

Between:	GRAEME ASHLEY HOFFMANN AND CHUDA KAEWONGKHON HOFFMAN ATF HOFFMANN DRILLING PTY LTD SUPERANNUATION FUND 716 001 453	Appellant
And:	GOLD COAST CITY COUNCIL	Respondent
And:	CATHERINE CERIS ASH	First Co-Respondent by Election
And:	AUSTRALIAN RAINFOREST CONSERVATION SOCIETY INC	Second Co-Respondent by Election
And:	GECKO ENVIRONMENT COUNCIL ASSOCIATION INC	Third Co-Respondent by Election
And:	BERNIE WINTER	Fourth Co- Respondent by Election
And:	CHARLES COLIN ALEX ORSINI	Sixth Co-Respondent by Election

SECOND CO-RESPONDENT'S OBJECTIONS TO THE APPELLANT'S EVIDENCE

SUMMARY

1. The Second Co-Respondent by Election (**ARCS**) objects to the Appellant's evidence, as particularized in Schedule 1, on the basis that:¹
 - (a) it is or relies on hearsay evidence (e.g. the Douglas Partners 2017 and 2018 reports, and the 'Hair Report' of 2021);
 - (b) it is or relies on opinion evidence of multiple groundwater experts, including experts who are not called as witnesses and have not participated in the expert joint meeting processes (e.g. the 'Hair Report' in Annexure B to the Joint Groundwater-Ecology JER, which contains opinions of a second expert (Mr Iain Hair) relied upon by the Appellant);
 - (c) it relies on unstated and unidentified assumptions (e.g. of aquifer properties such as transmissivity);

¹ A small number of the grounds of objection also raise that the Appellant's evidence contains opinions outside the field of expertise of the expert/s who prepared the report (assumed to be limited to groundwater) involving ecology; however, this is a relatively minor issue. Schedule 1 is based on the documents of which ARCS is aware the Appellant seeks to rely on as at 1 February 2022. ARCS reserves its rights to object to further or new documents being tendered.

- (d) it is not based on facts proven by admissible means (e.g. of water quality from the bores and the aquifer properties such as the recharge area and transmissivity); and/or
- (e) the matters assumed are not sufficiently like the matters established to render the opinion of the experts called by the Appellant of any value (e.g. the Appellant's expert/s assumed that the aquifer and cone of depression is uniform when it is accepted by all of the groundwater experts that the aquifer is not uniform and affected by fracturing of the rock strata).
2. Chesterman J (with whom Williams and Jerrard JJA agreed) described the core principles upon which the objections are based as “nothing new”, “should be well understood by all counsel” and “elementary” in *R v Ping* [2006] 2 Qd R 69 at 79, [43]-[46] (extracted below).
 3. The Court discussed many of these core principles in rejecting the evidence of acoustical engineers in a recent planning appeal: *Gold Coast Motorsport Training Centre Pty Ltd v Gold Coast City Council & Ors* [2021] QPEC 33 at [128]-[181].
 4. The focus of ARCS' objections are substantive issues that are material to the proper resolution of the appeal, not trivial issues that are not seriously in dispute. In this context:
 - (a) ARCS does not dispute facts that were agreed by its groundwater expert during the expert meeting process, although the agreement or disagreement of experts during a conclave does not decide the admissibility of evidence.²
 - (b) Nor does ARCS dispute facts or premises that it considers ought rightly be admitted under r 25 of the *Planning and Environment Court Rules 2018 (Rules)*.
 5. ARCS does not object to groundwater reports lodged by the Appellant in the development application process (e.g. the Douglas Partners 2017 and 2018 reports) being tendered in a non-hearsay manner (i.e. as original evidence³) but does object to the extent that the Appellant relies on those documents in a hearsay manner to prove the truth of the statements made in them.
 6. Notwithstanding this objection, ARCS accepts the facts and premises agreed by the experts as set out in Schedule 2.
 7. ARCS submits that in relation to the remaining facts the subject of its objections, particularly those set out in Schedule 3, this is not an appropriate case for the Court to exercise its discretion under r 25 of the Rules to order that the rules of evidence do not apply to proving a fact if the court considers:
 - (a) strict proof of the fact may cause unnecessary or unreasonable expense, delay or inconvenience in the proceeding; or
 - (b) the fact is not seriously in dispute.

² *Sanrus Pty Ltd & Ors v Monto Coal 2 Pty Ltd & Ors (No 5)* [2019] QSC 210 (**Sanrus No 5**) at [37] and [40] per Bond J (as his Honour then was).

³ *Hughes v National Trustees Executors & Agency Co of Australasia Ltd* (1979) 143 CLR 134 at 153 (Gibbs J); and *Walton v The Queen* (1989) 166 CLR 283 at 288-289 (Mason CJ).

8. As the evidence-in-chief of the groundwater expert will be confined to the joint expert reports (**JERs**) and individual reports produced by the experts in accordance with the Court's orders, ARCS asks the Court to rule on the admissibility of the Appellant's groundwater evidence at the commencement of the hearing so that ARCS will know the case it is to meet and to allow it to make informed forensic judgements about the future conduct of the proceedings, including what parts of the evidence should be the subject of cross-examination and closing submissions.⁴

EVIDENCE IN DISPUTE

9. Schedule 2 particularises the facts/premises relevant to the objections that ARCS submits are:
- (a) common ground between the three groundwater experts;
 - (b) not disputed by ARCS; and/or
 - (c) established on the admissible evidence.
10. Schedule 3 particularises the facts/premises/assumptions and opinions relevant to the objections that ARCS submits are:
- (a) not common ground between the three groundwater experts;
 - (b) disputed by ARCS;
 - (c) not established on the admissible evidence (or facts that the Court ought not to exercise its discretion under r 25 of the Rules); and/or
 - (d) in relation to opinions, not sufficient like the facts that are established to render the opinion of any value.

THE OBJECTIONS SHOULD BE DECIDED IMMEDIATELY

11. The objections should be decided immediately at the commencement of the trial and not deferred for consideration in the final judgment as there is not a very good reason to defer ruling on them.
12. In *Sanrus Pty Ltd & Ors v Monto Coal 2 Pty Ltd & Ors (No 5)* [2019] QSC 210 (***Sanrus No 5***), Bond J (as his Honour then was) ruled on 120 objections to expert evidence made during a civil trial involving a dispute between joint venture partners concerning performance of a joint venture for the exploitation of a coal deposit at Monto in Queensland. The objections were raised without notice at trial after the experts had engaged productively in a joint expert conclave and his Honour addressed as a preliminary issue whether he should defer ruling on admissibility at [33]-[41], relevantly (footnote omitted):

[33] The plaintiffs contended that I should not proceed to determine the defendants' objections, but should defer ruling on admissibility until my final judgment. I heard submissions on this question during oral argument. At the end of oral argument I advised the parties that I intended to rule on the objections and would explain why in my judgment.

[34] In *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588, French CJ, Gummow, Hayne, Crennan, Kiefel and Bell JJ at explained (at [19] and [20]):

[...] As a general rule, trial judges confronted with an objection to admissibility of evidence should rule upon that objection as soon as possible. Often the ruling can and should be given immediately after the

⁴ *Greer v Greer* [2021] QCA 143 at [78] (Bond JA (with whom Sofronoff P and Wilson J agreed)).

objection has been made and argued. If, for some pressing reason, that cannot be done, the ruling should ordinarily be given before the party who tenders the disputed evidence closes its case. That party will then know whether it must try to mend its hand, and opposite parties will know the evidence they must answer.

It is only for very good reason that a trial judge should defer ruling on the admissibility of evidence until judgment. [...]

[35] The general rule stated in *Dasreef Pty Ltd v Hawchar* has been referred to with approval in the Queensland Court of Appeal: see *Mark Bain Constructions Pty Ltd v Avis*; *Mark Bain Constructions Pty Ltd v Barnscape Pty Ltd* [2012] QCA 100 at [120] per Fraser JA with Chesterman JA and Fryberg J agreeing.

[36] The plaintiffs sought to persuade me that there were very good reasons not to apply the general rule.

[37] The plaintiffs argued that it was significant that the experts had “engaged productively in the joint expert conclave process without the difficulty which is sought to be imputed to the evidence of one of them”. That argument was not persuasive. The engagement of experts in conclaves was done by order which specifically stated the conclaves were to be without prejudice to objections to admissibility and in the context which specifically set a timetable for objections. In any event, expert witnesses are not judges. The fact that they might be able to “engage productively” (or even reach agreement, for that matter) in discussions about evidence is neither here nor there, if the evidence upon which they engaged or even reached agreement is found not to meet the criteria for admissibility of expert opinion when an objection is ruled upon by a judge.

[38] The plaintiffs complained that the defendants had given no notice that they intended to object to the expert reports of Mr Freeman to the extent that was now sought to be done. The defendants gave the requisite notice in accordance with the timetable which had been set by order of the Court, as amended.⁹ The complaint might have been more persuasive if the defendants’ objections were spurious or marginal. However, it will appear, many of the defendants’ objections have merit. While it is true that the resolution of the objections has caused disruption to the trial plan, that cannot be helped. I do not find the extent of the objections do be a good reason to defer ruling.

...

[40] Subject to some caveats concerning the application of the proof of assumption rule (as to which see [50] below) and other specific issues in which I have formed the view that I should not yet make an evaluative judgment about disputed matters of proof, in my view this was an appropriate case for the application of the general rule. My ruling on the present objections will permit both sides of this case to make informed forensic judgments about the future conduct of the proceeding. In particular, it will permit the defendants to conduct the course of their cross-examination of Mr Freeman (P) in the knowledge of the particular evidence which is admissible and which they must answer. But further, and to the extent that any other expert reports from either side are subject to such deficiencies as I might find to exist in Mr Freeman’s reports, my ruling will also permit the parties to make informed forensic judgments about the extent to which they seek to press those reports (or seek to object to them). And, it is not insignificant to remark that neither the parties in their final submissions, nor I in my eventual final judgment on the merits of this proceeding, should be troubled with having to deal with inadmissible expert opinion evidence, if a proper objection has been taken to it.

[41] Of course, if inadmissible expert opinion is admitted, because objection has not been taken to it, then it will be necessary to deal with that opinion in my eventual final judgment by reference to the law as explained in *Hughes v National Trustees Executors and Agency Co of Australasia Ltd* (1979) 143 CLR 134; *Robert Bax & Associates v Cavenham Pty Ltd* [2013] 1 Qd R 476 and *Beaven v Wagner Industrial Services Pty Ltd* [2018] 2 Qd R 542.

13. ARCS submits the general rule should be applied here and the objections ruled on immediately at the commencement of the trial rather than deferred to the final judgment for similar reasons as stated by Bond J.

14. Ruling on the objections immediately rather than deferring to the final judgement reflects the approach taken earlier in the proceedings by the Court when objections to the Joint Expert Report (**JER**) on Climate Change were taken by the Appellant, without notice to ARCS, at a directions hearing and the Court dealt with the objections immediately, striking out much of the JER.

RELEVANT PRINCIPLES

15. The rule against hearsay evidence prohibits statements made by a witness who is not called to give evidence being relied upon to establish the truth of the statements.⁵ Two potentially relevant exceptions to the rule against hearsay are:
- (a) information in authoritative scientific publications or statements by organisations, public authorities or persons regarded by experts in a field as having knowledge and expertise in the relevant area, including tables and statistical material on which experts ordinarily rely;⁶ however, this exception does not extend to proving primary facts or data peculiar to the particular case upon which an expert opinion is based⁷; and
 - (b) facts contained in business records and other documents admissible under s 92 of the *Evidence Act 1977* (Qld).
16. The Court’s rules prohibit multiple experts in a single field being relied upon without the leave of the Court.⁸ The Court took a strict approach in applying the rule against ARCS early in the procedural steps leading to trial, thereby striking out much of the JER Climate Change, which put the Appellant on notice of the strict approach that would be applied.
17. In the circumstances of ARCS objections, the rule against hearsay and the rule against multiple experts are relevant to, and substantially built upon by, the principles stated in *Makita (Australia) Pty Ltd v Sprowles* [2001] NSWCA 305; (2001) 52 NSWLR 705 (*Makita*) at 729-744 [59]-[85] and subsequent case law.
18. The Court discussed and applied *Makita* and subsequent case law in rejecting the evidence of acoustical engineers in a recent planning appeal: *Gold Coast Motorsport Training Centre Pty Ltd v Gold Coast City Council & Ors* [2021] QPEC 33 at [128]-[181].
19. In *Makita*, Heydon JA stated at [64] and [85]:

64 The basal principle is that what an expert gives is an opinion based on facts. Because of that, the expert must either prove by admissible means the facts on which the opinion is based, or state explicitly the assumptions as to fact on which the opinion is based. If other admissible evidence establishes that the matters assumed are “sufficiently like” the matters established “to render the opinion of the expert of any value”, even though they may not correspond “with complete precision”, the opinion will be admissible and material: see generally *Paric v John Holland Constructions Pty Ltd* [1984] 2 NSWLR 505 at 509–510; *Paric v John Holland (Constructions) Pty Ltd* (at 846; 87). One of the reasons why the facts proved must correlate to some degree with those assumed is that the expert’s conclusion must have some rational relationship with the facts proved.

