeguards, consistent with a precautionary approach, should be incorporated into the conditions of approval to increase the likelihood of successfully delivering net biodiversity gains in a timely manner from the offset strategy.

114 First, in the preparation of the Biodiversity Management Plan, there should be surveys and an evaluation of the biodiversity values of the vegetation, both remnant vegetation and derived grasslands, in both the offset area and the surface development area to be cleared for the project and, based on the results of the surveys and evaluation, actions in the offset area to offset the loss of biodiversity values in the surface development area should be developed. Condition 43(d) of Schedule 3 of the revised conditions of approval should be amended to require the Biodiversity Management Plan to include:

Â· a description, based on field surveys and in consultation with the Office of Environment and Heritage, of the biodiversity values of the vegetation communities in the offset area, including remnant vegetation and derived grasslands, including as habitat for the threatened species that are recorded in the surface development area of the project;

Â· a description of the biodiversity values to be lost through clearing of vegetation communities in the surface disturbance area, including remnant vegetation and derived grasslands, including as habitat for the threatened species recorded in the surface development area of the project; and

Â· a description of the short, medium and long term measures that would be implemented to:

- implement the offset strategy;
- maintain and enhance biodiversity values in the offset area to offset the loss of biodiversity values in the surface development area;
- provide and enhance suitable habitat in the offset area for the threatened species that are recorded in the surface development area;
- manage the remnant vegetation and habitat on the site (including in the offset area).

115 Secondly, there should be better integration of the offset strategy with the other strategies, plans and programs required under the conditions of approval. Condition 43(c) of Schedule 3 goes some way to achieving integration but only with respect to rehabilitation of the site. Condition 43(c) should be expanded to require the Biodiversity Management Plan to describe how the offset strategy and its implementation will be integrated with other existing strategies, plans and programs required under the approval, including the Giant Barred Frog Management Plan, Water Management Plan and Rehabilitation Management Plan, and their implementation.

116 Thirdly, there should be greater specificity, and less discretion, in providing long term security of the offset area. Condition 42 of Schedule 3 should be amended to specify that the long term security of the offset area is to be provided either by reservation in perpetuity by a conservation agreement pursuant to s 69B of the *National Parks and Wildlife Act* 1974 or by a public positive covenant and/or a restriction on the use of land (in favour of an appropriate public authority), in either case registered on the title of all lands comprising the offset area.

117 With the offset strategy proposed and the revised conditions of approval, amended to include these additional safeguards, I am satisfied that there will be gains in the conservation of biodiversity and the

relevant threatened species of sufficient magnitude to compensate for the loss of vegetation, habitat and biodiversity values caused by the carrying out of the Duralie Extension Project.

118 I have included the additional safeguards, together with other revisions of the wording, in the conditions of approval. In revising the conditions of approval, I have taken into account the conditions recommended by ICAG as well as by the other parties.

Water quality and water flow

119 ICAG, along with many other objectors from the community and environmental groups, have raised concern about the potential impacts of the Duralie Extension Project on water quality and water flow in Mammy Johnsons River and Karuah River. In relation to water quality, the concerns focus on the potential for dirty mine water to be discharged into Mammy Johnsons River, principally by run-off from irrigated areas being allowed to discharge to watercourses that flow to Mammy Johnsons River, reducing water quality and adversely impacting aquatic species, including the Giant Barred Frog. A reduction in water quality may be caused by an increase in salinity or a change in the chemical composition of the water apart from salinity. The potential impacts of the mine on water quality occur not only during the operation of the mine, when irrigation with mine-affected water will occur, but also after mining has ceased and water is stored in the final voids left by open cut mining.

120 In relation to water flow, the concern is that the mine may reduce stream flow in or base flow to Mammy Johnsons River or draw down groundwater resources.

121 The Duralie Extension Project proposes to address these potential water quality and water flow impacts by augmenting and modifying the existing water management system and by addressing the water quality issues in the final rehabilitation.

122 The existing water management system relevantly includes four key components: clean water diversion, dirty water management, on-site irrigation and controlled discharge of run-off.

123 *Clean water diversion*. Diversion drains are installed up catchment to divert surface water around mining operations, thereby minimising the amount of water making its way to the mine (see Environmental Assessment, Appendix A, s A3.1.2).

124 *Dirty water system*. The water management system is designed to collect and store all water from mine activities and all mine disturbance areas on-site. Water collected for storage on-site includes incident rainfall on mine disturbance areas, groundwater inflows into the open pits and run-off from irrigated areas of a water quality not suitable to be discharged off-site. Water is stored in a number of dams, including the Main Water Dam, Auxiliary Dam No 1 and Auxiliary Dam No 2 (Environmental Assessment, Appendix A, s A3.1.1).

125 In the event that the capacity of a water management storage is exceeded, excess water is transferred and stored temporarily in the open pit. Water stored in water management storages is used to support mine operations (such as dust suppression) and for irrigation of designated irrigation areas on-site.

126 *On-site irrigation*. Excess mine water is irrigated in designated irrigation areas. Operation of the irrigation areas is managed in accordance with the Irrigation Management Plan. Five types of irrigation areas are currently approved and operated, as follows:

- Â· Type I â€“ irrigation areas located between the Main Water Dam diversions and the water storage inundation area of the Main Water Dam;
- Â· Type II â€“ irrigation areas located upslope of the Main Water Dam diversions within ML 1427;
- Â· Type III â€“ irrigation areas located upslope of the northern extent of the Weismantel open pit, including the upper reaches of Coal Shaft Creek;
- Â· Type IV â€“ irrigation areas located on partially rehabilitated and rehabilitated areas of the waste rock emplacement; and
- Â· Type V â€“ irrigation areas located on inactive (but not yet topsoiled or rehabilitated) areas of the waste rock emplacement

(Environmental Assessment, Appendix A, s A3.1.5).

127 The Irrigation Management Plan includes a first flush protocol. The first flush protocol is designed to collect initial (or â€œfirst flushâ€) rainfall run-off from two types of irrigation areas which drain to Coal Shaft Creek or Mammy Johnsons River (ie Type II and Type III only) following prolonged dry spells, if this run-off contains high salinity as a result of salt build-up in irrigated soils (Environmental Assessment, Appendix A, s A3.1.6).

128 *Controlled discharge of run-off*. The first flush protocol under the Irrigation Management Plan permits discharge of run-off from the two types of irrigation areas to Coal Shaft Creek and consequently to Mammy Johnsons River if both the discharging waters (run-off) and the ultimate receiving waters (Mammy Johnsons River) have salinity concentrations below specified levels. Sensors measuring electrical conductivity (salinity) have been installed in the Main Water Dam diversion southern and northern drains. The sensors automatically measure run-off from the Type II irrigation areas. The first flush system for the Type II irrigation areas generally operates as follows:

Â· when electrical conductivity readings in the Main Water Dam diversion drain sumps are equal to or greater than 1,326 microsiemens/cm, or if the electrical conductivity reading at Site 11 in the Mammy Johnsons River (Site 11 is approximately 3 kms south of the confluence of Mammy Johnsons River with Coal Shaft Creek) is equal to or greater than 400 microsiemens/cm, motorised butterfly valves in the pipelines at the downstream end of the Main Water Dam diversion northern and southern drains automatically open, directing run-off from the irrigation areas to the Main Water Dam; and

Â· when the electrical conductivity readings in the Main Water Dam diversion drains sumps are below 1,326 microsiemens/cm and the electrical conductivity reading in Mammy Johnsons River (at Site 11) is below 400 microsiemens/cm, the valves automatically close, allowing the run-off in the Main Water Dam diversion to flow to the Coal Shaft Creek diversion and Mammy Johnsons River downstream of the mine (Environmental Assessment, Appendix A, s A3.1.6).

129 The first flush system for the Type III irrigation areas differs from the first flush system for the Type II irrigation areas in that it is not automated but depends on manual use of a field electrical conductivity meter to check electrical conductivity (salinity) levels in the northern diversion dam which receives run-off from the Type III irrigation areas

and manual operation of the valves to retain, divert or release water from the northern diversion dam. The first flush system is the same, however, in using the same trigger levels:

Â· when the electrical conductivity reading in the northern diversion dam is equal to or greater than 1,326 microsiemens/cm, a valve in the base of the diversion dam is opened, directing run-off from the irrigation areas to the Weismantel open pit sumps where it is then pumped to the Main Water Dam;

Â· when the electrical conductivity reading in the northern diversion dam is below 1,326 microsiemens/cm, the electrical conductivity reading in Mammy Johnsons River (at Site 11), is equal to or greater than 400 microsiemens and the dam is not full (ie there is a low risk of spill to the Coal Shaft Creek diversion), no action is taken and the electrical conductivity levels are checked following the next rainfall event;

Â· when the electrical conductivity reading in the northern diversion dam is below 1,326 microsiemens/cm, the electrical conductivity reading in Mammy Johnsons River (at Site 11) is equal to or greater than 400 microsiemens/cm and the northern diversion dam is near capacity (ie there is a high risk of spill to the Coal Shaft Creek diversion), a valve in the base of the diversion dam is opened, directing run-off from the irrigation areas to the Weismantel open pit sumps where it is then pumped to the Main Water Dam; and

Â· when the electrical conductivity reading in the northern diversion dam is below 1,326 microsiemens/cm, and the electrical conductivity reading in Mammy Johnsons River (at Site 11) is below 400 micro siemens/cm, the water contained in the northern diversion dam is pumped to the Coal Shaft Creek diversion from whence it can flow down to Mammy Johnsons River (Environmental Assessment, Appendix A, s A3.1.6).

130 A first flush protocol is not implemented on Type I irrigation areas as these are within the catchment area of the Main Water Dam or on Type V irrigation areas as these areas drain to the mine workings. A first

flush protocol for Type IV irrigation areas is proposed to be developed as part of the Duralie Extension Project (Environmental Assessment, Appendix A, s A3.1.6).

