

1 **Adani Mining Pty Ltd –v– Land Services of Coast and Country & Ors.**
2 **Land Court Nos. MRA428-14, EPA429-14, MRA430-14, EPA431-14,**
3 **MRA432-14, EPA433-14, EPA446-14**

4
5 **Joint Experts Report: *Springs Ecology***

6 **1 Introduction**

7 This Joint Experts Report (JER) addresses issues relating to springs ecology with respect to the
8 Land Court of Queensland Appeal Numbers MRA428-14, EPA429-14, MRA430-14, EPA431-14,
9 MRA432-14, EPA433-14 and EPA446-14 between the applicants Land Services of Coast and
10 Country & Ors. and the respondent Adani Mining Pty Ltd, filed in the Brisbane Registry.

11 **1.1 Experts' Statement**

12 The appellant has nominated Dr Roderick Fensham (**RF**) as the expert for springs ecology with the
13 respondent nominating Mr Bruce Wilson (**BW**) as the expert for springs ecology.

14 This joint report has been prepared by Mr Bruce Wilson and Dr Roderick Fensham in accordance
15 with the Order made by the Land Court of Queensland on 20 October 2014.

16 We acknowledge that:

- 17
- 18 • we have been instructed to assist the Land Court by investigating and reporting on the
19 issues relating to springs ecology associated with this case, and
 - 20 • we have been instructed on an expert's duty in accordance with *Rule 22 of the Land*
21 *Court Rules 2000*, which we have read and understood, and that we have understood
22 and discharged that duty.

23 We confirm that no instructions were given or accepted to adopt or reject any particular opinion in
24 preparing this joint written statement as per *Rule 426 of the Uniform Civil Procedure Rules 1999*.

25 **1.2 Meetings**

26 The springs ecology experts corresponded by email and phone between the December 5 2014
27 and January 15 2015.

28 **2 Background**

29 2.1 The Land Services of Coast and Country Inc. (LSCCI); has made an objections to the
30 granting of an Environmental Authority (EA) for the Carmichael Mine and Rail Project.

31 2.2 LSCCI have raised objections to the applications in the following areas:

- 32 (a) groundwater;
- 33 (b) groundwater dependent ecosystems;
- 34 (c) surface water;

- 35 (d) biodiversity (primarily focused on impacts to the Black-throated Finch (BTF);
- 36 (e) climate change; and
- 37 (f) economic and social matters.
- 38 2.3 In terms of the impacts to the springs ecology has LSCCI specifically raised the following
39 matters:
- 40 (a) if the mine proceeds, it will cause severe adverse environmental impacts to
41 groundwater and dependent users, species and ecosystem (paragraph 11 of the
42 LSCCI Objection).
- 43 (b) if the mine proceeds, it will impact groundwater dependent springs and systems
44 that are important for human use, agriculture and biodiversity, including but not
45 limited to:
- 46 • the Doongmabulla Springs – Including Moses, Little Moses and Joshua:
47 and
 - 48 • The Mellaluka Springs – including Mellaluka Spring, Lignum Spring and
49 Stories Spring (paragraph 12 of the LSCCI Objection).
- 50 (c) The full extent of the adverse environmental impacts to groundwater and
51 dependent species and ecosystems cannot be particularised by the objector due
52 to the inadequate information provided by the Applicant in the applications, EIS
53 and SEIS (paragraph 13 of the LSCCI Objection).
- 54 (d) It has not been adequately demonstrated that the mine will not have
55 unacceptable adverse impacts on groundwater, and dependent species and
56 ecosystems. In particular:
- 57 (i) It has not been adequately demonstrated that the mine will not have an
58 unacceptable adverse impact on the environment by change to the
59 quality and quantity of groundwater considering 269(4)(j) in the *Mineral
60 Resources Act 1989* (MRA).
 - 61 (ii) The absence of adequate scientific information about a potential impact
62 with severe and long term impacts is good reason to refuse mining lease
63 applications considering 269(4)(j) of the MRA.
 - 64 (iii) Absence of adequate scientific information about potentially severe and
65 long-term adverse impacts on biodiversity is good reason to refuse the
66 mining lease applications considering s 269(4)(l) of the MRA.
 - 67 (iv) Adverse environmental impacts and potentially severe adverse
68 environmental impacts cause by these proposed mining operations on
69 biodiversity and ecosystems is an inappropriate use of the land when
70 current use does not pose a similar threat considering s 269(4)(m) of the
71 MRA (paragraph 14 of the LSCCI Objection).