...

⁵ *Walton v The Queen* (1989) 166 CLR 283 at 288-289 (Mason CJ).

⁶ *PQ v Australian Red Cross Society* [1992] 1 VR 19 at 34-36 per McGarvie J. See also: *Borowski v Quayle* [1966] VR 382 at 386-387 per Gowans J; *English Exporters (London) Ltd v Eldonwall Ltd* [1973] Ch 415 at 420-422, especially 421(E) to 422(C) per Megarry J; *R v Abadom* [1983] 1 WLR 126 at 129-131, especially 131(B)-(G) per Kerr LJ, Ewbank and Leonard JJ; *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588 (*Dasreef*) at 615 [69] per Heydon J; *R v Patel (No 6)* [2013] QSC 64, [7]-[10] per Fryberg J.

⁷ *R v Abadom* [1983] 1 WLR 126 at 131(B)-(G); *PQ v Australian Red Cross Society* [1992] 1 VR 19 at 34-36 per McGarvie J; *R v Patel (No 6)* [2013] QSC 64, [7]-[10] per Fryberg J.

⁸ *Planning and Environment Court Rules 2018*, r 36.

85 In short, if evidence tendered as expert opinion evidence is to be admissible, it must be agreed or demonstrated that there is a field of “specialised knowledge”; there must be an identified aspect of that field in which the witness demonstrates that by reason of specified training, study or experience, the witness has become an expert; the opinion proffered must be “wholly or substantially based on the witness’s expert knowledge”; so far as the opinion is based on facts “observed” by the expert, they must be identified and admissibly proved by the expert, and so far as the opinion is based on “assumed” or “accepted” facts, they must be identified and proved in some other way; it must be established that the facts on which the opinion is based form a proper foundation for it; and the opinion of an expert requires demonstration or examination of the scientific or other intellectual basis of the conclusions reached: that is, the expert’s evidence must explain how the field of “specialised knowledge” in which the witness is expert by reason of “training, study or experience”, and on which the opinion is “wholly or substantially based”, applies to the facts assumed or observed so as to produce the opinion propounded. If all these matters are not made explicit, it is not possible to be sure whether the opinion is based wholly or substantially on the expert’s specialised knowledge. If the court cannot be sure of that, the evidence is strictly speaking not admissible, and, so far as it is admissible, of diminished weight. And an attempt to make the basis of the opinion explicit may reveal that it is not based on specialised expert knowledge, but, to use Gleeson CJ’s characterisation of the evidence in *HG v The Queen* (at 428 [41]), on “a combination of speculation, inference, personal and second-hand views as to the credibility of the complainant, and a process of reasoning which went well beyond the field of expertise”.

20. This reasoning and the principles stated at [85] (***Makita principles***) have been applied many times by the High Court,⁹ Court of Appeal¹⁰ and the Court itself.¹¹
21. Chesterman J (with whom Williams and Jerrard JJA agreed) described these principles as “nothing new”, “should be well understood by all counsel” and “elementary” in *R v Ping* [2006] 2 Qd R 69 at 79, [43]-[46]:

[43] Mr Jones was a properly qualified clinical psychologist. He was, relevantly, an expert whose opinion might be admitted into evidence. Before it could be accepted, however, the factual basis for the opinion had to be explained to the court. Mr Jones had to recount the facts on which he based his opinion. To do that he had to give in evidence the history he took from the complainant about his symptoms and what led up to them. Mr Jones’s rehearsal of those facts would not prove them but once he had said what he understood the facts to be on which he formed his opinion that opinion could be provisionally admitted into evidence. If the facts were proved by someone who had knowledge of them, in this case the complainant, the opinion would be admitted unconditionally. If the facts were not proved the condition on which the admission depended would be unsatisfied and the opinion could not be acted on by the tribunal of fact.

⁹ e.g. *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588 at 604 [37] (French CJ, Gummow, Hayne, Crennan, Kiefel and Bell JJ).

¹⁰ e.g. *R v Ping* [2006] 2 Qd R 69 at 79, [44] (Chesterman J with whom Williams and Jerrard JJA agreed); *R v Naidu* [2008] QCA 130 at [68] (Fraser JA with whom McMurdo P and Mackenzie J agreed); *R v Kleimeyer* [2014] QCA 56 at [31] (Applegarth J with whom Muir and Morrison JJA agreed); *R v Mackenzie* [2016] QCA 277 at [37] (Gotterson JA with whom McMudo P and Atkinson J agreed); *Woolworths Limited v Grimshaw* [2016] QCA 274 at [24] (McMurdo P with whom Applegarth and Flanagan JJ agreed); *Beaven v Wagner Industrial Services Pty Ltd* [2018] 2 Qd R 542 at [60] (McMeekin J with whom Fraser and Philippides JJA agreed); *Speets Investment Pty Ltd v Bencol Pty Ltd* [2020] QCA 247 at [140] (Callaghan J with whom Sofronoff P and Bond J agreed); *Greer v Greer* [2021] QCA 143 at [78] (Bond JA with whom Sofronoff P and Wilson J agreed).

¹¹ e.g. *Development Watch Inc & Anor v Sunshine Coast Regional Council & Anor* [2020] QPEC 25 at [385] (Kefford DCJ); and *King of Gifts (Qld) Pty Ltd v Redland City Council & Anor* [2020] QPEC 42 at [97] (Kefford DCJ); *Gold Coast Motorsport Training Centre Pty Ltd v Gold Coast City Council & Ors* [2021] QPEC 33 at [128]-[129] (Kefford DCJ).

[44] There is nothing new in any of this. It should be well understood by all counsel. The rules relating to the admission of expert opinion evidence were recently reviewed by Heydon J.A. in *Makita (Australia) Pty Ltd v Sprowles* (2001) 52 N.S.W.L.R. 705 at 729–742. His Honour noted (731–732):

“The basal principle is that what an expert gives is an opinion based on facts. Because of that, the expert must either prove by admissible means the facts on which the opinion is based, or state explicitly the assumptions as to fact on which the opinion is based. If other admissible evidence establishes that the matters assumed are ‘sufficiently like’ the matters established ‘to render the opinion of the expert of any value’, even though they may not correspond ‘with complete precision’, the opinion will be admissible and material ...”

[45] This has been the law for many years. In *Ramsay v. Watson* (1961) 108 C.L.R. 642 at 648–649 the High Court pointed out that a medical specialist “is ordinarily allowed to state the ‘history’ he got from the patient” because “statements made to an expert witness [are] admissible if they are the foundation, or part of the foundation, of the expert opinion ...”. Such statements are not evidence of the existence of the facts recounted and “if the man whom the physician examined refuses to confirm in the witness box what he said in a consulting room” the opinion will have little or no value, depending upon the facts of the case. The same rule is true for a psychiatrist: see *Gordon v. R.* (1982) 41 A.L.R. 64.

[46] This elementary rule having been overlooked, Mr Jones’s opinion was inadmissible.

22. Similarly, Fraser JA (with whom McMurdo P and Mackenzie J agreed) said in *R v Naidu* [2008] QCA 130 at [68] (footnote in original):

[68] It is unquestionably the law that expert opinion evidence is inadmissible if the opinion is not expressed upon a state of facts both identified and proved in evidence.⁴

⁴ See, eg, *Makita (Australia) Pty Ltd v Sprowles* (2001) 52 NSWLR 705 per Heydon JA, particularly at [85] and at [70] quoting from the judgment of King CJ in *R v Fowler* (1985) 39 SASR 440 at 442, 443; *R v Ping* [2006] 2 Qd R 69 per Chesterman J at [43]–[46], citing *Makita (Australia) Pty Ltd v Sprowles* at 729–742, *Ramsay v Watson* (1961) 108 CLR 642 at 648–649; [1961] HCA 65, and *Gordon v R* (1982) 41 ALR 64. The facts relied upon by the expert need not be identical with those proved but must be sufficiently like them if the opinion is to be probative: *Makita (Australia) Pty Ltd v Sprowles* at [64] – [66]; *R v Ping* at [44].

23. In *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588 (*Dasreef*), while a minority view,¹² Heydon J developed his analysis in *Makita* further in the context of:¹³

- (a) **an assumption identification rule**, which provides that expert evidence is inadmissible unless the facts on which the opinion is based are stated by the expert by way of proof if the expert can admissibly prove them, otherwise as assumptions to be proved in other ways (at [64]);
- (b) **a proof of assumption rule**, which provides that an expert opinion is not admissible unless evidence has been, or will be, admitted, whether from the expert or from some other source, which is capable of supporting findings of fact which are sufficiently similar to the factual assumptions on which the opinion was stated to be based to render the opinion of value (at [66]); and
- (c) **a statement of reasoning rule**, which provides that an expert opinion is inadmissible unless the expert states in chief the reasoning by which the expert conclusion arrived at flows from the facts proved or assumed by the expert so as to reveal that the opinion is based on the expert’s expertise.

¹² As discussed in Ian Freckleton QC, Westlaw AU, *Expert Evidence* (online 27 January 2022) [2.20.22].

¹³ *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588 at 612–3, [61]–[65]. See also, Freckleton, n 12.

24. Heydon J explained the function of the proof of assumption rule in *Dasreef* at 622, [90] (footnote omitted):

90 *Function of the proof of assumption rule.* The function of the proof of assumption rule is to highlight the irrelevance of expert opinion evidence resting on assumptions not backed by primary evidence. It is irrelevant because it stands in a void, unconnected with the issues thrown up by the evidence and the reasoning processes which the trier of fact may employ to resolve them (134). If the expert's conclusion does not have some rational relationship with the facts proved, it is irrelevant. That is because in not tending to establish the conclusion asserted, it lacks probative capacity. Opinion evidence is a bridge between data in the form of primary evidence and a conclusion which cannot be reached without the application of expertise. The bridge cannot stand if the primary evidence end of it does not exist. The expert opinion is then only a misleading jumble, uselessly cluttering up the evidentiary scene.

25. Bond J (as his Honour then was) summarised the *Makita* principles in the context of subsequent decisions of the High Court and Court of Appeal, including adopting Heydon J's framework in *Dasreef*, in *Sanrus Pty Ltd & Ors v Monto Coal 2 Pty Ltd & Ors (No 5)* [2019] QSC 210 (***Sanrus No 5***) at [45] to [49] and [51] to [52]; and *Sanrus Pty Ltd & Ors v Monto Coal 2 Pty Ltd & Ors (No 7)* [2019] QSC 241 (***Sanrus No 7***) at [93]-[101].
26. Bond JA (with whom Sofronoff P and Wilson J agreed) stated in *Greer v Greer* [2021] QCA 143 at [73]-[75] and [77] in relation to a ground of appeal based on the primary judge erring in relying upon the opinion of an expert witness:

[73] The principles of law which are relevant to the appellant's complaint are well settled.

[74] **First**, expert opinion evidence is inadmissible unless the facts on which the expert opinion is based are both identified by the expert and proved in evidence: see *Makita (Aust) Pty Ltd v Sprowles* (2001) 52 NSWLR 705 per Heydon JA at 743-4 [85]; *R v Naidu* [2008] QCA 130 per Fraser JA at [68]; *Dasreef Pty Ltd v Hawchar* (2011) 243 CLR 588 per Heydon J at 612-3 [64] to [65].

[75] **Second**, expert opinion evidence is inadmissible unless the expert states, in chief, the reasoning by which the conclusion arrived at flows from the facts proved or assumed by the expert so as to reveal that the opinion is based on the expert's expertise: see *Makita (Aust) Pty Ltd v Sprowles* at 743-4 [85]; *R v Sica* [2014] 2 Qd R 168 per Muir and Gotterson JJA and Applegarth J at 189-90 [104]; *R v Lentini* [2018] QCA 299 per Sofronoff P, with Philippides JA and Henry JA agreeing, at [55]; *Dasreef Pty Ltd v Hawchar* at 622-4 [91] to [94]. However, the extent to which this is necessary may vary depending on the nature of the case. As French CJ, Gummow, Hayne, Crennan, Kiefel and Bell JJ noted in *Dasreef Pty Ltd v Hawchar* at 604 [37]:

...