131 The proposed water management system for the Duralie Extension Project is based on the existing water management system, including ensuring that there is no uncontrolled discharge of water from the mine site. The augmentations or modifications proposed include:

- Â· raising the embankment of Auxiliary Dam No 2 to increase its storage capacity to 2,900 ML;

- Â· installing up catchment diversion drains in the new areas to be mined in MLA 1 and ML 1427, to divert clean water around mining operations;

- Â· installing down slope sediment dams to manage run-off from disturbance areas; and

- Â· developing new irrigation areas, progressively as new rehabilitation areas become available and mining extends into existing irrigation areas (Environmental Assessment, Appendix A, s A3.2).

132 The Duralie Extension Project would continue to utilise the approved irrigation areas as well as develop additional irrigation areas (Type VI). At the hearing, the location and extent of the Type VI areas were amended, primarily to remove irrigation from areas to be conserved as biodiversity offsets but also to better correspond with topography. The revised Type VI irrigation areas are shown in Exhibit D10 (and in Appendix 4 of the revised conditions of approval, Exhibit M8). The development and operation of the additional irrigation areas would be consistent with the Irrigation Management Plan, including continued implementation of a first flush protocol. The additional irrigation areas would have run-off collection drains constructed downslope, directing run-off from the areas to constructed sumps or small dams. These sumps or small dams would be monitored for electrical conductivity following rainfall events and dewatered to the Main Water Dam by pumping based on a protocol consistent with that used for the Type II areas (Environmental Assessment, Appendix A, s 3.2.5).

133 At the hearing, Duralie Coal proposed that one of the first flush protocol trigger levels, which would be used to determine whether to pump water back to the Main Water Dam or discharge it to the unnamed tributary north of MLA 1, would be derived from sampling of the unnamed tributary and would represent the 80th percentile of salinity levels in the unnamed tributary. The trigger level for salinity in Mammy Johnsons River would remain the same as that under existing first flush protocols, namely 400 microsiemens/cm measured at Site 11 on Mammy Johnsons River.

134 Irrigation would also occur on the expanded areas of waste rock emplacement as they are rehabilitated (Type IV irrigation areas). Run-off from these areas would be collected in a collection dam in the south west corner of the waste rock emplacement. Where the measured electrical conductivity in the collection dam is equal to or greater than 1,326 microsiemens/cm, or if the electrical connectivity reading in Mammy Johnsons River (at Site 11) is equal to or greater than 400 micro siemens/cm, the accumulated water in the collection dam would be pumped to the Main Water Dam.

135 ICAG expressed concern that the proposed water management system will not ensure that there is no material increase in the salinity or chemical composition of Mammy Johnsons River. A focus of ICAGâ€™s evidence and Duralie Coalâ€™s response, was the existing water management system, and in particular the existing first flush protocol. ICAG endeavoured to prove that the existing development consent which regulates the carrying out of the existing Duralie Coal Mine, including the existing water management system and first flush protocol, were inadequate in ensuring that the water quality in Coal Shaft Creek and Mammy Johnsons River had not been adversely affected. Such endeavours were, to an extent, misdirected, because the Court has no power to revoke or modify the existing development consent, including the approved water management system under that consent. The Court can only determine the impacts on water quality of the Duralie Extension Project and the adequacy of the proposed water management system for that Duralie Extension Project.

136 ICAGâ€™s efforts were better directed when it argued that features of the existing water management system, which it claims were inadequate, should not be used for the proposed water management

system for the Duralie Extension Project. The inadequate features of the existing water management system are as follows:

Â· it does not expressly prohibit direct discharge to Mammy Johnsons River;

Â· it does not regulate pollutants other than salinity;

Â· it has a trigger level for salinity that is too high;

Â· the ecotoxicity testing undertaken to date does not establish no adverse effect on the aquatic ecosystem in Mammy Johnsons River;

Â· it has poorly located sampling points for monitoring of water quality; and

Â· the first flush protocol depends for its effectiveness on human intervention.

137 ICAG argued that if approval were to be given, the approved water management system should overcome these inadequacies.

138 ICAG also argued that details of the new water management system for the Duralie Extension Project should be settled before any approval is granted. In particular, ICAG argued that the trigger levels for operation of the first flush protocol in the additional irrigation areas, and the infrastructure and equipment at the collection and pump back points in the additional irrigation areas, should be settled before approval is granted. I will deal with these arguments.

No direct discharge of mine-affected water

139 Both the existing and proposed water management systems are designed to prevent uncontrolled discharge of mine-affected water from the mine site to Mammy Johnsons River. Any discharge of mine-affected water from the mine site is controlled in at least two ways: first,

discharge can only occur if the salinity concentrations of discharging and receiving waters are below specified levels in accordance with the first flush protocol and, secondly, discharge can only be via Coal Shaft Creek or, for the additional irrigation areas, via the unnamed tributary flowing from MLA 1, and only then into Mammy Johnsons River. No part of the existing or proposed water management system proposes any discharge directly from any mining disturbance area to Mammy Johnsons River. In these circumstances, the conditions of any approval of the Duralie Extension Project should reflect this system of no direct discharge to Mammy Johnsons River. I, therefore, agree with that part of ICAGâ€™s proposed Conditions 25A and 25B which prohibit discharge of mine water directly into Mammy Johnsons River.

Contaminants other than salinity

140 The main contaminant and indictor of mine water quality is salinity (Gilbert Report, Exhibit D1, para 3.1). Nevertheless, ICAG argues that there is the potential for the Duralie Extension Project to change the chemical composition of watercourses for contaminants other than salinity.

141 The existing first flush protocol only uses electrical conductivity (salinity) as the trigger for determining whether to discharge or store run-off from irrigated areas. Dr Wright expressed concern that run-off from irrigation areas which has increased levels of contaminants other than salinity (increased compared to the levels that would have existed without the mine) would not be detected under the first flush protocol and could be discharged into Coal Shaft Creek, or the unnamed tributary to the north, and consequently into Mammy Johnsons River, adversely impacting water quality.

142 Dr Wright expressed concern that he had been unable to find detailed information on the exact chemical attributes of mine wastewater that is irrigated and whether it changes over time (Wright Report, Exhibit A7, para 1.20). Dr Wright also expressed concern as to the lack of assessment of toxic pollutants (such as heavy metals) or non-toxic pollutants such as sediments or deoxygenated run-off water (Wright Report, Exhibit A7, paras 1.6 and 1.19).

143 ICAG submitted that, in the absence of testing for pollutants other

than salinity, there is a real risk of pollutants at elevated concentrations being irrigated and potentially finding their way into Mammy Johnsons River.

144 Duralie Coal responded in two ways. First, it submits that there has been testing of a suite of contaminants over lengthy periods in a variety of locations (see Environmental Assessment, Appendix A, pp A-22 to A-23, Table A-5). Secondly, it submits that testing has been undertaken for contaminants other than salinity in the Main Water Dam between 2007 and 2009 (Environmental Assessment, Appendix A, s AB2.5, p AB-6). Dr Noller stated, in oral evidence, that the results of that testing showed that the pH level of the water and its hardness were consistent throughout the period. The pH level and hardness of water are indicators of toxicity of metal contaminants. He said that the fact that that there was no material change in those measures, together with the fact that the results of the ecotoxicity and macroinvertebrate testing showed no adverse effects, established that the existing Duralie Coal Mine was not causing unacceptable levels of non-saline contaminants. Dr Kalf and Mr Gilbert were of the same view.

145 In my view, a precautionary approach should be adopted for the water management system for the Duralie Extension Project. The Duralie Extension Project will involve open cut operations in two different coal seams, the Weismantel and Clareval seams. The mine-affected water from the Duralie Extension Project cannot be guaranteed to be of the same chemical composition as the mine-affected water from the existing Duralie Coal Mine which only operates in the Weismantel seam. The water quality in the unnamed tributary into which run-off from the additional irrigation areas would be discharged cannot also be guaranteed to be of the same water quality as that of Coal Shaft Creek. Hence, satisfactory results from testing in the past of the impacts of the existing Duralie Coal Mine on water quality are not sufficient to justify not imposing a requirement for future water quality testing for contaminants other than salinity. I consider that the Water Management Plan, which would be required to be prepared under the revised conditions of approval, should specify, first, performance criteria, including trigger levels for investigating any potentially adverse impacts on water quality of watercourses into which run-off from irrigation areas may directly or indirectly flow, including Coal Shaft Creek, the unnamed tributary and Mammy Johnsons River, for an expanded range of contaminants and water quality criteria in addition to salinity and, secondly, require

monitoring for such contaminants and criteria. Contaminants and criteria should include, in addition to salinity, heavy metals, sediment load, pH, hardness and biological oxygen demand.

Salinity trigger level

146 The existing first flush protocol approved under the existing development consent uses a run-off trigger level of 1,326 microsiemens/cm for discharges to Coal Shaft Creek. This trigger level is based on the 80th percentile of salinity levels for Coal Shaft Creek (based on low and high flows). Hence, run-off with salinity levels of up to 1,326 microsiemens/cm can be discharged into Coal Shaft Creek and consequently into Mammy Johnsons River.

147 Dr Wright expressed the view that run-off with a level of 1,326 microsiemens is highly saline, several times above ANZECC guidelines (2000) for ecosystem protection, and several times the salinity levels recorded from Mammy Johnsons River (Wright Report, Exhibit A7, para 1.21). ICAG submitted, based on Dr Wrightâ€™s views, that the existing trigger level for Coal Shaft Creek should not be used as the trigger level for discharge of run-off from the additional irrigation areas (separate from Coal Shaft Creek).

148 At the hearing, Duralie Coal agreed that the Coal Shaft Creek trigger level of 1,326 microsiemens/cm should not necessarily be used as the new trigger level for the unnamed tributary. Nevertheless, Duralie Coal still submitted that the new trigger level should be set in the same way as the Coal Shaft Creek trigger level was set, namely in accordance with the ANZECC guidelines. These guidelines require trigger levels representing the 80th percentile value of the relevant reference data set. For the unnamed tributary, this would include data points in the unnamed tributary. The goal would be to ensure that the run-off discharged from the additional irrigation areas into the unnamed tributary does not exceed the 80th percentile of salinity levels for the unnamed tributary.