72 73 **3 Groundwater Joint Experts Report**

74 A copy of the Joint Groundwater Experts Report dated January 9 2015, was made available to
75 **BW** and **RF** on January 10 2015.

76

77 **4 Grounds and Issues**

78 The grounds and issues addressed in this report were taken from those listed under “Springs
79 Ecology” in the notice of issues provided by the Appellant and delivered on November 28 2014 and
80 confirmed in an amended notice of issues on 2 December 2014.

81 These grounds and issues are listed in the next section with specific responses by the experts.

82 **5 Areas of Agreement and Disagreement**

83 **Ecological Significance of the Doongmabulla Springs**

84

85 **Issue No. 12** *“The Doongmabulla Springs has exceptional ecological value.*

86

87 *(a) The exceptional ecological value of the Doongmabulla Springs is primarily based on the*
88 *unusually high level of endemism among the species for which it provides habitat.*

89 *(b) This high level of endemism within the Doongmabulla Springs is understood to be*
90 *largely a consequence of in situ evolution, driven by factors among the following:*

91

92 *(i) the age of the springs – the Doongmabulla Springs is likely to be at least 1 million*
93 *years old;*

94 *(ii) the isolation of the Doongmabulla Springs; and*

95 *(iii) the particular/peculiar water chemistry.”*

96

97 **We** agree that the Doongmabulla Springs Complex has exceptional ecological value. The
98 Doongmabulla Springs support numerous spring wetlands with a large area (10.3ha) of permanent
99 or near permanent wetlands compared to other inland springs.

100 **We** agree there a large number of plant species endemic to GAB spring wetland include *Chloris*
101 *sp.* (Edgbaston R.J.Fensham 5694), *Eriocaulon carsonii*, *Eryngium fontanum*, *Hydrocotyle*
102 *dipleura*, *Myriophyllum artesium*, and *Sporobolus pamelae* occur at the Doongmabulla Springs.

103 **We** agree the Doongmabulla Springs support a “community of native species dependent on natural
104 discharge of groundwater from the Great Artesian Basin (GAB spring wetlands) which is listed as
105 an endangered Threatened Ecological Community (TEC) under the Commonwealth Environment
106 Protection and Biodiversity Conservation Act 1999 (EPBC). The springs are therefore considered
107 a Matter of National Environmental Significance (MNES) and have been dealt with as such in the
108 current EIS and subsequent approvals.

109 **We** agree the Mellaluka Springs do not support vegetation of exceptional ecological value.

110 **We** agree that it is speculative to assert that the endemic plant species at the Doongmabulla
111 Springs have evolved *in situ* and that the springs themselves are more than a million years old. It is
112 also possible that the spring flora has evolved on springs elsewhere, and dispersed to the
113 Doongmabulla Springs.

114

115 **Impacts on the Springs**

116
117 **Issue No. 13.** *“It is accepted that the proposed mine may lead to the permanent drying of the Mellaluka*
118 *Springs Complex, such that the springs’ ecological values will be permanently lost.”*

119 **We** agree that if the proposed proposed mine leads to the permanent drying of the
120 Mellaluka Springs, then the springs’ ecological values will be permanently lost.

121
122 **BW:** The loss of some ecological values of Mellaluka springs could be mitigated in some
123 circumstances e.g. such as the provision of permanent water for target fauna species.

124
125
126 **Issue No. 14 (in part).** *“The likely impacts of the proposed mine on the ecological values of the*
127 *Doongmabulla Springs Complex are not clear.*

128 (a) *If the drawdown impact on the Doongmabulla Springs is greater than predicted by the*
129 *Applicant’s numerical modelling, then the impact on the springs’ hydraulic head and flow rates*
130 *will be greater than anticipated.*

131

132 (c) *Subject to the outcomes of the meeting of experts in hydrogeology, there appears to be*
133 *significant uncertainty or disagreement about:*

134 (i) *which of the underlying aquifers is the likely source of water to the Doongmabulla Springs; and*

135 (ii) *whether the Applicant’s predictive numerical modelling:*

136 (A) *adequately reflects the geological features that create the Doongmabulla Springs; and*

137 (B) *accurately predicts the likely extent of groundwater drawdown impacts on the*
138 *Doongmabulla Springs.*

139 **We** provide no opinion on these matters and rely on the opinion of the appointed
140 hydrogeological experts.