[77] **Fourth**, the approach which should be taken to expert opinion based partially on facts not proved in evidence and partially on facts proved in evidence is that explained by Ipp J (with whom Malcolm CJ agreed) in *Pownall v Conlan Management Pty Ltd* (1995) 12 WAR 370 at 377-8 (citations omitted, emphasis added):

“In my opinion, expert opinion based *entirely* on inadmissible evidence is itself inadmissible and there is no discretion to admit it. I form this view as to admit such an opinion would be to admit indirectly, the inadmissible evidence itself. If an opinion, based solely on evidence that the court by law is required to exclude, is itself admitted, the inadmissible evidence would have some influence over the court's decision. Such a result would defeat the purpose of the law that excludes the inadmissible evidence. If the primary facts on which

the evidence is based are not admissible, the opinion is valueless and irrelevant and, in my opinion, should be excluded. It is for this reason that the Court of Appeal in *R v Turner* observed (at 840) that an expert in examination-in-chief should be asked to state the facts on which his opinion is based, and that it was wrong to leave it to the other side to elicit the facts by cross-examination. It is only when the primary facts upon which the opinion has been based are established that the opinion should be admitted into evidence.

On the other hand, where the expert opinion is based only partly on inadmissible testimony and that inadmissible testimony can readily be ascertained and discarded, the opinion should be admitted subject to weight. ...

Where the expert opinion is based on a combination of admissible and inadmissible material, and it is impossible to determine what conclusions are based on the expert's own observations and what conclusions are based on what he has been told, or to what degree the expert has been influenced by the hearsay material, the evidence should be excluded: ...”

APPLICATION OF PRINCIPLES TO THE EVIDENCE

27. Particulars of the Appellant’s evidence that ARCS objects to and the application of the principles set out above are provided in Schedule 1.
28. The details of the objections will not be repeated here but some general submissions will be made.
29. While it is not for the respondent or ARCS’ experts to object to inadmissible evidence as this is a matter of law,¹⁴ the substance of many of the objections were raised by the respondent’s and ARCS’ experts during the joint expert meetings on the basis they affected the scientific validity and reliability of the claims made by the Appellant’s groundwater expert, Dr Trevor Johnson (TJ). For example, Associate Professor Currell (MC) stated in the Groundwater JER in relation to the SLR modelling relied upon by TJ and the lack of sufficient evidence for the factual basis for TJ’s opinions:

“2f. MC believes that the modelling referred to by TJ above is overly simplistic, using basic analytical equations which are not demonstrated to be suitable for the setting and are poorly documented, missing supporting data, equations and assumptions. He believes such modelling is nowhere near fit for the purpose of predicting drawdown and/or water budget changes resulting from the development. He notes that more in-depth analytical and/or numerical groundwater modelling tools could potentially achieve this, but this would first require more comprehensive field data from the site to ensure such modelling is an appropriate representation of the hydrogeology of the site.”¹⁵

...

“7a. MC says that key hydrogeological features of the site are not well characterized, such as the depth, thickness and extent of different aquifer units, the nature and extent of porosity and permeability, and the degree of connectivity between the aquifer in which the extraction bore(s) are constructed and:

- a) Surface water systems
- b) Underlying/adjacent aquifer units.”¹⁶

¹⁴ *Sanrus Pty Ltd & Ors v Monto Coal 2 Pty Ltd & Ors (No 5)* [2019] QSC 210 at [37] per Bond J.

¹⁵ Groundwater JER, [2f].

¹⁶ Groundwater JER, [7a].

30. ARCS also raised with the Appellant the need for a proper factual basis being established for the ‘Hair Report’ on pump testing and to disclose the facts or assumptions on which Dr Johnson’s opinions in the Joint Groundwater-Ecology JER were based.¹⁷ In particular, ARCS requested, but the Appellant declined to disclose:¹⁸

“(a) all bore construction details and lithology logs relevant to the pump testing, including the depths at which the bores are screened;

(b) all monitoring results from any bores on your client’s land;

(c) any documents in your client’s possession or control relevant to the geology or hydrogeology of your client’s land, including documents possessed or controlled by Dr Johnson or Mr Hair.”

31. ARCS reserved “its rights to object to Dr Johnson evidence if it is not established by a proper factual basis” in its correspondence of 10 August 2021¹⁹ but the Appellant did not attempt to rectify these fundamental and elementary problems with its evidence in subsequent reports or lay witness statements according to the timetable established by the Court for the appeal to proceed to hearing.

32. In relation to the various hearsay reports referred to by the Appellant’s groundwater expert (e.g. the Douglas Partners’ reports), ARCS submits:

(a) The Court ought not exercise its discretion to admit the reports under r 25 of the Rules as they contain facts and opinions that are seriously in dispute (as demonstrated by the criticisms made particularly of the ‘Hair Report’ of pump testing by the Council and ARCS’ experts²⁰).

(b) These documents are not admissible as authoritative scientific publications or statements by organisations, public authorities or persons regarded by experts in a field as having knowledge and expertise in the relevant area, as this exception to the hearsay rule does not extend to proving primary facts or data peculiar to the particular case upon which an expert opinion is based.²¹

(c) These documents should not be admitted under s 92 of the *Evidence Act 1977* (Qld), in circumstances where:

(i) the Appellant has tendered no evidence to satisfy s 92(2);

(ii) the Appellant was put on notice months ago by the joint expert meeting process²² and by ARCS correspondence of 10 August 2021²³ that many basic facts concerning groundwater on the site contained in earlier reports by people not called as witnesses were disputed and Dr Johnson’s opinions needed to be established on a proper factual

¹⁷ This correspondence, dated and emailed on 10 August 2021, is Exhibit RKP-02 to the affidavit of Revel Katherine Pointon, affirmed 17 August 2021 (eCourt Doc #34), pp 5-6 (**Pointon affidavit**).

¹⁸ *Ibid.*

¹⁹ *Ibid.*

²⁰ See, e.g. Joint Groundwater-Ecology JER at (17) and (18); Tony McAlister’s individual expert report, 22 December 2021, at [57]-[58] and [65]; and Associate Professor Currell’s individual report, 3 December 2021, pp 2-3.

²¹ *R v Abadom* [1983] 1 WLR 126 at 131(B)-(G); *PQ v Australian Red Cross Society* [1992] 1 VR 19 at 34-36 per McGarvie J; *R v Patel* (No 6) [2013] QSC 64, [7]-[10] per Fryberg J.

²² e.g. Groundwater JER, [3]-[5], [2f], [7a], [17a]

²³ Exhibit RKP-02 to Pointon affidavit (eCourt Doc #34), pp 5-6.

basis, but the Appellant did not attempt to rectify these fundamental and elementary problems with its evidence in subsequent reports or lay witness statements according to the timetable established by the Court for the appeal to proceed to hearing;

- (iii) given the notice given to the Appellant of the fundamental and elementary problems with its evidence and the need to properly prove Dr Johnson’s opinions, the Appellant’s failure to rectify these problems appears to reflect a tactical decision made by the Appellant to proceed in the face of these fundamental problems and deficiencies; and
 - (iv) the subject site is in a highly sensitive location that has considerable ecological value as habitat and corridors protected under the planning scheme²⁴ and contributing to the integrity of the Outstanding Universal Value (**OUV**) of the nearby World Heritage Area,²⁵ with national park within 100m south of the bores and World Heritage Areas within 430m north, 570 m west and 820 m east of the bores.²⁶
33. In relation to the objections based on the Court’s rules prohibiting multiple experts in a single field being relied upon without the leave of the Court,²⁷ leave should not be granted for the Appellant to rely on the opinions of multiple experts here, in particular:
- (a) where the other experts relied upon by the Appellant (e.g. Iain Hair of Douglas Partners) are not called as witnesses and have not participated in the expert meeting process ordered by the Court;
 - (b) in relation to Mr Iain Hair of Douglas Partners’ opinions in particular, in response to concerns being raised by the Council about Mr Hair’s report being attached as Appendix 4 to the Ecology JER, the Appellant’s solicitor wrote to the Council on 6 May 2021 stating “We confirm that Mr Hair is not an expert in this proceeding. Our client does not intend to rely upon Mr Hair’s opinions.”;²⁸
 - (c) ARCS raised its objection to Mr Hair’s opinions being relied upon as a second expert and that Dr Johnson’s opinions needed to be established on a proper factual basis in correspondence of 10 August 2021,²⁹ but the Appellant did not attempt to rectify these fundamental and elementary problems with the evidence it relied upon in subsequent reports or lay witness statements according to the timetable established by the Court for the appeal to proceed to hearing;
 - (d) the Court took a strict approach in applying the rule against ARCS early in the procedural steps leading to trial, thereby striking out much of the JER Climate Change, which put the Appellant on notice of the strict approach that would be applied; and

²⁴ Ecology JER, [27].

²⁵ World Heritage JER, [6]-[8] (Dr Kooyman), accepted by Mr Moffit at [23]; and Dr Kooyman individual expert report at [8]-[13], [25]-[49] and [54].

²⁶ See the Ecology JER, pp 72 and 73.

²⁷ *Planning and Environment Court Rules 2018*, r 36.

²⁸ The quote is extracted in correspondence exhibited at p 5 to the Pointon affidavit (eCourt Doc #34).

²⁹ Exhibit RKP-02 to Pointon affidavit (eCourt Doc #34), pp 5-6.

- (e) having applied the rule strictly against ARCS, it would be grossly unfair if the Court allowed the Appellant to rely on the opinions of multiple groundwater experts.
34. Of particular significance are the objections to the results and analysis of the 7-day pump test conducted by Mr Iain Hair in early 2021. Mr Hair is not called as a witness but Dr Johnson relies on his hearsay statements to conclude that “there will be no change at a location more than 170 m from the pumping bores” and “there will be no measurable change at points more than 100 m away in any direction”.³⁰ In forming that opinion:
- (a) Dr Johnson relies on facts and assumptions not proved by admissible evidence (e.g. aquifer transmissivity within the Hobwee Basalt layer to 830m elevation, which includes areas of approximately 200m west and east of the bores, where groundwater springs are known to occur).
 - (b) Dr Johnson relies on unstated and unidentified assumptions, including:
 - (i) that impacts on the aquifer and cone of depression are uniform;
 - (ii) unstated and unknown aquifer properties such as transmissivity west and east of the bores; and
 - (iii) that groundwater and the vadose zone on which vegetation and animals rely to the west and south of the bores is unaffected by the extraction.
35. Another ground for rejecting as inadmissible Dr Johnson’s conclusion is that the matters he has assumed are not sufficiently like the matters established to render his opinion of any value. In particular:
- (a) Dr Johnson assumed that the impacts on the aquifer and cone of depression are uniform whereas it is agreed by all experts that the aquifer is affected by fracturing of the rock and not uniform; and
 - (b) In circumstances where multiple groundwater springs are known to occur within 200 m east and west of the bores,³¹ Dr Johnson’s opinion contradicts (and is not sufficiently like) the agreed fact that:

“The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance.”³²
36. These are not trivial problems with Dr Johnson’s evidence. They are fundamental.

³⁰ Joint Groundwater-Ecology JER, p 17 (Annexure A).

³¹ The existence of a permanent groundwater spring on the subject site approximately 200m to the east of the bores is common ground (see, e.g., Groundwater JER at p 13 and Ecology JER, p 73). In relation to the groundwater springs to the east and west of the bores, see the affidavit of Elanor Marie Fenge, affirmed 5 November 2021 (eCourt Doc #38).

³² Groundwater JER, Point of Agreement 8, which was reaffirmed as remaining “unchanged” in the Joint Groundwater-Ecology JER at (12).

37. On their face, Dr Johnson’s opinions are largely based on inadmissible evidence, including ‘the Hair Report’. At best it is impossible to identify which parts of his opinion are based on admissible material, which means his evidence should be excluded as Bond JA (with whom Sofronoff P and Wilson J agreed) stated in *Greer v Greer* [2021] QCA 143 at [77]³³ (emphasis in original):

Where the expert opinion is based on a combination of admissible and inadmissible material, and it is impossible to determine what conclusions are based on the expert's own observations and what conclusions are based on what he has been told, or to what degree the expert has been influenced by the hearsay material, the evidence should be excluded:”

38. Dr Johnson’s evidence is such a combination of admissible and inadmissible material. It is impossible to determine what conclusions are based on admissible material and to what degree he has been influenced by inadmissible material.