149 I consider that it is appropriate to set the trigger levels for controlling discharge from the additional irrigation areas into the unnamed tributary using the ANZECC guidelines, being trigger levels

representing the 80th percentile of the data set for the unnamed tributary and the Mammy Johnsons River into which the unnamed tributary flows. The requirement to do so can be specified in the conditions of approval which require preparation of a water management plan (in Condition 29 of Schedule 3 of the revised conditions of approval). The effectiveness of the trigger level will be required to be monitored under the Water Management Plan.

150 I consider that it is sufficiently certain and final to prescribe in the approval the mechanism by which the trigger levels are to be set; it is not necessary to prescribe the exact figures of trigger levels in the approval. I also consider that it is not necessary to specify in the approval the precise design of the collection sumps or small dams and the pump back equipment regulating either discharge to the unnamed tributary or pump back to the Main Water Dam. The design can be formulated in the Water Management Plan, which is to be submitted for approval to the Director-General of the Department of Planning and Infrastructure (see Condition 29 of Schedule 3 of the revised conditions of approval). However, as I find below, the design of the water management system should minimise dependency on human intervention, such as manual testing of water quality to determine whether to discharge or pump back run-off and manual operation of valves to discharge or pump back run-off.

Ecotoxicity testing

151 Ecotoxicity testing was undertaken of water from the Main Water Dam. The purposes of ecotoxicity testing is to analyse the response of chosen aquatic species to all constituents in water, not just salinity. The ecotoxicity testing was undertaken using a range of test species covering five taxa considered to be representative of aquatic species found in Coal Shaft Creek and Mammy Johnsons River. The test species lie above and below the trophic level of frogs.

152 Dr Noller stated that the results of the testing showed no acute or chronic toxicity for the test species at any dilution of water from the Main Water Dam (Noller Report, Exhibit D3, para 3.4). The results indicate that, assuming that the run-off from the irrigation areas would be of the same quality as the Main Water Dam water, the ecotoxicity of the run-off would have negligible effects on aquatic biota and that the risk of change to aquatic ecosystem assemblages is low. However, as the run-off from

the irrigation areas is expected to be of better quality than the water from the Main Water Dam and a high level of dilution is expected in Coal Shaft Creek, Dr Noller considered the risk of change to aquatic ecosystem assemblages would be even lower than the risk just described (Noller Report, Exhibit D3, para 3.4).

153 ICAG submitted that the ecotoxicity testing undertaken to date does not necessarily lead to this conclusion, for a number of reasons:

(a) the ecotoxicity testing was only undertaken on two occasions, so it is only a snapshot that could have changed (Dr Wright in Joint Expertsâ€™ Report on Water Issues, Exhibit A6, and Wright Report, Exhibit A7, para 1.18);

(b) there has been no prediction of water quality for the Duralie Extension Project as the testing was on the Main Water Dam water from the existing operations of the Duralie Coal Mine;

(c) ecotoxicity testing was only undertaken in the Main Water Dam and not in the target ecosystem, being Mammy Johnsons River. Water in the Main Water Dam may not be the worst case scenario because the run-off water from irrigation could be affected by other factors, such as sediment, pollution, build-up of salinity, irrigation contamination, and be de-oxygenated (Wright Report, Exhibit A7, 1.19);

(d) there has been poor monitoring and survey work for aquatic species in Coal Shaft Creek, making it not possible to assert that the test species were representative of aquatic species in Coal Shaft Creek (Wright Report, Exhibit A7, para 1.15);

(e) the test species used were inappropriate to identify potential effects on any saline-sensitive species in the watercourses because none of the species used were sensitive to increased salinity levels. The few test species used may not be representative of the diverse range of plant and animal species in local waterways (Wright Report, Exhibit A7, para 1.18); and

(f) although the test species used were above and below the trophic

level of frogs, there was no evidence to support the contention that using such taxa would be a suitable proxy for the effects on the Giant Barred Frog. The tests only confirmed that the Main Water Dam water would not kill food sources for the frog, not whether it would affect the frog itself (Dr Nollerâ€™s evidence in cross-examination).

154 I consider there is force in these points and that they justify adopting a precautionary approach to the design of the water management system for the Duralie Extension Project. The water management system should require the undertaking of ecotoxicity testing, not only using water from water storages, but also in the target ecosystem. Ecotoxicity testing should be undertaken of water at water monitoring sites, such as the sites measuring the impact on water quality from discharged run-off, downstream of the confluence of Coal Shaft Creek and Mammy Johnsons River and downstream of the confluence of the unnamed tributary and Mammy Johnsons River. The design and timing of ecotoxicity testing should be formulated in the Water Management Plan, to be approved under the revised conditions of approval (Condition 29 of Schedule 3 of the revised conditions of approval).

155 Ecotoxicity testing in the target ecosystem should be supplemented by continued macroinvertebrate sampling along Mammy Johnsons River at appropriate monitoring sites upstream and downstream of the respective confluences of the unnamed tributary and Mammy Johnsons River and Coal Shaft Creek and Mammy Johnsons River.

Monitoring points

156 Currently, there are sampling sites on Mammy Johnsons River upstream and downstream of the confluence of Mammy Johnsons River with Coal Shaft Creek. The upstream sampling site is Site GB1 and the downstream sampling sites are High Noon and Site 11. There are a number of tributaries between the upstream sampling site of GB1 and the confluence of Mammy Johnsons River with Coal Shaft Creek. There are also tributaries between the confluence of Mammy Johnsons River and Coal Shaft Creek and the downstream sampling sites of High Noon and Site 11. There are also agriculture and other uses downstream of the confluence that might impact on water quality and flow between the

confluence and the downstream sampling sites. The distance between the upstream sampling site of GB1 and the two downstream sampling sites is 2 kms (to High Noon) and 3 kms (to Site 11).

157 Dr Wright considered that the current upstream and downstream sampling sites are not appropriately located to assess the impacts of mine operations on water quality and consequently aquatic ecosystems, including the Giant Barred Frog. Dr Wright suggested that sampling sites closer to the confluence of Coal Shaft Creek and Mammy Johnsons River would be more appropriate in order to analyse the effect of the Duralie Coal Mine on water quality.

158 Mr Gilbert and Dr Noller considered that the current sampling sites are adequate to determine any negative impacts on water quality in Mammy Johnsons River from the Duralie Coal Mine. Mr Gilbert concluded, based on using catchment area contributions to Mammy Johnsons River upstream and downstream of its confluence with Coal Shaft Creek, that the current sampling sites above and below the confluence of Coal Shaft Creek to be â€œsufficiently close to enable the effects of flows from Coal Shaft Creek on the water quality in Mammy Johnsons River to be reliably identified and assessedâ€ (Gilbert Report, Exhibit D1, para 1.10).

159 Nevertheless, Mr Gilbert agreed in oral evidence that there would be no reason not to move the downstream testing location closer to the confluence, possibly 100 m downstream from the confluence, providing that the testing point is downstream of the â€œmixing zoneâ€ for Mammy Johnsons River and Coal Shaft Creek.

160 I consider that the existing sampling sites should be retained, in order to ensure continuity of the water quality sampling data set. However, it would be beneficial to establish an additional water quality monitoring site immediately downstream of the mixing zone below the confluence of Mammy Johnsons River and Coal Shaft Creek. This monitoring site should have the capacity to monitor the major criteria relevant to water quality impacts on biological diversity and aquatic ecological integrity.

First flush protocolâ€™s dependence on human intervention

161 Run-off from the additional irrigation areas (in the subcatchment of the unnamed tributary) will be directed to constructed sumps or small dams. The salinity levels of the water in these sumps or small dams will be measured. When the salinity levels are equal to or greater than the salinity trigger level, water in the sumps or small dams will be pumped out to the Main Water Dam but when the salinity levels are lower than the salinity trigger level, the sumps or small dams would be allowed to overflow and/or be pumped out to downstream drainage lines flowing to the unnamed tributary and consequently to Mammy Johnsons River.

162 Duralie Coalâ€™s Environmental Assessment states that the first flush protocol for the additional irrigation areas (Type VI) will be consistent with that used for Type II irrigation areas (Environmental Assessment, Appendix A, s A3.2.5, p A-42). The first flush system for Type II irrigation areas has sensors in the Main Water Dam diversion drain sumps measuring automatically the salinity levels of run-off from the Type II irrigation areas. When the electrical conductivity readings in the sump are equal to or exceed the salinity trigger level, motorised valves in the sumps open to direct run-off to the Main Water Dam but when the electrical conductivity readings in the sump are lower than the salinity trigger level they close, allowing run-off to continue down Coal Shaft Creek diversion and then to Mammy Johnsons River. This automated sensing and valve switching first flush system for Type II irrigation areas contrasts with the first flush system for Type III irrigation areas which relies on manual use of a field electrical conductivity meter to measure salinity levels in the northern diversion dam which receives run-off from Type III irrigation areas and manual operation of valves to retain water in, or divert or release water from, the northern diversion dam. However, in his report, Mr Gilbert was less emphatic as to the use of automated sensing and valve switching, saying only that the first flush management â€œmay include automated systems with back-up systems if requiredâ€ (Gilbert Report, Exhibit D1, para 1.22).

163 Dr Wright expressed concern about the first flush system for the additional irrigation areas (Type VI) depending on manual intervention. There is a greater risk of human error in operating a first flush system which depends on human intervention to manually respond after heavy rain to measure salinity with a field electrical conductivity meter and manually operate the first flush diversion (Wright Report, Exhibit A1, para 1.22). The risk increases because of the number of sumps or small dams which would require a manual response.

164 In my view, an automated first flush system should be implemented for the new, Type VI irrigation areas similar to that used for the Type II irrigation areas. This should be required under the Water Management Plan (required under Condition 29 of Schedule 3 of the revised conditions of approval).