141 **We** understand from the Groundwater Joint Experts Report that there is still debate about
142 the source aquifer for the Doongmabulla Springs; i.e. if it is above or below the Rewan
143 formation. This has implications for the listing the Doongmabulla Springs as a GAB spring
144 wetland under the EPBC, as aquifers below the Rewan formation are classified as Galilee
145 rather than Great Artesian Basin and therefore may not meet the definition of the TEC in
146 the listing advice (TSSC, 2001) or the recovery plan (Fensham *et al.* 2012).

147
148 **Issue No. 14 (in part).** *“The likely impacts of the proposed mine on the ecological values of the*
149 *Doongmabulla Springs are not clear.*

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153 (b) *The Applicant does not properly assess the potential or likely extent of the ecological impacts on*
154 *the Doongmabulla Springs:*

155 (i) *The Applicant’s hydrogeological modelling indicates that the mine dewatering will have some*
156 *impact on the Doongmabulla Springs*

157 (ii) *Any drawdown from the source aquifer will have an impact on the Doongmabulla Springs,*
158 *such as a reduction in the flow rate into the springs and some reconfiguration of the habitat (i.e.*
159 *reduction in the volume of any pools and the area inundated by the Doongmabulla Springs).*

160 (iii) If the drawdown impacts on the Doongmabulla Springs reduce the flow rate but maintain
161 artesian discharge, the extent of the impacts on the ecology of the Doongmabulla Spring is very
162 difficult to predict.

163

164 (d) If the Doongmabulla Springs dry, either permanently or temporarily, any endemic species will not
165 survive and will become extinct.

166 **We** agree that if the Doongmabulla Springs dry either permanently or temporarily the
167 endemic species will not survive and become extinct from the site.

168
169 **We** agree that reductions in flow rates will reduce the extent of the wetlands associated
170 with the Doongmabulla Springs and that the extent of impacts on the ecology of the
171 endemic species is very difficult to predict. However, the endemic plant species can survive
172 on spring wetlands much smaller than the largest spring wetlands at Doongmabulla, as
173 demonstrated by their existence on small spring wetlands at Doongmabulla and elsewhere.

174
175 **We** agree assessing the impact on ecological values of the Doongmabulla Springs
176 requires an assessment of the predicted change in flow rates.

177
178 **RF:** Effective offsetting for the complete loss of the Doongmabulla Springs is not feasible
179 because:

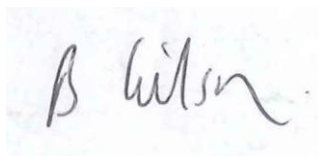
- 180
181 **a)** enhancing existing values of other springs is not an effective offset for the loss of
182 the exceptional values of the entire complex at the Doongmabulla Springs;
183 **b)** the circumstances to reconstruct the hydrological, chemical and biological
184 values at additional artificial springs complex are unavailable.

185
186 **BW:** Enhancing existing values of other springs is unlikely to be able to provide an effective
187 offset for the loss of the exceptional values of the entire complex at Doongmabulla Springs
188 (because it would be difficult to find the area of suitable existing springs required) and
189 reconstructing artificial springs that are totally equivalent to all the values of the
190 Doongmabulla Springs is not possible. However, enhancing existing values at another
191 spring site may be able to provide equivalent values that could be used to offset specified
192 impacts at the Doongmabulla Springs.

193
194 **We** agree the most effective contribution for offsetting the loss of values at the
195 Doongmabulla Springs may include the investment in recovery actions to address
196 conservation problems at springs in other locations.
197

198 **6 Request for Further Information**

199
200 **We** require an assessment of the predicted change in flow rates to fully assess the impact
201 on ecological values of Doongmabulla Springs.
202



Bruce Wilson
Dated: 15/1/2015



Rod Fensham
Dated: 15/1/2015

203

204 **7 References**

- 205 TSSC – Threatened Species Scientific Committee (2001) Commonwealth Conservation Advice on
206 the community of native species dependent on natural discharge from the Great Artesian basin.
207 Australian Government, Canberra. Accessed 6/1/2015, Available at
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