39. Dr Johnson’s evidence has become what Heydon J described in *Dasreef* as “only a misleading jumble, uselessly cluttering up the evidentiary scene.”³⁴ His evidence should be ruled inadmissible and struck-out.

CONCLUSION

40. Given the many criticisms made by the respondent’s and ARCS’ experts and the notice given to the Appellant of the fundamental and elementary problems with its evidence and the need to properly prove Dr Johnson’s opinions, the Appellant’s failure to rectify these problems appears to reflect a tactical decision made by the Appellant to proceed in the face of these fundamental problems and deficiencies.

41. The Appellant’s evidence particularised in Schedule 1 ought to be rejected as inadmissible. The deficiencies in the evidence are material and proof of the expertise of Dr Johnson is not sufficient to overcome them.³⁵ It would be an error of law for the Court to admit inadmissible evidence that is objected to.

42. Admitting this inadmissible evidence would render any decision by the Court favourable to the Appellant susceptible to appeal on the basis that the decision is made without evidence, as occurred in *Redland City Council v King of Gifts (Qld) and HTC Consulting Pty Ltd & Anor* [2021] QCA 210.



Dr Chris McGrath
ARCS counsel
2 February 2022

³³ Citing *Pownall v Conlan Management Pty Ltd* (1995) 12 WAR 370 at 377-8 (per Ipp J with whom Malcolm CJ agreed)

³⁴ *Dasreef* at 622, [90].

³⁵ As was the case when the Court rejected the evidence of an acoustics engineer in *Gold Coast Motorsport Training Centre Pty Ltd v Gold Coast City Council & Ors* [2021] QPEC 33 at [157].

SCHEDULE 1: PARTICULARS OF OBJECTIONS³⁶

No.	Document or statement the subject of objection	Reference	Ground/s of objection
1.	Peter J Ramsay & Associates, “Hydrological Impact Assessment for the Existing Groundwater Source at 133 Repeater Station Road, Springbrook, Queensland”, dated 24 July 2014	[Not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	1.1 Hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i> . 1.2 Opinion of second groundwater expert who is not called to give evidence and has not participated in the joint expert meeting process. 1.3 Relies on facts and assumptions not proved by admissible evidence. 1.4 The matters assumed are not sufficiently like the matters established to render the opinion of any value.
2.	Peter J Ramsay & Associates, “Pumping Test to Support Commercial Groundwater Extraction, 133 Repeater Station Road, Springbrook, Queensland”, dated 27 November 2014	[Not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	2.1 Grounds of objection as for objection 1
3.	Peter J Ramsay & Associates, “Review of Water Level Monitoring Data for the Springbrook Groundwater Source, 133 Repeater Station Road, Springbrook, Queensland, November 2014 to March 2015”, dated 25 May 2015	[Not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	3.1 Grounds of objection as for objection 1
4.	Peter J Ramsay & Associates, “Review of Water Level Monitoring Data for the Springbrook Groundwater Source, 133 Repeater Station Road, Springbrook, Queensland, July 2015 to May 2017”, dated 16 June 2017	[Not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	4.1 Grounds of objection as for objection 1

³⁶ Schedule 1 is based on the documents of which ARCS is aware the Appellant seeks to rely on, or may seek to rely on, by reference to the documents served and the eTrial Document List prepared by the Appellant as at 1 February 2022, including documents submitted during the development application but not attached to expert reports or affidavits. ARCS reserves its rights to object to further or new documents not listed in this Schedule being tendered or relied upon.

5.	Douglas Partners, “Report on Groundwater Resource Assessment for Proposed Commercial Groundwater Extraction, 263 Repeater Station Road, Springbrook”, dated November 2017	[Included as “specialist report” in development application but not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	<p>5.1 Hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>5.2 Opinion of second groundwater expert (Mr Iain Hair) who is not called to give evidence, who has not participated in the joint expert meeting process and who the Appellant’s solicitor stated the Appellant would not be relying upon as an expert.³⁷</p> <p>5.3 Contains opinions outside the field of expertise of the expert (assumed to be limited to groundwater) involving ecology, to the extent that the report purports to state that “impacts” including ecological impacts (e.g. to the vadose zone and animals and plants reliant on surrounding groundwater springs fed by the aquifer) “would be minimal”.</p> <p>5.4 Relies on facts and assumptions not proved by admissible evidence (e.g. that the aquifer and any impacts to it are uniform and not affected by fracturing).</p> <p>5.5 Relies on unstated and unidentified assumptions, including:</p> <ul style="list-style-type: none"> (a) aquifer properties such as recharge area and transmissivity; and (b) the relevant scale for assessment of impacts is unstated, making it unclear whether the assessment assumes the relevant scale is impacts to the site itself, including groundwater springs on the site, or at a regional scale (e.g. at Little Nerang Dam, over 10km to the north of the site) or some other scale. <p>5.6 The matters assumed (e.g. that the aquifer and any impacts due to the proposed extraction of groundwater are uniform and not affected by fracturing) are not sufficiently like the matters established to render the opinion of the groundwater expert called by the Appellant of any value, including that the</p>
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³⁷ The Appellant’s solicitor wrote to the Council on 6 May 2021 stating “We confirm that Mr Hair is not an expert in this proceeding. Our client does not intend to rely upon Mr Hair’s opinions.” This statement is extracted in correspondence exhibited at p 5 to the Pointon affidavit (eCourt Doc #34).

			report assumes a uniform/homogeneous and extensive aquifer, which is not the case for this site. ³⁸
6.	Douglas Partners, “MCU/2018/495: Development Permit for Proposed Commercial Groundwater Extraction at 263 Repeater Station Road, Springbrook QLD 4213”, dated 19 June 2019	[Submitted to Council during the development application but not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	6.1 Grounds of objection as for objection 5.
7.	Douglas Partners, “Re Proposed Bottled Water Supply, 263 Repeater Station Road, Springbrook, Southeast Queensland”, dated 13 September 2018.	[Submitted to Council during the development application process but not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	<p>7.1 Grounds of objection as for objection 5 with the exception that the scale of assessment in this report is identified.</p> <p>7.2 In relation to the scale of the assessment, the matters assumed are not sufficiently like the matters established to render the opinion of any value, including:</p> <p>(a) The report contradicts (and is not sufficiently like) the agreed fact that “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance.”³⁹</p> <p>(b) Little Nerang Dam is a significant distance downstream of the bores and receives inflow from a larger catchment and more extensive network of tributaries than would likely be impacted by the bore extraction. As such, comparing the proposed extraction volume at the bores to the relatively large magnitude of inflows from the wider catchment area into Little Nerang Dam, obscures potentially much more significant local impacts upstream of this dam, such as the smaller streams and springs</p>

³⁸ This criticism has been made a number of times by the respondent’s and ARCS’ experts (e.g. Tony McAlister’s individual report, 22 December 2021, at [22]).

³⁹ Groundwater JER, Point of Agreement 8, which was reaffirmed as remaining “unchanged” in the Joint Groundwater-Ecology JER at (12)..

			<p>flowing to Twin Falls, Cave Creek and Natural Bridge - sites of considerable significance.⁴⁰</p> <p>(c) The modelling of local impacts is overly simplistic and assumes uniform recharge and drawdown, which has not been established by admissible evidence and contradicts the accepted facts that the aquifer is subject to fracturing and heterogeneous.⁴¹</p>
8.	SLR “Water Balance Assessment – 263 Repeater Station Road, Springbrook”, dated June 2020	[Not presently in evidence – objection is taken if the Appellant seeks to tender this document other than as original evidence]	<p>8.1 Contains hearsay (e.g. summarizing and relying on Douglas Partners reports for the site) for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>8.2 Contains opinions of two additional groundwater experts (Helen Doherty and Hayden Munck) who were not nominated by the Appellant, who are not called to give evidence and who have not participated in the joint expert meeting process.</p> <p>8.3 Contains opinions outside the field of expertise of the experts who prepared the report (assumed to be limited to groundwater) involving ecology, to the extent that the authors purport to state that “impacts” including ecological impacts (e.g. to the vadose zone and animals and plants reliant on surrounding groundwater springs fed by the aquifer) are “clearly insignificant” and “imperceptible”.</p> <p>8.4 Relies on facts and assumptions not proved by admissible evidence, including:</p> <ul style="list-style-type: none"> (a) the results of pump testing done by Douglas Partners; (b) the connectivity between recharge occurring over the region above elevation of 830m AHD (shown on the map on p 7 of the Groundwater JER) and the aquifer in which the production bores are installed, is not demonstrated; (c) the report assumes the recharge area for the aquifer is

⁴⁰ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [3b](b)).

⁴¹ This criticism has been made a number of times by the respondent’s and ARCS’ experts (e.g. Tony McAlister’s individual report, 22 December 2021, at [22]).

			<p>309 ha based on an assumption that recharge occurs uniformly across the area above 830 m AHD but it cannot be assumed that recharge above 830 m AHD occurs across this full area or that it infiltrates into a connected aquifer system in which the bores are installed, without first mapping groundwater elevation contours and documenting the hydrogeological characteristics of the area in more detail;⁴²</p> <p>(d) groundwater flow patterns and hydraulic gradients have not been characterised in the area of the development – e.g. there are no water table or potentiometric surface maps, which are required to understand the impacts of drawdown caused by the production bores on groundwater flow and discharge to the surface (which may be environmentally important);⁴³</p> <p>(e) the volume of water stored in the aquifer has not been determined and there are insufficient data to estimate this currently;⁴⁴</p> <p>(f) it has not been adequately demonstrated that the estimated recharge rates are appropriate for the site;⁴⁵</p> <p>(g) water table fluctuation in the vicinity of the springs and other potential GDEs (or aquifer porosity) has not been adequately documented with supporting evidence;⁴⁶</p> <p>(h) key hydrogeological features of the site are not well characterized, such as the depth, thickness and extent of different aquifer units, the nature and extent of porosity and permeability, and the degree of connectivity between the aquifer in which the</p>
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⁴² These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [1e] and [17a]).

⁴³ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [8a]).

⁴⁴ These point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

⁴⁵ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [3b](a)).

⁴⁶ This point was raised at the time of the Groundwater JER by Tony McAlister (see Groundwater JER, [6c]).

			<p>extraction bore(s) are constructed and surface water systems and underlying/adjacent aquifer units;⁴⁷</p> <p>(i) hydraulic parameters, including transmissivity, hydraulic conductivity, porosity and storativity have not been reported for the site from the aquifer where extraction is proposed, or other adjacent aquifer units, noting that such parameters may be highly site-specific in fractured rock aquifers. These parameters may be highly variable and those estimated at 133 Repeater Station Road (using a pumping test) may not be representative for the area surrounding the bores in the current application;⁴⁸</p> <p>(j) the modelling uses basic analytical equations which are not demonstrated to be suitable for the setting and are poorly documented, missing supporting data, equations and assumptions.⁴⁹</p> <p>8.5 Relies on unstated and unidentified assumptions (e.g. of aquifer properties such as transmissivity and the conceptual hydrogeological model for groundwater relevant to the site).</p> <p>8.6 The matters assumed are not sufficiently like the matters established to render the opinion of the groundwater expert called by the Appellant of any value, including:</p> <p>(a) The report contradicts (and is not sufficiently like) the agreed fact that “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance”⁵⁰ in circumstances where multiple groundwater springs are</p>
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⁴⁷ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [7a]).

⁴⁸ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [9a])

⁴⁹ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

⁵⁰ Groundwater JER, Point of Agreement 8, which was reaffirmed as remaining “unchanged” in the Joint Groundwater-Ecology JER at (12)..