Water flow

165 Concern was also raised as to the impact that the Duralie Extension Project might have on water flow to and in Mammy Johnsons River and on groundwater resources. The Director-Generalâ€™s Environmental Assessment Report concluded that: there would be negligible loss of run-off to the surrounding catchment, as the reduction in the size of the catchment due to the project would be small, and the two creeks that would be affected by the project are ephemeral with irregular flows; the project is unlikely to result in any loss of base flow to (or leakage from) Mammy Johnsons River because the alluvial aquifer is hydraulically disconnected from the deeper groundwater system that would be depressurised by the expanded mining operations; and there would be negligible impact on water users downstream of the project area (p 14 in Exhibit M1, Vol 2, p 1286).

166 The Director-Generalâ€™s Environmental Assessment Report nevertheless recommended (at p 14) the imposition of a number of conditions to mitigate impacts on water flow and groundwater resources, including that Duralie Coal offset any loss of base flow to Mammy Johnsons River (now Condition 26 of Schedule 3 of the revised conditions of approval); provide a compensatory water supply to any landowner whose water licence entitlements are adversely impacted by the project (now Condition 27 of the revised conditions of approval); and carry out extensive monitoring of the surface and groundwater impacts of the project (now part of Condition 29 of Schedule 3 of the revised conditions of approval).

167 The conclusions in the Director-Generalâ€™s Environmental Assessment Report were supported by the evidence of Mr Gilbert (on surface water and base flows) (Gilbert Report Exhibit D1, para 4) and Dr Kalf (on groundwater) (Kalf Report, Exhibit D2, para 4.1).

168 I accept these conclusions that undertaking the Duralie Extension Project, in compliance with the revised conditions of approval, will not adversely impact on surface water flows or groundwater resources.

Final voidsâ€™ impact on water quality

169 The Duralie Extension Project will result in two final voids at the completion of mining. Dr Wright expressed concern that the Environmental Assessment does not contain sufficient information and analysis to allow assessment of the ongoing risk of leakage of water in the final voids of increased salinity or contamination by heavy metals, into the groundwater or river system.

170 Mr Gilbert, Dr Noller and Dr Kalfâ€™s evidence is that there will be no adverse impacts on water quality and river system conditions by reason of the final voids. So far as surface water is concerned, modelling of inflows and outflows of water in the final voids was conducted over a 360-year term. That modelling showed that the water levels in the voids would reach an equilibrium level below levels where there would be any real risk of spilling to the surrounding watercourses and that the salt concentrations in the voids would be unlikely to rise to high levels relative to the original groundwater during the period (Gilbert Report, Exhibit D1, para 1.24).

171 With respect to groundwater, Dr Kalf expressed the opinion that the groundwater impact of the final voids would be â€œinconsequential.â€ If there were to be any groundwater outflow from the void (and this would not necessarily be the case), the outflowing groundwater is likely to have similar salinity as the pre-mine groundwater and would flow with solute migrating through the sub-surface backfill and adjacent rock strata. The rate of flow would be restricted by the low to very low permeability of the clay cut-off wall and in-situ rock not mined out. Therefore, the effect in Mammy Johnsons River would be very similar to pre-mine conditions that had slow seepage of relatively high salinity groundwater migrating towards Mammy Johnsons River (Kalf Report, Exhibit D2, para 5.18).

172 I accept the evidence of Mr Gilbert and Dr Kalf and find that the final voids are not likely to have unacceptable water quality impacts. Duralie Coal will be required to address the post-mine water quality impacts of the final voids initially in the Water Management Plan

(Condition 29 of Schedule 3 of the revised conditions of approval) and consequently in the Rehabilitation Management Plan (Condition 57 of Schedule 3 of the revised conditions of approval).

Giant Barred Frog

173 The Giant Barred Frog (â€œGBFâ€) is a listed threatened species under both the *Threatened Species Conservation Act* 1995 (NSW) and the EPBC Act. A population of the GBF is located in the Mammy Johnsons River in the locality of the Duralie Coal Mine. The Commonwealth declared the Duralie Extension Project to be a controlled action under the EPBC Act. This declaration was made because of the potential impact the Duralie Extension Project could have on the GBF population. The most likely ways the project could impact the GBF are by changes in hydrology, salinity or water quality in Mammy Johnsons River.

174 On 22 December 2010, the Commonwealth Minister granted approval under s 130(1) of the EPBC Act for the Duralie Extension Project, subject to conditions. The conditions:

Â· limit the footprint of surface development to 209 ha and the irrigation areas to 140 ha (Condition 1);

Â· prohibit exploration activities within areas of known or potential GBF habitat or within 60 m of Mammy Johnsons River without prior approval (Condition 2);

Â· require irrigation and run-off from the project area to be managed in accordance with the Duralie Coal Mine Irrigation Management Plan (2008) and not otherwise be discharged into the Mammy Johnsons River catchment (Condition 3);

Â· limit the release of water into the Mammy Johnsons River catchment to when electricity conductivity levels do not exceed 400 microsiemens/cm in Mammy Johnsons River and 1,326 microsiemens/cm in the Main Water Dam, or alternative thresholds advised by the Commonwealth Department (Condition 4);

Â· if the results of the GBF surveys required under Condition 6 identify a decline of 20% or more in the frog population within 500 m of the project area, limit further the release of water into the Mammy Johnsons River catchment to when electrical conductivity levels are less than 400 microsiemens in Mammy Johnsons River and 530 microsiemens in Coal Shaft Creek, until otherwise advised by the Commonwealth Department, and require the mine water released during this time to not exceed 530 microsiemens at the point of discharge into Coal Shaft Creek (Condition 5);

Â· require baseline GBF surveys in order to ascertain the local population of the GBF in the Mammy Johnsons River (Condition 6 â€“ these surveys have now been undertaken);

Â· require submission for approval of a GBF management plan (Condition 7), the implementation of the approved GBF management plan (Condition 8), and provision of a report on the implementation of the GBF management plan annually for the first five years and then every five years thereafter (Condition 9);

Â· require implementation of the mitigation measures in the existing Duralie Coal Mine Vegetation Clearance Protocol (2002), Irrigation Management Plan (2008), Site Water Management Plan (2008), Rehabilitation Management Plan (2007) and Rehabilitation Management Plan (2007b) as well as the fauna protection and management measures in Appendix E â€“ Terrestrial Flora and Fauna Assessment of the Environmental Assessment (2010) (Conditions 10 and 11);

Â· require Duralie Coal to permanently protect and secure an offset area to compensate for the approved disturbance within the project area, including a minimum of 1.5 km (in streamside length) of known or suitable GBF habitat (including a minimum width of 80 m on either side of the stream or river edges) (Condition 12), obtain the Commonwealth Ministerâ€™s approval of an Offset Management Plan (Condition 13), implement the Offset Management Plan (Condition 14), and register a conservation covenant or similar instrument on the title of the land containing the Offset area (Condition 15);

Â· require publication of all plans approved by the Commonwealth Minister (Conditions 16 and 17); and

Â· impose various reporting and auditing requirements (Conditions 18â€“24).

175 The NSW Director-Generalâ€™s Environmental Assessment Report concluded, in light of all of the information submitted by Duralie Coal and the management, mitigation and contingency measures proposed by Duralie Coal, that â€œthe risk of the project having an adverse impact on the local population of the Giant Barred Frog is lowâ€ (p 20 in Exhibit M1, Vol 2, p 1292). Nevertheless, the Director-Generalâ€™s Environmental Assessment Report recommended conditions be imposed requiring Duralie Coal to:

> â€œâ— ensure the project has no more than a neglible impact on the local population of the Giant Barred Frog;
>
> â— prepare a Giant Barred Frog Study by the end of May 2011 to improve the baseline information on the local population; and
>
> â— prepare and implement a detailed Giant Barred Frog Management Plan for the project, including a contingency plan which would be implemented if subsequent monitoring suggests the project is having an adverse impact on the frogâ€ (p 20).

176 These recommended conditions have been included (and expanded) in the revised conditions of approval tendered at the hearing (Conditions 30, 31 and 32 of Schedule 3 of the revised conditions of approval, Exhibit M8). Condition 30 sets a performance standard that the project must have no more than a negligible impact on the local GBF population. Condition 31 requires Duralie Coal, within 3 months of the Courtâ€™s decision, to prepare a Giant Barred Frog Study in consultation with the Office of Environment and Heritage and to the satisfaction of the Director-General of the Department of Planning and Infrastructure. The study must:

â€œ(a) investigate the extent of the Giant Barred Frog population in the Mammy Johnsons River Catchment;

(b) assess the condition of the Giant Barred Frog habitat where it is recorded within the Catchment, including the existence of any Chytrid fungus;

(c) analyse the age structure of the frog population and the health of tadpoles; and

(d) document the relevant hydrological conditions both prior to and during the study, including rainfall, water flows and quality in Mammy Johnsons River, both upstream and downstream of the confluence of Mammy Johnsons River and Coal Shaft Creek, and in Coal Shaft Creek.â€

177 Condition 32 requires Duralie Coal to prepare and implement a Giant Barred Frog Management Plan to the satisfaction of the Director-General of the Department of Planning and Infrastructure. The plan must:

â€œ(a) be prepared in consultation with the OEH [Office of Environment and Heritage] by a suitably qualified and experienced person, whose appointment has been endorsed by the Director-General;

(b) be submitted to the Director-General for approval within 3 months of the date of determination in Land and Environment Court Proceedings No. 10090 of 2011;

(c) include a summary of the Giant Barred Frog Study;

(d) establish performance measures for evaluating the impact of the project on the local Giant Barred Frog population;

(e) describe the measures that would be implemented to minimise the potential spread of the Chytrid fungus, including training of staff in site hygiene management

in accordance with the NPWS [National Parks and Wildlife Service] *Hygiene Protocol for the Control of Disease in Frogs 2001*;

(f) include a program to monitor the potential impact of the project on the local frog population, which includes:

Â· detailed performance indicators for the project, with reference to the performance measures established in (d) above;

Â· annual monitoring of the frog population and its habitat during the breeding season along Mammy Johnsons River both upstream and downstream of the confluence of Mammy Johnsons River and Coal Shaft Creek;

Â· trigger levels for further investigation; and

(g) a contingency plan that would be implemented if monitoring suggests the frog population downstream of the confluence of Mammy Johnsons River and Coal Shaft Creek is declining due to the project, which may include a revision of the first flush salinity trigger or the implementation of additional water quality controls.â€

178 At the hearing, the partiesâ€™ experts on the GBF, Dr White and Dr Newell, in their joint expertsâ€™ report (Exhibit A8) and in their concurrent evidence, agreed that:

(a) in relation to the populations of the GBF:

Â· there is no GBF habitat in the project area;

Â· GBF occur above and below the confluence of Coal Shaft Creek and Mammy Johnsons River and appeared to be present in these areas during the operation of the Duralie Coal Mine;

Â· recent surveys of the GBF (by Dr White in 2011) indicate that GBF are more widely distributed in the broader Mammy Johnsons River catchment than was indicated by the survey results in the Environmental Assessment;

Â· recent surveys also indicate that the GBF is present in a nearby catchment, namely the Crawford River; and

Â· is not clear how different populations of GBF in the Stroud valley (Mammy Johnsons River) and Myall Ranges are connected (if at all).

(b) in relation to habitat of the GBF:

Â· breeding sites for the GBF consist of pools with under-cut banks and presence of riparian vegetation; and

Â· the presence of apparently suitable habitat for GBF does not guarantee the presence of the frogs in those areas.

(c) in relation to surveys and monitoring:

Â· information collected during surveys in January to March 2011 indicated the need for further modification of the monitoring approach;

Â· development of a long term monitoring program that will meet the requirements of the Commonwealth Governmentâ€™s and State Governmentâ€™s approvals (specifically, the requirement to enable a 20% reduction in population size to be detected) requires a rigorous statistical approach using captureâ€“markâ€“recapture analysis and sites selected throughout the Mammy Johnsons River catchment; and

Â· ideally, these sites should be randomly selected and include control sites (in The Glen Nature Reserve and Ghin-Doo-Ee National Park) and sites above and below the confluence of Coal Shaft Creek and Mammy Johnsons River;

Â· the monitoring study must be able to measure the vital rates (eg recruitment, survival, age structure etc) of GBF at various sites within the Mammy Johnsons River catchment; and

Â· the assessment of potential impacts on the GBF in the Mammy Johnsons River catchment is confounded by past and ongoing agricultural activities and the monitoring program must be able to discriminate between the sources of the impact through the selection of appropriate control sites.

(d) in relation to potential impacts on the GBF:

Â· the most likely ways that the Duralie Extension Project could impact on the GBF is through changes in hydrology in Mammy Johnsons River, changes in salinity in Mammy Johnsons River and through direct contribution to global climate change;

Â· there are no specific studies available that assess the impact of elevated salinity on GBF. Salinity impacts are more likely to occur in the larval stage than for the adult frog; and

Â· macroinvertebrate studies have been used as a surrogate to investigate potential toxicological impacts on the GBF. While these studies are widely used, their adequacy as a surrogate for the GBF has not been determined.

179 ICAG proposed alternative and additional conditions in relation to the GBF. The alternative Condition 30 was that the performance standard fixed should be that the project is to have â€œno impactâ€ rather than â€œnegligible impactâ€ on the local GBF population. The additional Condition 31A expanded the requirements for the GBF Study required by Condition 31. ICAGâ€™s Condition 31A proposed:

â€œ31A The Giant Barred Frog Study must be reviewed and expanded into a longitudinal study of the life cycle of the â€˜populationâ€™ of the Giant Barred Frog over the lifetime of the mine and for a 5 year period after the mine ceases to operate, which is to include:

(a) clarification as to what exactly constitutes â€˜the populationâ€™ of the Giant Barred Frog

for the purposes of monitoring, and that this is the population at the location most susceptible to impacts from the mine;

(b) baseline data collected for sites (transects) below and above the site to be used for comparison with data collected in the future;

(c) testing to determine if any changes to Giant Barred Frog populations identified downstream of the site on the monitoring transects are a result of impacts from the mining operation;

(d) a requirement for detailed capture/recapture studies using â€˜Pollocks robust designâ€™ at sites above and below the confluence of Coal Shaft Creek and Mammy Johnsons River, and at a series of control sites in the upper reaches of the catchment;

(e) a requirement that individual frogs encountered during the study should be tagged (or scanned);

(f) a requirement that transects be of a fixed length (at least 400m), and that the area searched on each occasion be the same;

(g) a requirement that transects are to be randomly selected;

(h) a requirement that testing be conducted on a minimum of three consecutive nights, on four occasions per season (12 visits to each transect in each season) over the life of the mine, and for a 5 year period after the mine ceases to operate;

(i) a requirement that individual frogs encountered during the study be swabbed for the presence of the chytrid fungus;

(j) a requirement that weather conditions and search effort should be recorded during each census at the transect site.â€

180 ICAGâ€™s additional Condition 31B required that the GBF Study be analysed by a suitably qualified independent expert and a report prepared by that person be made public and published by Duralie Coal

on its website. Similarly, ICAGâ€™s additional Condition 32A required the GBF Management Plan, required by Condition 32, and the initial proposal for the GBF Study, required by Condition 31 as expanded by ICAGâ€™s Condition 31A, be submitted to a suitably qualified independent expert who is to prepare a report to the Director-General of Planning as to whether the GBF Management Plan and initial proposal for the GBF Study are consistent with the conditions of approval and are otherwise satisfactory.

181 Dr White and Dr Newell, in their concurrent evidence, were in agreement as to ICAGâ€™s proposed conditions, except that Dr White did not agree with the transect length of 400 m in Condition 31A(f) and preferred a length of 200 m, or with the requirement for testing on three consecutive nights in Condition 31A(h) and preferred simply three nights.

182 I find that, with appropriate conditions of approval, the Duralie Extension Project is not likely to impact adversely on the local GBF population. I consider that the performance standards should remain as proposed in Condition 30 of Schedule 3 of the revised conditions of approval, namely â€œnegligible impact,â€ rather than â€œno impactâ€ as proposed by ICAG. This accords better with Condition 5 of the EPBC Act approval and is more realistic. Whilst the conditions of approval have as their goal that the Duralie Extension Project should have no impact on the local GBF population, even with full compliance with the conditions of approval, there can be no guarantee that this goal will be met. Making the goal a legally enforceable condition may be unrealistic.

183 Condition 31 of Schedule 3 should require the GBF Study. The purpose of the GBF study is to establish baseline data on the local population of the GBF, which will inform the GBF Management Plan. The GBF Study, therefore, needs to be completed before the GBF Management Plan. However, I consider that it would be beneficial for the investigations and assessments undertaken for the GBF Study to continue over the life of the mine and for a period afterwards to monitor the local population of the GBF and any impacts on the population. ICAGâ€™s Condition 31A achieves this goal. It requires the initial GBF Study to be regularly reviewed and expanded into a longitudinal study over the lifetime of the mine and for a five year period after the mine ceases to operate. This GBF long-term study is distinct from the initial GBF Study. Both Duralie Coalâ€™s and ICAGâ€™s experts on the GBF, Dr White and Dr Newell, agreed on the feasibility and terms of the long-

term study proposed by ICAGâ€™s Condition 31A, with the exception of two points of detail. I consider that the GBF long-term study should be as proposed in ICAGâ€™s Condition 31A, with the exception of changing the transect length in (f) to 200 m and the nights of testing to be simply three nights, rather than three consecutive nights, as recommended by Dr White.

184 I do not consider it necessary for the GBF Study and the GBF Management Plan to be reviewed by an independent expert, as proposed by ICAGâ€™s Conditions 31B and 32A. Condition 31, however, should have added to it the same requirement as is in Condition 32(a) for the GBF Management Plan, so that the GBF Study is prepared by a suitably qualified and experienced person whose appointment has been endorsed by the Director-General of the Department of Planning and Infrastructure. Conditions 31 and 31A, for the GBF Study, and Condition 32, for the GBF Management Plan, are sufficiently prescriptive of the process and content of the Study and Management Plan respectively to ensure that they will be satisfactory. In both cases, the preparation must be in consultation with the relevant government agency with expertise in threatened species including the GBF, namely the Office of Environment and Heritage. The government agency will act as a peer reviewer of the GBF Study and the GBF Management Plan. The GBF Management Plan will also be required to be prepared in accordance with the general management plan requirements in Condition 2 of Schedule 5 of the revised conditions of approval. It will also be required to be included in the overarching Environmental Management Strategy (required by Condition 1 of Schedule 5). Duralie Coal will be required to review annually compliance with the GBF Management Plan as part of the annual review (as required by Condition 3 of Schedule 5) and revise the GBF Management Plan as appropriate (as required by Condition 4 of Schedule 5). The review and revision of the GBF Management Plan is to be to the satisfaction of the Director-General (Conditions 3 and 4 of Schedule 5). There will be a requirement for an independent annual audit (Condition 8 of Schedule 5) and publication of all plans, monitoring data and other information (Condition 10 of Schedule 5). I consider these conditions collectively achieve the purposes of peer review, accountability and transparency.

185 In summary, I consider that the conditions of both the EPBC Act approval and the Part 3A approval which I find appropriate:

Â· *in respect of water quality and hydrology*: ensure that the Duralie

Extension Project will not materially change the salinity, water quality and water levels in Mammy Johnsons River from what they would have been in the absence of the Duralie Extension Project, thereby avoiding one of the key threats to the GBF population in Mammy Johnsons River;

Â· *in respect of biodiversity management and the offset strategy*: will conserve and restore riparian vegetation and habitat for the GBF along Mammy Johnsons River and restore native vegetation in adjacent derived grasslands, thereby reducing current adverse impacts of agricultural practices on riverbank stability, erosion and run-off; and

Â· *in respect of the GBF Study and Management Plan*: will improve knowledge, reduce uncertainty and improve management of the GBF population and its habitat in Mammy Johnsons River.

Health impacts from $PM_{2.5}$ emissions

186 The Duralie Extension Project would generate particulate matter (â€œPMâ€), of various diameter size, from the removal and storage of overburden, mining and transport of coal, and operation of internal combustion engines. The smallest sized particulate matter regulated by air quality standards is particulate matter with a diameter of less than 10 micrometers (PM_{10}). This category includes particulate matter with a diameter of less than 2.5 micrometers ($PM_{2.5}$). However, there is no air quality standard which regulates $PM_{2.5}$ particularly.