			<p>known occur within 200 m east and west of the bores, which the report neither recognizes or accounts for.⁵¹</p> <p>(b) The report assumes that the relevant scale for assessing impacts is inflow into Little Nerang Dam, over 10km north of the site, rather than impacts to the site and immediately surrounding area, including the vadose zone and flora and fauna reliant on the groundwater springs to the west and east of the proposed pumps.</p> <p>(c) Little Nerang Dam is a significant distance downstream of the bores and receives inflow from a larger catchment and more extensive network of tributaries than would likely be impacted by the bore extraction. As such, comparing the proposed extraction volume at the bores to the relatively large magnitude of inflows from the wider catchment area into Little Nerang Dam, obscures potentially much more significant local impacts upstream of this dam, such as the smaller streams and springs flowing to Twin Falls, Cave Creek and Natural Bridge - sites of considerable significance.⁵²</p> <p>(d) The report assumes the relationship between rainfall and runoff for a stream gauge in the Numinbah Valley, over 10km northwest of the site, is “within the vicinity of the site” and applicable to modelling impacts at a catchment scale. This has not been established.</p> <p>(e) The report uses streamflow data from the Numinbah gauge to estimate baseflow a significant distance downstream from the site and at far lower topographic elevation. This is unlikely to provide reliable estimates of groundwater recharge that are applicable for the aquifer at the site of the proposed bores.⁵³</p> <p>(f) Reliable estimates of groundwater recharge that are</p>
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⁵¹ The existence of a permanent groundwater spring on the subject site approximately 200m to the east of the bores is common ground (see, e.g., Groundwater JER at p 13 and Ecology JER, p 73. In relation to the groundwater springs to the east and west of the bores, see the affidavit of Elanor Marie Fenge, affirmed 5 November 2021 (eCourt Doc #38).

⁵² This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [3b](b)).

⁵³ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]. He made a similar point at [16a]).

			<p>applicable for the aquifer at the site of the proposed bores would require other lines of evidence based on site-specific data, such as groundwater hydrographs and/or environmental tracers.⁵⁴</p> <p>(g) The report uses an inappropriate model and calibrated this model to a site that is topographically very different to the area upstream of and adjacent to 263 Repeater Station Road.⁵⁵</p> <p>(h) The report used an incorrectly large catchment area to then extrapolate their model findings to the site in question.⁵⁶</p> <p>(i) The modelling is overly simplistic, using basic analytical equations which are not demonstrated to be suitable for the setting and are poorly documented, missing supporting data, equations and assumptions.⁵⁷</p> <p>(j) The modelling of local impacts is overly simplistic and assumes uniform recharge and drawdown, which has not been established by admissible evidence and contradicts the accepted facts that the aquifer is subject to fracturing and heterogeneous.⁵⁸</p> <p>(k) The use of a lumped conceptual whole of catchment water balance model to then assess recharge rates within a smaller, steeper, upper part of the catchment grossly averages processes and provides no insights to such matters at the subject site.⁵⁹</p> <p>(l) The use of the model developed by SLR which is calibrated for flow data at the Numinbah gauge (catchment area 68 km²) to then extrapolate groundwater recharge at the 263 Repeater Station Road site, with a far</p>
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⁵⁴ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

⁵⁵ This point was raised at the time of the Groundwater JER by Tony McAlister (see Groundwater JER, [3c]).

⁵⁶ This point was raised at the time of the Groundwater JER by Tony McAlister (see Groundwater JER, [3c]) and in his individual report at [78]-[83].

⁵⁷ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

⁵⁸ This criticism has been made a number of times by the respondent's and ARCS' experts (e.g. Tony McAlister's individual report, 22 December 2021, at [22]).

⁵⁹ This point was raised at the time of the Groundwater JER by Tony McAlister (see Groundwater JER, [16c]) and in his individual report at [78]-[82].

			<p>smaller and totally different catchment and climate pattern, is incorrect. This analysis takes no consideration of the individual characteristics (slope, catchment area, incident rainfall, et cetera) of the 263 Repeater Station Road site itself, nor of the nature of the geology and aquifer characteristics beneath the site.⁶⁰</p> <p>(m) The modelling is nowhere near fit for the purpose of predicting drawdown and/or water budget changes resulting from the development. More in-depth analytical and/or numerical groundwater modelling tools could potentially achieve this, but this would first require more comprehensive field data from the site to ensure such modelling is an appropriate representation of the hydrogeology of the site.⁶¹</p> <p>(n) The modelling conducted by SLR Consulting under TJ’s instruction is surface water balance modelling that has (incorrectly) inferred groundwater recharge rates at the site in question. It tells us nothing about changes in water table levels or how much and where such water may express in adjacent environmentally significant locations. It also takes no account of potential cumulative impacts of other existing operations in the area (e.g. that at 133 Repeater Station Road).⁶²</p> <p>(o) The modelling does not consider the potential for climate change to (further) reduce the amounts and reliability of rainfall in the area in the coming decades.⁶³</p>
9.	“It is agreed that the water table level in the proposed extraction bores at the time that Douglas Partners completed a pump test on the site (in 2017) was approximately 830 m	Groundwater JER, [2]	<p>9.1 Relies on hearsay (relying on Douglas Partners reports for the site) for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>9.2 Relies on facts and assumptions not proved by admissible</p>

⁶⁰ These points were raised by Tony McAlister in his individual report at [78]-[82].

⁶¹ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

⁶² These points were raised at the time of the Groundwater JER by Tony McAlister (see Groundwater JER, [6c]).

⁶³ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [3b](c)).

	AHD.”		evidence (e.g. the results of pump testing done by Douglas Partners).
10.	<p>“It is agreed that an existing groundwater extraction business at 133 Repeater Station Road, approximately 1 km north of the subject site, was approved by Council on 9 September 2015. The ground level at 133 Repeater Station Road is approximately 820 m AHD as compared with 910 m AHD at 263 Repeater Station Road, making it some 90m lower than the subject site. In making this determination, Council considered a groundwater impact report prepared by Peter J Ramsay & Associates (Hydrogeological Impact Assessment for the Existing Groundwater Source at 133 Repeater Station Road, 24 July 2014). That report stated that the aquifer was approximately 60 m thick, and that the principal source of groundwater recharge was rain falling directly on the ground surface above. The report also stated that the average hydraulic conductivity of the aquifer was 0.36 m/day, with an effective aquifer porosity of 0.05.”</p>	Groundwater JER, [3]	<p>10.1 Relies on hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>10.2 Relies on facts and assumptions not proved by admissible evidence.</p> <p>10.3 Relies on opinions of additional groundwater expert/s who were not nominated by the Appellant, who are not called to give evidence and who have not participated in the joint expert meeting process.</p>
11.	<p>“The principal finding of the Peter J Ramsay report was that groundwater extraction of up to 12 ML/annum (constant rate of 0.38 L/s) was possible at 133 Repeater Station Road, and that a) groundwater bores more than 500 m distant would be beyond the radius of influence of drawdown from such extraction and b) short-term hydraulic impacts to springs approximately 500 m from the wells were not likely. However, they noted the</p>	Groundwater JER, [4]	<p>11.1 Relies on hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>11.2 Relies on facts and assumptions not proved by admissible evidence.</p> <p>11.3 Opinion of second groundwater expert who is not called to give evidence and who has not participated in the joint expert meeting process.</p>

	potential for long-term drawdown in the aquifer to impact upon baseflow to the springs. The Ramsay report could not confirm whether there would be a long-term impact on water levels in the aquifer since they had not undertaken relevant water balance assessments. It is agreed that Council considered this information when issuing an approval for the extractive industry on that site.”		
12.	“It is agreed that Douglas Partners undertook site and desktop groundwater investigations for the 263 Repeater Station Road site as per their 2017 report and two subsequent letters to Council. ... Douglas Partners estimated that the maximum impact of groundwater extraction of up to 16 ML/annum at 263 Repeater Station Road would be a reduction in the water table level of approximately 1.5 m at a distance of 270 m from the bores.”	Groundwater JER, [5]	<p>12.1 Relies on hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>12.2 Relies on facts and assumptions not proved by admissible evidence.</p> <p>12.3 Opinion of groundwater expert (Mr Iain Hair) who is not called to give evidence, who has not participated in the joint expert meeting process and who the Appellant’s solicitor stated the Appellant would not be relying upon as an expert.⁶⁴</p>
13.	“TJ states that there is only [one] way to determine the catchment area, and this is to trace around the 830 m AHD contour on a topographic map of the area. Please see the following image which shows the extent of the 830 m AHD contour. It is clear and unremarkable that seepage occurring on this area following rainfall will flow into the aquifer. ... It is noted that the analysis is conservative in that we have terminated the catchment area used in the analysis to	Groundwater JER, [1d]	<p>13.1 Relies on opinions of two additional groundwater experts (Helen Doherty and Hayden Munck) who were not nominated by the Appellant, who are not called to give evidence and who have not participated in the joint expert meeting process (and are directly referred to in the quoted extract by Dr Johnson in his reference to “we have ...”).</p> <p>13.2 Relies on facts and assumptions not proved by admissible evidence, including:⁶⁵</p> <p>(a) the connectivity between recharge occurring over the region above elevation of 830m AHD shown in the map on p 7 of the Groundwater JER, and the aquifer in</p>

⁶⁴ See footnote 37.

⁶⁵ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [1e]).

	exclude about 86 ha of the area above 830 m AHD in the far east of the map.		<p>which the production bores are installed, is not demonstrated; and</p> <p>(b) it cannot be assumed that recharge above 830m AHD occurs across this full area or that it infiltrates into a connected aquifer system in which the bores are installed, without first mapping groundwater elevation contours and documenting the hydrogeological characteristics of the area in more detail; and</p> <p>(c) the modelling uses basic analytical equations which are not demonstrated to be suitable for the setting and are poorly documented, missing supporting data, equations and assumptions.⁶⁶</p> <p>13.3 ARCS otherwise repeats the objections to reliance on the SLR report generally as set out above in objection 8.</p>
14.	“TJ says that the above investigation was reported upon in the SLR Consulting report of June 2020. That report concluded that the extraction of up to 16 ML of groundwater from the aquifer per annum would have only a minor impact on the volume of water stored in the aquifer. The water balance model, based on the Goldsim interpretation of the Australian Water Balance Model (AWBM), achieved excellent calibration performance against actual surface flows recorded at the Department of Natural Resources and Mines (DNRM) gauge at Numinbah (Figure 6 in the report).”	Groundwater JER, [2a]	<p>14.1 Grounds of objection as for objection 13.</p> <p>14.2 In addition, the matters assumed are not sufficiently like the matters established to render the opinion of the groundwater expert called by the Appellant of any value, including:⁶⁷</p> <p>(a) The SLR Consulting Report uses streamflow data from the Numinbah gauge to estimate baseflow a significant distance downstream from the site and at far lower topographic elevation. This is unlikely to provide reliable estimates of groundwater recharge that are applicable for the aquifer at the site of the proposed bores.⁶⁸</p> <p>(b) Reliable estimates of groundwater recharge that are applicable for the aquifer at the site of the proposed bores would require other lines of evidence based on</p>

⁶⁶ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

⁶⁷ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [1e]).

⁶⁸ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

			<p>site-specific data, such as groundwater hydrographs and/or environmental tracers.⁶⁹</p> <p>(c) The modelling is overly simplistic, using basic analytical equations which are not demonstrated to be suitable for the setting and are poorly documented, missing supporting data, equations and assumptions.⁷⁰</p> <p>(d) The modelling is nowhere near fit for the purpose of predicting drawdown and/or water budget changes resulting from the development. More in-depth analytical and/or numerical groundwater modelling tools could potentially achieve this, but this would first require more comprehensive field data from the site to ensure such modelling is an appropriate representation of the hydrogeology of the site.⁷¹</p>
15.	<p>“TJ says that groundwater modelling has been undertaken by a number of consulting engineers in this area (URS, Peter J Ramsay & Associates, Douglas Partners), each of whom has determined that the short term impacts of groundwater extraction are close to insignificant. TJ notes that SLR Consulting was not undertaking additional groundwater modelling, but instead setting up a water balance model on the advice of Water Technology acting on behalf of Council. He does not consider the groundwater conditions here to be significantly complex and relies on the previous findings which Council had itself considered and accepted in approving groundwater extraction at 133 Repeater Station Road. He does not believe that more</p>	Groundwater JER, [2d]	<p>15.1 Relies on hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>15.2 Relies on facts and assumptions not proved by admissible evidence, including the facts and assumptions identified above in objection 13.</p> <p>15.3 Relies on opinions of groundwater experts who are not called to give evidence and who have not participated in the joint expert meeting process.</p> <p>15.4 The matters assumed are not sufficiently like the matters established to render the opinion of the groundwater expert called by the Appellant of any value, including the matters identified above in objection 14.</p>

⁶⁹ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

⁷⁰ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

⁷¹ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2f]).