187 ICAG raised a concern about the potential impacts of $PM_{2.5}$ on human health. Particulate matter 2.5 micrometers in diameter are fine particles. By way of comparison, a human hair is about 100 micrometers, so about 40 fine particles ($PM_{2.5}$) could be placed side by side on the width of a human hair. ICAG argues that, notwithstanding there are no air quality standards for $PM_{2.5}$, the conditions of approval should specify maximum criteria for $PM_{2.5}$ emission concentrations and require a study into the cumulative impacts of particulate matter emissions on the health of communities in the vicinity of the mine. The Minister for Planning and Duralie Coal oppose these conditions, submitting that they are not justified on the evidence, including the air quality measurement and monitoring data of particulate matter and dust emissions from mining operations at the Duralie Coal Mine and other coal

mines or the modelling of likely future emissions of particulate matter and dust, and that the avoidance and mitigative measures relating to air quality proposed and to be required by the revised conditions of approval will ensure that impacts on air quality and human health will be acceptably small. I agree with the Minister for Planning and Duralie Coal, for the reasons that follow.

188 The Director-Generalâ€™s Environmental Assessment Report considered Duralie Coalâ€™s air quality impact assessment, which was updated to assess the incremental increase in 24 hour PM_{10} concentrations as a result of the Duralie Extension Project. The air quality predictions in that assessment were based on implementation of a number of existing and proposed mitigation measures, including:

> â€œâ— minimising the area of disturbance as far as practicable;
>
> â— watering the coal handling area, haul roads and coal stockpiles;
>
> â— watering coal prior to transportation to the Stratford mine complex;
>
> â— revegetating topsoil stockpiles; and
>
> â— using adequate stemming in blast drill holes and scheduling blasting events to avoid poor dispersion conditions.â€ (Director-Generalâ€™s Environmental Assessment Report, p 19 in Exhibit M1, Vol 2, p 1291).

189 The Duralie Extension Project was predicted to comply with all of the applicable health and amenity-based air quality criteria (both incremental and cumulative) at almost all of the privately owned properties around the site. Nevertheless, it would contribute to some minor and infrequent (less than 5 times a year) exceedences of the 24 hour PM_{10} criteria at two privately owned properties directly to the north of MLA 1. The Director-Generalâ€™s Environmental Assessment Report expressed the view that:

> â€œthese exceedences could be avoided with the use of a real-time dust management system on site. This system would use real-time dust monitoring data and meteorological

forecasting data to guide the day to day planning of mining operations, and stop and/or relocate operations during adverse weather conditions when exceedences of the short term PM 10 criteria are most likely to occur.â€ (Director-General's Environmental Assessment Report, p 19).

190 The Director-Generalâ€™s Environmental Assessment Report considered the concerns raised in public submissions about the impacts of $PM_{2.5}$ dust emissions from the Duralie Extension Project as well as the potential for coal dust to pollute tank water supplies in the villages of Stroud Road and Wards River. The Director-Generalâ€™s Environmental Assessment Report noted that:

â€œdespite growing interest in the potential PM 2.5 impacts of mining, it is not currently government policy to assess proposals against this criterion. Furthermore, the Department notes the results of the air quality assessment demonstrate that the risk of tank water contamination as a result of dust emissions is negligibleâ€ (pp 19-20).

191 Nevertheless, the Director-Generalâ€™s Environmental Assessment Report recommended the imposition of conditions to regulate air quality at residences surrounding the mine, requiring Duralie Coal to:

â€œâ— comply with contemporary air quality criteria;

â— acquire any property where dust emissions exceed the applicable land acquisition criteria, if requested by the landowner;

â— develop a comprehensive air quality and greenhouse gas management plan, including a real-time dust monitoring program and development of a management system that requires operations to be relocated, modified and/or stopped where there are exceedences of the relevant air quality criteria;

â— independently investigate air quality complaints and undertake applicable management measures;

â— respond effectively to inquiries or complaints; and

â— publicly report on its environmental performance.â€ (Director-Generalâ€™s Environmental Assessment Report, p 20).

192 The revised conditions of approval tendered at the hearing (Exhibit M8) reflect mostly, but not completely, the mitigation measures and conditions recommended in the Director-Generalâ€™s Environmental Assessment Report.

193 The mitigation measures upon which Duralie Coalâ€™s air quality predictions were based, and which were accepted by the Director-General, are not expressly required to be undertaken in any condition of approval. However, they could be implemented as part of best practice air quality management on-site (required by Condition 22 of Schedule 3) and as part of the various management plans, including the Air Quality and Greenhouse Management Plan (required by Condition 23 of Schedule 3).

194 Condition 19 of Schedule 3 prescribes performance standards in the form of long-term criteria for particulate matter, a short-term criterion for particulate matter and long-term criteria for deposited dust (in Tables 5, 6 and 7 in Condition 19 of Schedule 3). Condition 19 requires Duralie Coal to â€œensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed the criteria listed in Tables 5, 6 or 7 at any residence on privately-owned land or more than 25 percent of any privately-owned landâ€. This wording falls short of requiring Duralie Coal â€œto comply with contemporary air quality criteriaâ€, as had been recommended in the Director-Generalâ€™s Environmental Assessment Report (p 20). ICAG proposed an alternative Condition 19 which would require Duralie Coal to â€œensure that particulate matter emissions generated by the project do not exceed the criteria listed in Tables 5, 6 or 7 â€¦â€

195 I consider Condition 19 should require compliance with the criteria for particulate matter and dust, and that it is not sufficient to merely require the taking of â€œreasonable and feasible avoidance and mitigation measures.â€ Having set appropriate air quality criteria, Duralie Coal should be required to comply with such criteria. This was the approach recommended in the Director-Generalâ€™s Environmental Assessment Report. It is the approach used for noise in other conditions of approval. Duralie Coal is required to ensure that noise generated by the project does not exceed the appropriate noise criteria (see Condition 2 of Schedule 3 and see further below). There is no sufficient reason for taking a different approach with respect to air quality.

196 Notwithstanding the requirement to comply with the criteria for particulate matter and dust in Tables 5, 6 and 7 in Condition 19 of Schedule 3, the revised conditions of approval make provision for Duralie Coal to take two types of further action if there are, nevertheless, exceedences of the criteria. First, provision is made for the owner of an affected property to request acquisition by Duralie Coal. Condition 20 of Schedule 3 provides that if particulate matter emissions generated by the Duralie Extension Project exceed the criteria for particulate matter and dust in Tables 8, 9 and 10 (which fix criteria which are the same, except for one additional criterion for short term particulate matter, as the criteria in Tables 5, 6 and 7), at any residence on privately owned land or more than 25 per cent of any privately owned land, then upon receiving a written request for acquisition from the landowner, Duralie Coal is to acquire the land in accordance with the procedures in Conditions 5 and 6 of Schedule 4.

197 Secondly, provision is made for the taking of additional dust mitigation measures at the affected residences, on request of the owners. Condition 21 of Schedule 3 provides that, upon receiving a written request from the owner of any residence on the two worst affected properties (which are specified) or on privately owned land where subsequent air quality monitoring shows that the dust created by the Duralie Extension Project is greater than or equal to the applicable criteria in Tables 5, 6 or 7 on a systemic basis, Duralie Coal is to implement reasonable and feasible, additional dust mitigation measures (such as a first flush roof system, internal or external air filters and/or air conditioning) at the residence in consultation with the owner.

198 Condition 22 of Schedule 3 of the revised conditions of approval sets operating conditions for the operation of the Duralie Extension Project. Condition 22 provides that Duralie Coal is to:

> â€œ(a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including any emissions from spontaneous combustion;
>
> (b) minimise any visible air pollution generated by the project;
>
> (c) regularly assess the real-time air quality monitoring and meteorological forecasting data and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval,
>
> to the satisfaction of the Director-Generalâ€.

199 The requirement to use the real-time dust monitoring data and meteorological forecasting data to evaluate compliance with the criteria for particulate matter and dust, and, where exceedences of the applicable criteria occur, to relocate, modify and/or stop operations to ensure compliance, accords with the Director-Generalâ€™s Environmental Assessment Reportâ€™s recommendation (pp 19 and 20). The metrological data will be provided by the meteorological station in the vicinity of the site, required by Condition 24 of Schedule 3 of the revised conditions of approval.

200 Finally, Condition 23 of Schedule 3 requires Duralie Coal to prepare and implement an Air Quality and Greenhouse Gas Management Plan for the Duralie Extension Project, to the satisfaction of the Director-General of Planning. The plan must:

> â€œ(a) be prepared in consultation with OEH [Office of Environment and Heritage], and submitted to the Director-General for approval within 3 months of the

date of determination in Land and Environment Court proceedings no 10090 of 2011, unless otherwise agreed by the Director-General;

(b) describe the measures that would be implemented to ensure compliance with Conditions 17-22 of Schedule 3 of this approval, including the proposed real-time air quality management system; and

(c) include an air quality monitoring program, that:

Â· uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the project; and

Â· includes a protocol for determining exceedences with the relevant conditions of this approval.â€

201 ICAG submitted that, in addition to all of these measures for avoidance and mitigation of particulate matter and dust emissions, the conditions should fix further criteria for particulate matter with a diameter less than 2.5 micrometers ($PM_{2.5}$) (ICAGâ€™s proposed Conditions 19A and 19B) and require a study of the $PM_{2.5}$ emissions and the human health risk they pose (ICAGâ€™s proposed Condition 18A).