	extensive hydrogeological investigations are likely to yield different results than have been obtained so far.”		
16.	<p>“TJ says that the model, based on 120 years of rainfall data, indicated that an extraction rate of 16 ML/annum would remove on average less than 1% of the volume of water seeping to the aquifer in the wetter parts of the year, increasing to about 3% of the available volume during the drier months. The model also shows that the maximum impact on flows to Little Nerang Creek would have been 4.6% in the driest month on record. In his opinion, it is apparent that these impacts are much smaller than the annual variation in rainfall totals which occur on the site. The annual extraction rate represents less than 1% of the average volume of rain falling on the catchment.”</p>	Groundwater JER, [3a]	16.1 Grounds of objection as for objections 8 and 13-15.
17.	<p>“It is TJ’s opinion that the work completed by SLR Consulting, together with the historical hydrogeological analyses previously completed with others, demonstrates that the level of extraction proposed will have no significant impact on the Springbrook aquifer. If the intention of the studies undertaken was to examine the behaviour of the aquifer in minute detail, then the level of investigation proposed by MC and TM might be acceptable. However, the intention has always been to estimate the impact that a relatively minor volume of extraction will have on this aquifer. It has not been to study the aquifer in detail. On that basis, the level and extent of analysis</p>	Groundwater JER, [3d]	17.1 Grounds of objection as for objections 8 and 13-15.

	completed is consistent with the insignificant impact which has been estimated to occur by a number of different consulting engineers who have considered this matter.”		
18.	<p>“TJ says that the SLR Consulting analysis had the benefit of referring to a similar investigation completed by the Queensland University of Technology in relation to groundwater extraction from sites on Tamborine Mountain, which is considered to have very similar geology to the Springbrook area.”</p> <p>“TJ says that the volume of water proposed to be extracted from the Springbrook site is substantially less than that estimated for Mount Tamborine while the annual rainfall totals are significantly more. In his opinion, the same conclusion should therefore be applicable to the current proposal, i.e. the level of extraction is considered to be sustainable.”</p>	Groundwater JER, [4a].	<p>18.1 ARCS accepts that that the QUT study of Tamborine Mountain is part of the scientific literature that the groundwater experts may refer to but disputes that it has been established that Tamborine Mountain is a “very similar geology to the Springbrook area” or that its results are applicable to assessing the impacts of the proposed development.⁷² As a consequence, ARCS objects to Dr Johnson’s opinion based on the following grounds.</p> <p>18.2 Dr Johnson’s opinion relies on facts and assumptions not proved by admissible evidence, including that the results of the QUT study at Mt Tamborine is applicable to the site.</p> <p>18.3 Dr Johnson’s opinion assumed matters that are not sufficiently like the matters established to render the opinion of any value, including because:</p> <p>(a) Tamborine Mountain was found by QUT to include a multi-layered aquifer system with multiple basalt aquifers within a thickness of up to 150 m whereas the current geological information from the Repeater Station Rd site – while incomplete - indicates a much thinner and less extensive aquifer system with lower storage capacity.⁷³</p>
19.	“TJ says that the Tamborine Mountain investigation is in fact an excellent analogue for the Springbrook extraction. Both sites are typified as basalt plateaus in south-east Queensland where groundwater extraction occurs from a fractured rock aquifer, and	Groundwater JER, [4d].	19.1 Grounds of objection as for objection 18.

⁷² The point that the results of the QUT study at Mt Tamborine cannot be assumed to apply to the site was raised by Associate Professor Currell in the Groundwater JER at [4b].

⁷³ This point was raised by Associate Professor Currell at [4e] of the Groundwater JER.

	both were formed by lava flows from the Tweed shield volcano. However, he also notes that this part of Springbrook receives more than double the Mt Tamborine rainfall on average. It would be expected that a higher sustainable groundwater extraction rate was therefore likely to be achievable at Springbrook.”		
20.	<p>“TJ says that the groundwater investigations undertaken by Douglas Partners and Peter J Ramsay & Associates in the local area have adequately determined the characteristics of the aquifer underlying the area, and have determined that the impacts of proposed extraction will be acceptable. If the requirement of the investigation is to conservatively determine the impact that planned extraction of groundwater will have on the aquifer, the level of investigation used by the applicant’s consultants is adequate.”</p> <p>“TJ says that the analyses and investigations completed by SLR Consulting have determined that the volume of extraction from the aquifer is not significant in comparison to either the volume of rainfall seepage which flows to the aquifer, or the volume of surface expression of groundwater in the Little Nerang Creek catchment.”</p>	Groundwater JER, [5b].	20.1 Grounds of objection as for objections 8 and 11-15.
21.	“there were no rare or endangered species which were reliant on groundwater in the vicinity of the spring. It was also discussed that the variation in water table level which might result from groundwater extraction	Groundwater JER, [5b].	<p>21.1 Relies on hearsay.</p> <p>21.2 States an opinion (regarding ecology) outside the area of expertise of the groundwater expert, Dr Johnson.</p> <p>21.3 Relies on facts and assumptions not proved by admissible</p>

	was unlikely to alter ecological characteristics of the site, including the area around the spring.”		evidence. 21.4 The matters assumed are not sufficiently like the matters established to render the opinion of any value, including: (a) The opinion contradicts (and is not sufficiently like) the agreed fact that “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance” ⁷⁴
22.	“TJ says that based on the low porosity of the aquifer, significant changes in groundwater table level are likely to be experienced following rainfall. In his opinion, changes in water level of between 5 and 10 m are likely to be common across the course of a year. The existing vegetation on site is obviously already resilient and acclimatised to these changes. Minor variations of less than 1 m caused by groundwater extraction are simply insignificant in this context.”	Groundwater JER, [6a].	22.1 Grounds of objection as for objections 8, 11-15 and 21 and, in addition, the following grounds. 22.2 Relies on facts and assumptions not proved by admissible evidence, including the level of water table fluctuation in the vicinity of springs and other potential GDEs (or aquifer porosity) has not been adequately documented with supporting evidence. ⁷⁵ 22.3 The matters assumed are not sufficiently like the matters established to render the opinion of any value. ⁷⁶ (a) any additional drawdown caused by the extraction bores would compound periods of natural decline in groundwater levels in response to low rainfall, and this may reduce water levels below minimum previously experienced (and potentially environmentally important) thresholds; and (b) analysing the impacts of groundwater extraction on surface ecological systems based on water table fluctuation alone overlooks the importance of discharge flux rates, and the potential for pumping wells to

⁷⁴ Groundwater JER, Point of Agreement 8, which was reaffirmed as remaining “unchanged” in the Joint Groundwater-Ecology JER at (12).

⁷⁵ These points were raised in response to Dr Johnson’s opinion by Associate Professor Currell at [6b] of the Groundwater JER.

⁷⁶ This points were raised in response to Dr Johnson’s opinion by Associate Professor Currell, at [6b], and agreed with by Tony McAlister, at [6c], of the Groundwater JER.

			capture potentially environmentally significant flow.
23.	<p>“the requirement to prepare a water balance model was the outcome of discussions between TJ and TM’s colleague at Water Technology, Mr Craig Flavel. The water balance model calculates the changes in water volumes which are likely to take place in the aquifer as a result of the groundwater extraction proposed, as well as the processes of evapotranspiration and surface expression. He also notes that, based on the aquifer parameters determined by Peter J Ramsay & Associates, the fractured basalt rock aquifer has a low porosity which dictates that there will be significant changes in water table level as a result of even small amounts of rainfall. He notes that Peter J Ramsay & Associates reported on level rises observed by URS in this locality following rainfall which support the TJ position.</p>	Groundwater JER, [6a].	23.1 Grounds of objection as for objections 8, 11-15, 21 and 22.
24.	<p>TJ’s opinion that “the previous groundwater investigations which have been undertaken in this local area have adequately characterised the aquifer. He also states that the surface expression of groundwater is largely centred on flows to Little Nerang Creek. He considers that the modelling which has been undertaken is suitable and adequate for the task, and has demonstrated that the impacts of extraction will be well within the bounds of normal climatic variation.”</p>	Groundwater JER, [7b].	24.1 Grounds of objection as for objections 8, 11-15, 21 and 22.

25.	<p>“TJ states that there has been adequate characterisation of the aquifer parameters, and that a detailed groundwater investigation is not warranted because of the predicted minor impacts of extraction. There is no requirement to complete the level of investigation sought by MC and TM unless the aim is to study the aquifer in minute detail. TJ notes that the level of investigation completed for this application is greater than was undertaken by Peter J Ramsay & Associates for the extraction activity approved by Gold Coast City Council at 133 Repeater Station Road. On the basis that there are no recorded issues with that operation, TJ contends that the level of investigation for 263 Repeater Station Road is adequate provided that suitable operational water level monitoring takes place.”</p>	Groundwater JER, [8b].	25.1 Grounds of objection as for objections 8, 11-15, 21 and 22.
26.	<p>“TJ believes hydraulic parameters (hydraulic conductivity and porosity) determined from the pumping test conducted at 133 Repeater Station Road are reasonable to adopt in assessing impacts of the current applications. TJ says that the work completed by Peter J Ramsay has determined these parameters if MC wishes to undertake additional investigations. However, he notes that both Douglas Partners and Peter J Ramsay & Associates have determined that the impacts of extraction will be insignificant. Further investigations simply for the sake of them</p>	Groundwater JER, [9b].	26.1 Grounds of objection as for objections 8, 11-15, 21 and 22.

	are not warranted.”		
27.	“TJ notes that he does not agree with TM’s representation of the SLR Consulting model, and he does not agree that the proposed extraction will have unacceptable adverse impacts. He further notes that any adverse impacts will be adequately determined and quantified as a consequence of the operational monitoring requirements which will be imposed on any approval. If such impacts occur, then the extraction rate can be suitably modified.”	Groundwater JER, [9d].	<p>27.1 Grounds of objection as for objections 8, 11-15, 21 and 22, in addition to the following ground.</p> <p>27.2 The matters assumed (that conditions will allow “any adverse impacts” to be adequately determined) are not sufficiently like the matters established to render the opinion of any value in circumstances, including because:</p> <p>(a) the Appellant’s proposed conditions do not provide for any monitoring of impacts to groundwater springs approximately 200 m to the west of the proposed bores that are established on the evidence.</p>
28.	TJ’s opinion that “The level of investigation is suitable and adequate for the insignificant impacts which have been predicted.”	Groundwater JER, [10b].	28.1 Grounds of objection as for objections 8, 11-15, 21 and 22.
29.	TJ’s opinion that “the results of modelling show that the potential impacts of extraction are well within the bounds of normal climatic variation. Provided that suitable monitoring is undertaken during the operational phase of the project, impacts will be readily determined and measured, and can be suitably ameliorated by reduction of the extraction rate. TJ also notes it would be possible to impose seasonal extraction limits based on actual rainfalls, such that extraction is geared towards wetter periods where such extraction is a significantly lower percentage of total seepage than estimated by SLR Consulting, which he already considers to be insignificant.”	Groundwater JER, [11b].	29.1 Grounds of objection as for objections 8, 11-15, 21, 22 and 27.

30.	<p>TJ’s opinion that “All that has happened here is that information obtained from a geologically similar area in the locality has been used to predict likely behaviour. This is standard practice in estimation of information such as rainfall intensities and catchment yields. There is no reason to consider that the application of the Mt Tamborine parameters to the subject site should not be acceptable, particularly in the context where there is no evidence that previous extraction activities on the Springbrook aquifer have had adverse environmental impacts.”</p>	Groundwater JER, [11d].	30.1 Grounds of objection as for objections 8, 11-15, 18, 21 and 22.
31.	<p>TJ’s opinion that “The level of investigation is adequate in terms of the scale of the operation and the findings that the impacts of extraction will be insignificantly small.”</p> <p>TJ “considers that the level of investigation is adequate in terms of the scale of the operation and the findings that the impacts of extraction will be insignificantly small.”</p> <p>“TJ says that the extent of analysis has been more than adequate to conservatively determine that the impacts of extraction will be insignificant.”</p> <p>TJ’s opinion that “The level of investigation sought by MC is out of all proportion to the possible impacts which could arise from the low rates of extraction sought.”</p>	Groundwater JER, [12b], [13b] [14b] & [15b].	31.1 Grounds of objection as for objections 8, 11-15, 21 and 22.