202 In my view, the evidence does not establish a sufficiently likely risk to human health from the levels of $PM_{2.5}$ emissions likely to be generated by the Duralie Extension Project. Dr McKenzie, a respiratory physician, concluded that â€œ[a]t the projected levels [of particulate emissions] in the air quality assessment there is unlikely to be any significant effect on mortality, lung development or rates of asthmaâ€ (McKenzie Report, Exhibit D7, para 21, p 18). Dr Holmes, an atmospheric physicist, concluded that, â€œit would seem unlikely that there will be any adverse health effects experienced by people living near the mineâ€ (Holmes Report, Exhibit D6, para 2.25). In the Joint Expertsâ€™ Report on Air Issues (Exhibit A10) Dr McKenzie described the potential risk to the health of persons residing in the locality to be â€œacceptably smallâ€, while Dr Holmes stated that as the particulate emissions will be within the health and nuisance based ambient air quality goals set by the State of NSW, they â€œshould be taken to be acceptableâ€ (p 5).

203 Professor Peters, called by ICAG, gave evidence about the general concerns of increasing atmospheric pollution with $PM_{2.5}$ on human health. He said that the potential health harm of $PM_{2.5}$ is related to the

toxicity component of $PM_{2.5}$ (they can contain toxic hydrocarbons and elemental carbon) and the fact that $PM_{2.5}$ can act as vehicles for allergens (Peters Report, Exhibit A11, pp 1â€“2). Professor Peters did not express an opinion on the likely specific impacts of the Duralie Extension Project, only stating that, if there were to be increases in background $PM_{2.5}$ related to mine expansion, there is a quite reasonable concern that such increases â€œwould set the community at even greater risks from episodic high exposures such as during bushfires or during adverse climatic or environmental conditionsâ€ (Peters Report, Exhibit A11, p 4). In the Joint Expertsâ€™ Report on Air Issues, Professor Peters opined that: â€œIf there is a deterioration in air quality there is a potential for harm and this will depend on the susceptibility of the individualâ€ (Exhibit A10, p 5).

204 I consider that the extensive, air quality avoidance and mitigation measures that will be required by the conditions of approval, and which I have summarised above, will satisfactorily address particulate matter and dust emissions from the Duralie Extension Project. Although these conditions of approval do not specifically address particulate matter of $PM_{2.5}$ size, nevertheless, because the measures address all particulate matter and dust emissions, and set criteria for particulate matter with a diameter less than 10 micrometers (PM_{10}), they necessarily include $PM_{2.5}$ and will avoid and mitigate $PM_{2.5}$ emissions and their adverse impacts, including on human health. I accept the evidence of Dr McKenzie and Dr Holmes that the potential risk to the health of persons in the locality from $PM_{2.5}$ emissions from the Duralie Extension Project is acceptably small.

Noise

205 The local residents raised concerns about the level of noise generated by the Duralie Extension Project and by the trains used to transport coal from the Duralie Coal Mine to the Stratford Coal Mine.

Noise of operations generally

206 The Duralie Extension Project will extend the open cut operations

to the north and west of the current Duralie Coal Mine and will increase the noise from operations. The Director-Generalâ€™s Environmental Assessment Report assessed the impacts of noise from operations of the Duralie Extension Project and the mitigation measures proposed in the following terms:

> â€œThe EA [Duralie Coalâ€™s Environmental Assessment] includes a Noise Impact and Blasting Assessment undertaken by Heggies Australia in accordance with the applicable guidelines, including the *NSW Industrial Noise Policy* (INP), the *Environmental Criteria for Road Traffic Noise* (ECRTN) and the *Interim Guidelines for the Assessment of Noise from Rail Infrastructure Projects* (see Appendix C of the EA which is appended at Appendix E).
>
> At the request of both the Department and DECCCW, this assessment was updated during the exhibition period to provide revised operational noise predictions based upon the implementation of the following noise mitigation measures:
>
> Â· replacing some of the older plant with quieter plant;
>
> Â· attenuating the remaining older plant;
>
> Â· constructing noise bunds at various locations; and
>
> Â· restricting the noisier operations to between 7am and 10pm.
>
> A copy of the revised operational noise predictions is provided at Appendix H.
>
> Furthermore, Duralie Coal purchased several properties in close proximity of the mine to further reduce the impacts of the project on private residences.
>
> Even with the implementation of these measures, however, the project is likely to cause exceedences of the applicable noise criteria at up to 20 privately-owned properties (see Table 2 and Figure 3) at some stage of the project. Most of

these exceedences would be to the north of the proposed expansion, and would largely be due to the proximity of these properties to the proposed mining operations.

Table 2: Summary of Operational Noise Impacts

Noise Exceedence	**Management generally at this level of exceedence**	**No. of affected private properties (all years)**
Marginally-affected Residences (1-2dB exceedence)	Noise mitigation, if possible	9
Moderately-affected Residences (3-5dB exceedence)	Noise mitigation, including noise mitigation at residence	3
Significantly-affected Residences (>5dB exceedence)	Acquisition upon request	5
Significantly-affected Vacant Land[1] (>5dB exceedence)	Acquisition upon request	3
Total Properties Exceeding Noise Criteria		**20**

[1] *Where more than 25% of a property is affected*

Both DECCW and the Department are satisfied that there is limited scope to further reduce the predicted impacts of the project other than using a real-time noise management system to minimise noise impacts during adverse weather conditions, and installing additional noise mitigation measures at the more-affected residences.

While the Department considers the residual noise impacts to be justified when the social and economic benefits of the project are taken into consideration, it has recommended conditions requiring Duralie Coal to:

Â· acquire the significantly-affected properties upon request;

Â· implement additional mitigation measures (such as double-glazing) at the residences where moderate to significant noise impacts are likely to occur;

Â· comply with contemporary noise criteria;

Â· implement best practice noise mitigation on site, including a real-time management system, to minimise the noise impacts of the project;

Â· prepare and implement a detailed Noise Management Plan for the project; and

Â· monitor and publicly report on the environmental performance of the project.â€ (Director-Generalâ€™s Environmental Assessment pp 15â€“16 in Exhibit M1, Vol 2, pp 1287â€“1288).

207 The revised conditions of approval tendered at the hearing (Exhibit M8) reflect these recommendations (Conditions 1, 2, 3, 4, 6 and 7 of Schedule 3 and Condition 1(b), 2(b), 3 and 4 of Schedule 5 and the Operational Noise Management and Mitigation Measures in the statement of commitments in Appendix 9, required to be implemented by Condition 2(b) of Schedule 2).

208 The structure of the revised conditions of approval concerning noise impacts from operations is to require Duralie Coal to:

Â· prepare and implement an Environmental Management Strategy (Condition 1 of Schedule 5) and a Noise Management Plan (Condition 7 of Schedule 3 and Condition 2 of Schedule 5);

Â· operate according to specified operational conditions (Condition 6 of Schedule 3 and Condition 2(b) of Schedule 2 and the operational noise management and mitigation measures in the statement of commitments in Appendix 9) and specified noise criteria (Conditions 2, 3 and 4 of Schedule 3);

Â· monitor and report on compliance (Conditions 7(c) of Schedule 3 and Conditions 1(f), 2(d) and (g) of Schedule 5);

Â· revise the strategies and plans in light of the monitoring data to improve environmental performance (Condition 2(h), 3, 4, 7 and 8 of Schedule 5); and

Â· provide for the taking of further action if noise criteria are not met, including acquisition upon request of noise affected properties (Conditions 1, 3 and 4 of Schedule 3 and Conditions 1â€“6 of Schedule 4).

209 The scheme for dealing with the impacts of operational noise on adjoining land is to divide the noise affected properties into four categories, with the measures required to be taken varying depending upon the category.

210 Firstly, the worst affected properties are identified in Table 1 in Condition 1 of Schedule 3 of the revised conditions of approval. For these properties, there are no mitigation measures which can reduce the noise impacts to a satisfactory level. Duralie Coal will, therefore, be required to acquire these properties on written request of the owners.

211 Secondly, the next most affected properties are identified in Table 2 in Condition 2 of Schedule 3 of the revised conditions of approval.

These include 12 identified properties as well as the properties within the catch-all phrase of â€œall other privately owned landâ€. Condition 2 of Schedule 3 fixes performance standards for these properties. Duralie Coal will be required to ensure that the noise generated by the project does not exceed the noise criteria specified in Table 2 either at any residence on privately owned properties or on 25 per cent of any privately owned land, unless there is written agreement with the relevant landowner to exceed these criteria.

212 Thirdly, notwithstanding this obligation to comply with the noise criteria in Condition 2 of Schedule 3, provision is made for owner-initiated acquisition of noise affected properties in the event that Duralie Coal is unable to comply with the noise criteria in Condition 2. Condition 3 of Schedule 3 provides that if the noise generated by the project exceeds the noise acquisition criteria specified in Table 3 (which criteria are generally higher than the noise criteria specified in Table 2) either at any residence on privately owned land or on more than 25 per cent of any privately owned land, Duralie Coal must acquire the land on the written request of the landowner affected.

213 Fourthly, specific provision is made for implementation of additional noise mitigation measures at residences on properties identified in Condition 4 of Schedule 3. These include the properties listed in Table 1, three properties listed in Table 2 and any privately owned land where subsequent noise monitoring shows the noise generated by the project is greater than a specified noise criteria. (This condition also now identifies properties affected by rail noise dealt with below). Duralie Coal will be required, on written request of the owner of any residence on land identified, to implement additional noise mitigation measures (such as double glazing, insulation and/or air conditioning), in accordance with the procedure in Condition 4.

214 I consider these measures, cumulatively, to deal with the impacts of operational noise are as satisfactory as is reasonably practicable. There is a limit to the steps that can be taken to mitigate the noise from the operation of this open cut mine in this location with the proximity of surrounding properties.

Noise generated by trains

215 The increase in the production rate as a result of the Duralie Extension Project will increase the number of coal train movements from the Duralie Coal Mine to the Stratford Coal Mine from approximately 950 to 1,125 per annum. Duralie Coal had sought also an extension of the rail operating hours at night from 10.00pm to 2.00am (the starting time would remain at 7.00am). The Director-Generalâ€™s Environmental Assessment Report concluded that Duralie Coal had not demonstrated that it had exhausted all other options to reduce the number of train trips for the project and did not support an extension of the rail operating hours at this stage. Nevertheless, the Director-Generalâ€™s Environmental Assessment Report accepted that it might be necessary to extend the rail operating hours at some stage in the future. The Director-Generalâ€™s Environmental Assessment Report therefore recommended that the conditions of approval restrict train operations to between 7.00am and 10.00pm unless Duralie Coal can demonstrate, to the satisfaction of the Director-General of Planning, that there are insufficient train paths for the project during those hours (p 17 in Exhibit M1, Vol 2, p 1289).