32.	TJ's opinion that the analysis done by the Appellant is suitable to assess impacts of the proposed development based on "The calibration of the AWBM model against known streamflows is an established and acceptable procedure. TJ says that the Australian Water Balance Model (AWBM) is an acceptable and accepted tool to enable water balance assessments to be undertaken for groundwater and surface water analysis purposes."	Groundwater JER, [16b].	32.1 Grounds of objection as for objections 8, 11-15, 21 and 22.
33.	TJ's opinion that the assumption that recharge occurs uniformly across the area above the topographic elevation of the point of groundwater extraction (SLR, 2020) "is reasonable in the context of the application which has been made."	Groundwater JER, [17b].	33.1 Grounds of objection as for objections 8, 11-15, 21 and 22.
34.	TJ's opinion that estimates of the catchment contributing to the aquifer "is simply a matter of geometry" and that the "the level of investigation and the assumptions made are reasonable in the context of a proposal to remove what seems to be a small proportion of the infiltration which finds its way to the aquifer" and "There is no need to overcomplicate the model, particularly when there have been no reported instances of adverse impacts resulting from existing extraction activities."	Groundwater JER, [18c].	34.1 Grounds of objection as for objections 8, 11-15, 21 and 22.

35.	TJ's opinion that the relationship between climate variability (e.g. rainfall intensity) and groundwater recharge rates has not been adequately explored at the site by the SLR Report and that "The variation in rainfall patterns is explicitly included in the AWBM model which uses daily rainfall totals over a period of 120 years to determine likely response. The scale and extent of modelling is compatible with the minor impacts which are likely to occur as a consequence of extraction."	Groundwater JER, [19b].	35.1 Grounds of objection as for objections 8, 11-15, 21 and 22. ⁷⁷
36.	<p>"TJ says that Peter J Ramsay & Associates reported that the extraction at 133 Repeater Station Road had no impact on lowering water levels in a monitoring well 70 m from the extraction site. TR [sic – TJ] says that Douglas Partners estimated (very conservatively) that the maximum reduction in water table level after 12 months of pumping with no rainfall recharge was 1.5 m at a distance of 270 m from the extraction point on 263 Repeater Station Road.</p> <p>TJ further states that he has independently confirmed the predicted drawdown of 1.5 m at a distance of 270 m from the extraction wells, estimated by Douglas Partners, by the use of Dupuits Theory and the Theis equation for transient flow. TJ believes the Douglas Partners analysis was based on the residual water table level which would exist</p>	Groundwater JER, [22b].	<p>36.1 Grounds of objection as for objections 7, 8, 11-15, 21 and 22 and the additional ground below.</p> <p>36.2 The matters assumed (that conditions will allow "any adverse impacts" to be adequately determined) are not sufficiently like the matters established to render the opinion of any value in circumstances, including because:⁷⁸</p> <ul style="list-style-type: none"> (a) use of the adopted equation is <u>not</u> demonstrated to be appropriate in this setting, as it makes a number of assumptions (e.g. aquifer is isotropic, homogeneous and of uniform thickness, pumping well fully penetrates the aquifer) that are <u>not</u> demonstrated for the site and likely to be incorrect; (b) given this (i.e. the matter raised in ground 36.2(a)), and the lack of geological information to allow for an assessment of the heterogeneity, anisotropy and saturated thickness of the aquifer, an accurate assessment of the extent of drawdown caused by the extraction bores requires further data, such as monitoring of drawdown in monitoring bores located

⁷⁷ Associate Professor Currell and Tony McAlister raised these issues at [19a], [19c] and [20a] of the Groundwater JER.

⁷⁸ Associate Professor Currell and Tony McAlister raised these issues at [22c] and [22d] of the Groundwater JER.

	after 12 months of continuous pumping with no rainfall occurring in that period. Based on the minimum recorded rainfall at the BOM Springbrook Road rainfall station (see Points of Agreement 5), TJ considers that the actual drawdown at a distance of 270 m from the bore will be significantly less than 1.5 m even in the worst drought year.”		different distances from the extraction bores during pumping.
37.	“The Springbrook system ... has been the subject of some level of investigation by at least 3 other consulting engineering firms. In each case, the conclusion in respect of extraction has been the same – there will be no adverse impact on the aquifer or systems which rely upon that aquifer. ... on the basis that extensive access to this aquifer occurs consistently in the Springbrook plateau, and that reasonably consistent peak flow rates of around 0.35 to 0.50 L/s have been achieved, the assumption that the aquifer is uniform is a reasonable one, especially in the context of the current matter. In TJ’s opinion, the level of investigation undertaken and the tools used for that purpose are adequate for the task, and support the conclusions of URS, Peter J Ramsay & Associates and Douglas Partners that extraction will have no adverse impacts on the aquifer.”	Groundwater JER, [22e].	37.1 Grounds of objection as for objections 7, 8, 11-15, 21 and 22.
38.	Dr Johnson’s opinions (which Mr Moffitt adopts) that: “the pump tests alone are sufficient for me to state that there will be no measurable impact from the proposed aquifer extraction on either flows in the adjoining streams, or	Joint Groundwater-Ecology JER, (3), (4), (14), (22) and (23) and Annexure A.	38.1 Relies on facts and assumptions not proved by admissible evidence, including: (a) hearsay evidence of the pump tests the objection to which is detailed further below in objection 42; (b) an assumption that the pump testing is representative of future impacts when bore construction and lithology

<p>on GDE's on this site or elsewhere”;</p> <p>“TJ’s assessment, identifying that there will be no change in groundwater availability for groundwater dependent ecosystems. This in turn leads WM to conclude that there will be no impact on flora and fauna associated with the subject spring or other springs beyond the cone of depression described by TJ.”</p> <p>“TJ says that the groundwater level monitoring which was undertaken on the subject site in February 2021 demonstrates that the proposed water extraction will have no measurable adverse impact on groundwater levels outside the boundary of the subject site. He also states that the monitoring shows that there will be no significant change in groundwater conditions at those locations on the site where groundwater exists close to the ground surface and sustains Groundwater Dependent Ecosystems (GDEs). He states that from a hydrological point of view, the proposed commercial extraction of water from the subject site will have no impact on these GDEs.”</p> <p>“TJ says ... that there can be no adverse impact on either springs or GDEs if these features lie outside of the cone of depression</p>		<p>logs from the pump test are absent, which means that it is unclear how representative the monitoring bore water levels are of the aquifer drawdown caused by the pumping wells – i.e., it is unclear whether the monitoring and pumping bores are tapping the same depth and lithology within the aquifer;⁷⁹</p> <ul style="list-style-type: none"> (c) substantial rainfall is admitted to have occurred during the pump test and affected water levels in some bores but the quantity of daily rainfall during the pump testing is unstated; (d) assumes uniform aquifer transmissivity within the entire Hobwee Basalt layer to 830m elevation, which includes areas of approximately 200m west and east of the bores, where groundwater springs are known to occur but where no monitoring bores are located (all bores on the site are in a single, north-south line); (e) assumes that the pump testing is sufficient to form the opinions reached but the pumping test conducted is unable to determine or account for the capture of water that currently supports groundwater dependent ecosystems at the site, and any other down-gradient surface water features which may be influenced by reduced discharge from the aquifer to the surface. The capture of such water cannot solely be determined based on an analysis of water table heights in an aquifer during pumping,⁸⁰ and (f) the extent of groundwater dependence of springs on the property which support downstream waterways, or their tolerance for reduced flows as a result of groundwater extraction (including the capture of discharge by
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⁷⁹ Associate Professor Currell raised this point in the Joint Groundwater-Ecology JER, p 7, (18)(e).

⁸⁰ Associate Professor Currell raised this point in the Joint Groundwater-Ecology JER, p 7, (18)(b).

<p>formed in the groundwater surface when pumping occur. TJ says that the definition of the cone of depression is that there is no change to groundwater levels or conditions outside of the boundary of the cone. The only question which needs to be considered is whether the nominated features (springs and GDEs) lie outside of that zone of influence. TJ says that the information derived from the pump tests is adequate for him to conclude that this is the case.”</p> <p>“TJ’s groundwater assessment leads him to conclude that the proposed extraction would cause no adverse impact on springs or GDE’s. This in turn leads WM to conclude that there will be no impact on flora and fauna associated with the subject spring or other springs beyond the cone of depression described by TJ.”</p> <p>“SLR Consulting, under my direction, prepared a report on this matter in June 2020 titled Water Balance Assessment. ... I am satisfied that the results show clearly that the planned extraction would have no measurable effect on the overall volume of water available for existing ecological and environmental requirements within the nominated catchment area.”</p>		<p>pumping wells and during dry periods) remains uncharacterised.⁸¹</p> <p>38.2 Relies on unstated and unidentified assumptions, including:</p> <ul style="list-style-type: none"> (a) that the pump test results remain valid despite (unquantified but apparently substantial) rainfall during the test period that affected water levels in some bores substantially but most bores only marginally; (b) that impacts on the aquifer and cone of depression are uniform; (c) unstated and unknown aquifer properties such as transmissivity; (d) that impacts on the aquifer and cone of depression are uniform, including to the west and east of the bores; (e) unstated and unknown aquifer properties such as transmissivity, including the transmissivity and the effect of fracturing in a west-east direction across the site, of which there is no evidence as all of the pumps on the site are located in a north-south line; that groundwater and the vadose zone on which vegetation and animals rely to the west and south of the bores is unaffected by the extraction. <p>38.3 The matters assumed are not sufficiently like the matters established to render the opinion of Dr Johnson of any value, in particular:</p> <ul style="list-style-type: none"> (a) Substantial rainfall was accepted to have occurred during the pump testing that influenced the test results, which Dr Johnson assumed did not affect the validity of the results (or, if it did affect the validity of the results, how this could be corrected for), when the scientific literature on pump testing indicates pump testing affected by heavy rainfall cannot be accounted for, the
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⁸¹ Associate Professor Currell raised this point in the Joint Groundwater-Ecology JER, p 7, (18)(c).

			<p>data of the test “becomes worthless”, and the test has to be repeated when the situation has returned to normal.⁸²</p> <p>(b) Dr Johnson assumed that the impacts on the aquifer and cone of depression are uniform whereas it is agreed by all experts that the aquifer is affected by fracturing of the rock and not uniform.</p> <p>(c) As the aquifer is fractured and likely to be heterogeneous, and as such the geology needs to be carefully characterised to determine if monitoring bores are screening a horizon which is connected with the zone being pumped.⁸³</p> <p>(d) Dr Johnson’s opinion contradicts (and is not sufficiently like) the agreed fact that “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance”⁸⁴ in circumstances where multiple groundwater springs are known occur within 200 m east and west of the bores.⁸⁵</p> <p>(e) Dr Johnson’s opinion assumes the relevant focus for assessing impacts is primarily (or entirely) on the effect of the extraction on the water table level. However this is only one component of the impact on groundwater that would arise from the extraction. Equally, or more important than the change in water table level, is the effect of the extraction on the discharge of water to the</p>
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⁸² Tony McAlister makes this point in his individual expert report, 22 December 2021, at [59] and [65]. Associate Professor Currell made a similar point in the Joint Groundwater-Ecology JER, p 7, (18)(d).

⁸³ Associate Professor Currell made these points in the Joint Groundwater-Ecology JER, p 7, (18)(f).

⁸⁴ Groundwater JER, Point of Agreement 8, which was reaffirmed as remaining “unchanged” in the Joint Groundwater-Ecology JER at (12).

⁸⁵ The existence of a permanent groundwater spring on the subject site approximately 200m to the east of the bores is common ground (see, e.g., Groundwater JER at p 13 and Ecology JER, p 73. In relation to the groundwater springs to the east and west of the bores, see the affidavit of Elanor Marie Fenge, affirmed 5 November 2021 (eCourt Doc #38).

			surface – that is, how much flow from the aquifer to springs, seeps and any associated ecosystems will be reduced. This is critically important given the location of the site at the headwaters of a local sub-catchment, whereby springs from the aquifer feed the streams which flow into Twin Falls and Cave Creek. ⁸⁶
39.	<p>“TJ says that the level of investigation completed in association with the groundwater level monitoring, as well as the information provided in previous assessments as outlined in the first groundwater JER, show that Council’s allegation that:</p> <p><i>Suitable geological characterisation, groundwater testing and modelling investigations have not been undertaken for the site and surrounding areas to demonstrate that the proposed use is acceptable</i></p> <p>is unsupported. Further groundwater investigation, monitoring and modelling would have no effect on the conclusion that commercial water extraction from the subject site does not lower groundwater levels more than 100 m from the extraction point.”</p> <p>“Further, if it is accepted that the monitoring adequately demonstrates this outcome (ie that extraction has no impact on groundwater levels external to the subject site), Council’s second allegation, namely that</p>	Joint Groundwater-Ecology JER, (15) and (16)	39.1 Grounds of objection as for objections 37 and 38.