216 The revised conditions of approval tendered at the hearing (Exhibit M8) reflect these recommendations. The mitigation measures required by the revised conditions of approval are as follows:

Â· No more than 5 laden trains are to leave the site each day and no more than 4 trains are to leave the site each day, when averaged over a 12 month period (Condition 7 of Schedule 2).

Â· Trains may only operate between 7.00am and 10.00pm unless otherwise approved by the Director-General in accordance with Condition 8 of Schedule 2 (Condition 8 of Schedule 2).

Â· Duralie Coal must keep accurate records of the date and time of each train movement to and from the site and make these publicly available on its website at the end of each calendar year (Condition 48 of Schedule 3).

Â· By the end of December 2011, or as otherwise agreed by the Director-General, Duralie Coal is required to replace the existing trains approved to operate on the NSW rail network in accordance with the

noise limits in the Australian Rail Track Corporationâ€™s Environment Protection Licence No 3142 (Condition 5 of Schedule 3). There are currently no noise limits that apply to the existing trains.

Â· Duralie Coal has committed to replace the existing trains with GL class locomotives (or equivalent) that are quieter than the existing trains from year 2 of the project (or sooner, subject to contractual arrangements) (see Duralie Coal Mine ROM Coal Rail Transport Noise commitment in the statement of commitments, Appendix 9, required to be implemented by Condition 2(b) of Schedule 2). The current level of noise generated by the existing trains will reduce when this occurs.

Â· Upon receiving a written request from the owner of any residence on certain specified land in the village of Wards River or along the route of the North Coast railway between the Stratford and Duralie Coal Mines where the maximum passby rail traffic noise from the Stratford mining complex (which is defined to be the Stratford and Bowens Road North mines, considered collectively) exceeds 85dBA, Duralie Coal is required to implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence (Conditions 4(d) and (e) of Schedule 3 of the development consent (DA No 23-98/99) for the Stratford Coal Mine granted on 5 February 1999 as modified on 26 November 2010, Exhibit D13).

Â· Duralie Coal is required to implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency and rail noise generated by the project, and regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on-site to ensure compliance with the relevant conditions of the approval, to the satisfaction of the Director-General (Condition 6 of Schedule 3).

Â· Duralie Coal is required to prepare and implement a Noise Management Plan for the project, in consultation with the Office of Environment and Heritage, to the satisfaction of the Director-General of Planning (Condition 7 of Schedule 3).

Â· The effectiveness of the Noise Management Plan is to be reviewed

and audited (in accordance with the requirements in Conditions 3 and 8 of Schedule 5) and, following this, revised to incorporate any recommended measures to improve the environmental performance of the project (Condition 4 of Schedule 5).

Â· Duralie Coal must comply with any reasonable requirements of the Director-General of Planning arising from the Departmentâ€™s assessment of any reports, strategies, plans, programs, reviews, audits or correspondence submitted in accordance with the approval and the implementation of any actions or measures contained in these documents (Condition 4 of Schedule 2).

217 With two exceptions, I consider these measures to deal with the impacts of noise generated by trains to be satisfactory. The first exception is that I do not consider that Condition 8 of Schedule 2 should empower the Director-General of Planning to extend the hours of operation of the trains arriving at and leaving the Duralie Coal Mine. As the Director-Generalâ€™s Environmental Assessment Report stated, Duralie Coal has not yet made out a case justifying extending the existing hours of operation of the trains, and thereby imposing additional burdens on residences affected by noise generated by coal train movements. The conditions of approval fixing the hours of operation of the trains to 7.00am to 10.00pm should therefore remain as they are at present. If Duralie Coal wishes to apply to extend the approved hours of operation of the trains, it can make application under the EPA Act to modify the approval in the future. Such modification application will need to justify any extension of the hours, including addressing the matters in the Ministerâ€™s proposed Condition 8(a) and (b) of Schedule 2. The modification application would be considered on its merits at that time. However, there should be no predetermination or indication of likely approval or indication of the likely terms of any approval (including what the extended hours might be or the number of years in which extended hours of operation would operate) in the current approval. Accordingly, Condition 8 of Schedule 2 of the revised conditions of approval should only contain the first sentence limiting the hours of train operation to between 7.00am and 10.00pm.

218 The second exception concerns the terms of the condition of approval for the Stratford Coal Mine requiring the taking of additional noise mitigation measures at residences affected by passby rail traffic noise (Condition 4(d) and (e) of Schedule 3 of the development consent for the Stratford Coal Mine). The condition applies only to residences on

land specified in the condition. Only five residences in the village of Wards River are specified (on the land listed as R8â€“R12 in the figure in Appendix 3 to the development consent (see Condition 4(d)). The catch-all category in Condition 4(c) is limited by the causal requirement that the passby rail traffic noise which exceeds the maximum noise criteria of 85 dBA be â€œfrom the Stratford mining complexâ€. The Stratford mining complex is defined to be â€œthe Stratford and Bowen Road North mines, considered collectively.â€ The inclusion of this causal requirement raises doubt that the condition would apply to require Stratford Coal Pty Ltd (a different company to Duralie Coal which is the proponent of the Duralie Extension Project) to implement additional noise mitigation measures at residences affected by passby rail traffic noise caused by trains transporting coal from the Duralie Coal Mine. As submitted by the Minister for Planning at the hearing, I consider that a requirement to implement additional noise mitigation measures at residences affected by passby rail traffic noise should be included in the conditions of approval for the Duralie Extension Project. This can be achieved by amending Condition 4 of Schedule 3 of the revised conditions of approval to mirror Condition 4(d) and the relevant part of 4(e) dealing with passby rail traffic noise, but removing the causal requirement for such noise to be from the Stratford mining complex, of the Stratford Coal Mine development consent.

Dust generated from trains

219 The local residents who live in proximity to the railway also raise concern as to the dust emissions from the uncovered laden train wagons transporting the ROM coal from the Duralie Coal Mine to the Stratford Coal Mine. Under the current development consent for the existing Duralie Coal Mine and under the Ministerâ€™s approval for the Duralie Extension Project, there are no conditions regulating dust from the coal trains. Apparently, Duralie Coalâ€™s practice has been to water the trains upon departure from Duralie to prevent or minimise dust being emitted during transportation to Stratford (see Environmental Assessment; Appendix D, section D2.3, p D-6). However, according to the local residentsâ€™ evidence, this practice has not been effective in suppressing dust and dust from the coal trains continues to impact upon the residences in proximity to the railway.

220 At the conclusion of the hearing, the Minister proposed and Duralie Coal did not oppose, a new condition addressing the issue of dust emissions from laden coal trains. Condition 21A:

> â€œ21A Within 3 months of the date of determination in the Land and Environment Court Proceedings No. 10090 of 2011, the Proponent shall submit a study of the dust emissions from the laden trains associated with the Project to the Director-General. This study must:
>
> (a) be carried out by a suitably qualified and experienced expert whose appointment has been endorsed by the Director-General;
>
> (b) include consultation with the OEH [Office of Environment and Heritage], the Department and the residents in close proximity to the railway line;
>
> (c) assess the scale, nature and significance of the dust emissions of the laden trains;
>
> (d) identify any reasonable and feasible mitigation measures that could be implemented to reduce the dust emissions from these trains;
>
> (e) recommend the implementation of any specific measures; and
>
> (f) be accompanied by the Proponentâ€™s response to any recommendations in the study.
>
> If, following review of the study, the Director-General directs the Proponent to implement additional mitigation measures to reduce the dust emissions of the laden trains associated with the Project, then the Proponent shall implement these measures to the satisfaction of the Director-General, and within one month of such direction, update the Air Quality &

Greenhouse Gas Management Plan for the Project to include a detailed program for the implementation of these measures.â€

221 I consider this new condition to be an appropriate mechanism to address the issue of dust emissions from coal trains. However, I wish to add two comments.

222 First, one of the mitigation measures that needs to be evaluated in the study of the dust emissions from the laden trains required by the condition is the covering of the laden train wagons. If the coal from the Duralie Coal Mine were to be transported from Duralie to Stratford by road, the laden trucks would be required, by relevant road rules, to be covered, thereby preventing dust emissions impacting residences in proximity to the road. It seems anomalous that the laden train wagons which serve the same purpose as trucks in transporting ROM coal from Duralie to Stratford, and which equally can generate dust emissions impacting the same residences in proximity to the railway, are not required to be covered.

223 Secondly, for the avoidance of doubt, a requirement for monitoring of any additional mitigation measures directed to be implemented by the Director-General should be included in the updated Air Quality and Greenhouse Gas Management Plan. This will then trigger other conditions of approval dealing with review of the monitoring data and performance, independent environmental audit, revisions of the management plan as well as access to information on the monitoring results.

Conclusion and orders

224 For these reasons, I consider that approval should be granted to the Duralie Extension Project, subject to conditions amended as I have indicated through the judgment. In order to grant approval on these modified conditions, it is necessary for the Court to uphold the appeal. This is necessary notwithstanding that the appeal is a third party objector appeal by ICAG against the decision of the Minister for Planning

to grant approval. As I noted in another third party objector appeal against a Part 3A approval, *Gerroa Environment Protection Society Inc v Minister for Planning and Cleary Bros (Bombo) Pty Ltd (No 2)* [2008] NSWLEC 254 at [5]â€“[6], in order to approve a project that is different in material respects, and on different conditions from those originally approved by the Minister, it is necessary for the Court to uphold the appeal.

225 Accordingly, I make the following orders:

1. The appeal is upheld.

2. Approval is granted under s 75J of the Environmental Planning and Assessment Act 1979 to the project application referred to in Schedule 1, and on the conditions referred to in Schedule 2 to 5, of the approval in Annexure A.

3. The exhibits may be returned.

Decision last updated: 14 November 2011