⁸⁶ These points are made by Associate Professor Currell in his individual report at [3.5].

	<p><i>It has not been demonstrated that the proposed extraction will not cause unacceptable environmental impacts, including when considering the cumulative impacts of the proposed extraction with other groundwater extraction operations and climate change</i></p> <p>is also unsupported.”</p>		
40.	<p>Dr Johnson’s opinions that “the majority of plants in the catchment area are not relying on the existing aquifer for their sustenance. The aquifer has been determined to be normally at a level of around 830 m AHD. Vegetation above this level will be drawing moisture from what is known as the vadose zone. This is the soil profile which exists between the ground surface and the water table. The vadose zone contains soil water which is seeping from the surface to deep drainage, some of which will eventually reach the aquifer and replenish it. There is also likely to be some capillary action which will draw water upwards from the aquifer into the vadose zone, as shown in the following sketch. However, this effect is expected to be minor, and is in any case occurring deep in the soil profile. In general, water moisture in the vadose zone will be unaffected by extraction from the groundwater.”</p>	<p>Joint Groundwater-Ecology JER, Annexure A, p 14.</p>	<p>40.1 Opinions outside the expert’s area of expertise (groundwater) in relation to ecological matters.</p> <p>40.2 Relies on facts and assumptions not proved by admissible evidence, including:</p> <ul style="list-style-type: none"> (a) assumptions about the extent of the vadose zone on the site and dependence of vegetation on it; and (b) assumptions that water moisture in the vadose zone will be unaffected by extraction from the groundwater.

41.	The entirety Annexure A, commencing at p 13 of the Joint Groundwater-Ecology JER and, in particular, to Dr Johnson’s opinions that “there will be no change at a location more than 170 m from the pumping bores”, “there will be no measurable change at points more than 100 m away in any direction”, and similar statements in Annexure A.	Joint Groundwater-Ecology JER, pp 13-19 (Annexure A)	41.1 Grounds of objection as for objection 38.
42.	Undated and unattributed report by Mr Iain Hair (‘the Hair Report’)) containing results and expert opinion regarding hydraulic (pump) testing of the bores at 263 Repeater Station Road conducted 14-21 February 2021.	Appendix 4 to the Ecology JER and Annexure B to the Joint Groundwater-Ecology JER	<p>42.1 Hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the Evidence Act.</p> <p>42.2 Contains opinions of second groundwater expert who:</p> <ul style="list-style-type: none"> (a) is not called to give evidence; (b) has not participated in the joint expert meeting process; and (c) the Appellant’s solicitor stated the Appellant was not relying upon.⁸⁷ <p>42.3 Contains opinions outside the field of expertise of the expert (assumed to be groundwater) involving ecology, that “Pumping at a rate of 0.5 L/s is sustainable in the long term with minimal or no impact on other groundwater users or the environment.”⁸⁸</p> <p>42.4 Relies on facts and assumptions not proved by admissible evidence, including:</p> <ul style="list-style-type: none"> (a) bore construction and lithology logs from the pump test are absent, which means that it is unclear how representative the monitoring bore water levels are of the aquifer drawdown caused by the pumping wells – i.e., it is unclear whether the monitoring and pumping

⁸⁷ See the correspondence exhibited at p 5 to the Pointon affidavit (eCourt Doc #34).

⁸⁸ Joint Groundwater-Ecology JER, p 26 (Annexure B).

			<p>bores are tapping the same depth and lithology within the aquifer;⁸⁹</p> <ul style="list-style-type: none"> (b) rainfall is admitted to have occurred during the pump test and affected water levels in some bores but the quantity of daily rainfall before and during the pump testing is unstated; (c) assumes uniform aquifer transmissivity within the entire Hobwee Basalt layer to 830m elevation, which includes areas of approximately 200m west and east of the bores, where groundwater springs are known to occur. <p>42.5 Relies on unstated and unidentified assumptions, including:</p> <ul style="list-style-type: none"> (a) that the pump test results remain valid despite (unquantified but apparently substantial) rainfall during the test period that affected water levels in some bores substantially but most bores only marginally; (b) that impacts on the aquifer and cone of depression are uniform; (c) unstated and unknown aquifer properties such as transmissivity; (d) bores orientated solely in a north-south line can be used to determine transmissivity to the west and east in fractured rock; and (e) the ecology of the vadose zone and groundwater dependent ecosystems around the bores, including within 200m. <p>42.6 The matters assumed are not sufficiently like the matters established to render the opinion of the groundwater expert called by the Appellant of any value, in particular:</p> <ul style="list-style-type: none"> (a) Substantial rainfall was accepted to have occurred during the pump testing that substantially affected the test results, which Mr Hair assumed did not affect the validity of the results (or, if it did affect the validity of
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⁸⁹ Joint Groundwater-Ecology JER, p 7, (18)(e).

			<p>the results, how this could be corrected for), when the scientific literature on pump testing indicates pump testing affected by heavy rainfall cannot be accounted for, the data of the test “becomes worthless”, and the test has to be repeated when the situation has returned to normal.⁹⁰</p> <p>(b) Mr Hair opines “Pumping at a rate of 0.5 L/s is sustainable in the long term with minimal or no impact on other groundwater users or the environment. Drawdown is quite limited outside the immediate area of the pumping bores.”⁹¹ This assumes impacts on the aquifer and cone of depression are uniform whereas it is agreed by all experts that the aquifer is affected by fracturing of the rock and not uniform. It also assumes bores located in a north-south line can be used to assess impacts to the west and east in fractured rock.</p> <p>(c) Mr Hair’s opinion (in 42.6(b)) contradicts (and is not sufficiently like) the agreed fact that “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance.”⁹²</p>
43.	Dr Johnson’s views in his individual report on the impacts based on the SLR Report and analysis of a uniform “cone of depression”, including that: “that the water balance analysis	Dr Johnson (TJ) individual expert report, 24 December 2022, [12]-[15] and [30].	43.1 Grounds of objection as for objections 8, 13-15 and 17.

⁹⁰ Tony McAlister makes this point in his individual expert report, 22 December 2021, at [59] and [65]. Associate Professor Currell made a similar point in the Joint Groundwater-Ecology JER, p 7, (18)(d).

⁹¹ Joint Groundwater-Ecology JER, p 26 (Annexure B).

⁹² Groundwater JER, Point of Agreement 8.

	<p>demonstrated that the volume of proposed water extraction represented only a very minor proportion of the total volume of water likely to be held in the aquifer, and further, that the extraction would produce virtually undetectable changes in water level in the broader aquifer (ie other than in close proximity to the extraction point).”</p> <p>“... if it can be demonstrated by measurement of groundwater level that the area of influence is restricted to the property itself, then there can be no adverse impact on any external user.”</p>		
44.	Dr Johnson’s views in his individual report on the impacts based on the ‘Hair Report’ of pump testing.	Dr Johnson (TJ) individual expert report, 24 December 2022, [15]-[22].	44.1 Grounds of objection as for objection 42.
45.	Dr Johnson’s concluding views in his individual report on the impacts based on the SLR report and the ‘Hair Report’ of pump testing.	Dr Johnson (TJ) individual expert report, 24 December 2022, [24]-[31].	45.1 Grounds of objection as for objections 38 and 42.
46.	Reliance on facts, premises, assumptions, opinions, documents and statements listed above in other evidence.	e.g. Town Planning JER, [41], [99], [101], [102]-[104], [106], [179](f) & (g), [180], [181], [184], [186]; Tourism JER, [28] & [32]; Visual Amenity JER, [50], [51] & [56]-[57].	46.1 Grounds of objection listed above relevant to the facts, premises, assumptions, opinions, documents and statements referred to in other evidence. 46.2 Based on facts and assumptions not proven by admissible evidence.
47.	<p>“Quality of the water from these bores ... has been tested so that it is known to be suitable for use. Mr Schomburgk has not seen those test results but assumes that the water is of an appropriate quality for bottling.”</p> <p>“The groundwater extracted from the subject</p>	Town Planning JER, [42] & [182]	47.1 Hearsay 47.2 Based on assumptions not proven in admissible evidence.

	site has been tested and found suitable (for purification, sale and consumption).”		
48.	<p>“the two (2) existing groundwater extraction facilities on Repeater Station Road have been operating for 25 years without causing apparent adverse social and environmental impacts”</p> <p>“I consider the existence of the two (2) other commercial groundwater extraction facilities on the same road, which have not had apparent significant adverse or unacceptable impacts (environmental or otherwise) in the last 25 years of operation, should be an indicator that the proposal can establish and operate in a sustainable way without detriment to matters of environmental significance.”</p>	Town Planning JER, [103](d) & 108(d) & similar statements at [178], [207](g) & [214](d)	<p>48.1 Based on assumptions not proven by admissible evidence.</p> <p>48.2 Opinion outside the field of expertise of the maker (town planning).</p>
49.	“Water quality testing has shown that the spring water sourced from Mr Hoffman’s property at Springbrook is of a high standard, which includes the water having low levels of iron and manganese.”	Statement of Ray Cavanough, 12 November 2021, [17]	<p>49.1 Hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>49.2 Relies on facts and assumptions not proved by admissible evidence.</p>
50.	<p>“I have been advised by Mr Hoffmann that the water quality from his Springbrook property has indicated positive results from initial water testing. In particular, testing has shown that water on this site has a high pH and has desirable minerals compared to the water quality at other sites.”</p> <p>“... if the spring water supplied was of the quality described by Mr Hoffmann, given it meets the Australian Water Quality Guidelines.”</p>	Statement of Cory Reeve, 21/12/2021, [18] & [20]	<p>50.1 Hearsay for which no exception applies and leave should not be granted to rely upon under s 92 of the <i>Evidence Act</i>.</p> <p>50.2 Relies on facts and assumptions not proved by admissible evidence.</p>

**SCHEDULE 2: ESTABLISHED GROUNDWATER FACTS / PREMISES
(INCLUDING FACTS AGREED TO BE UNKNOWN)**

As relevant to these objections, the following facts/premises are common ground between the three groundwater experts, not disputed by ARCS, and/or established on the admissible evidence:

Topography:

1. The site slopes eastward from the ridgeline as shown in Figure 3 of the Groundwater JER.

Geology:

2. The Springbrook area is underlain by the Hobwee Basalt which is part of the more extensive Lamington Basalt Complex⁹³ as shown in Figure 3 of the Groundwater JER.

Impact of water extraction on site and surrounding areas

3. “The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance.”⁹⁴

Aquifer/s:

4. The Hobwee Basalt is likely to support one or more aquifers consisting of fractured vesicular basalts.⁹⁵
5. The water table and/or potentiometric surface patterns in the area surrounding the bores are currently unknown.⁹⁶
6. The aquifer is subject to fracturing and is heterogeneous (i.e. not uniform).⁹⁷

Conceptual hydrogeological model

7. A preliminary conceptual hydrogeological model for the site is:⁹⁸
 - (a) Groundwater occurs within a fractured basalt aquifer (Hobwee Basalt), which receives recharge from rainfall, via infiltration through fractures in the rock, mostly along the ridge line that follows Repeater Station Road. The rates and pathways of groundwater flow in the aquifer are very likely to be dependent on the degree of fracturing within the basalt.

⁹³ Groundwater JER, Point of Agreement 1.

⁹⁴ Groundwater JER, Point of Agreement 8, which was affirmed in the Joint Groundwater-Ecology JER at (12).

⁹⁵ Groundwater JER, Point of Agreement 1.

⁹⁶ Groundwater JER, Point of Agreement 2.

⁹⁷ This point is made numerous times by the experts, including by Tony McAlister in his individual report of 21 December 2021, at [22] and [24], and is accepted by Dr Johnson in his individual report of 24 December 2021 at [20] (although Dr Johnson goes on to state this does not affect his opinion).

⁹⁸ See Associate Professor Currell’s individual expert report, 3 December 2021, pp 6-8.

- (b) The rates and pathways of groundwater flow in the aquifer and degree of fracturing within the basalt is currently poorly characterised, but likely to be heterogeneous – this is typical of groundwater in volcanic rock aquifers.
- (c) The basalt aquifer is underlain by the Springbrook Rhyolite, a rock type which is likely to be of relatively low permeability, and therefore having limited groundwater flow and storage capacity.
- (d) Flow of groundwater within the Hobwee Basalt aquifer travels away from the ridge line towards both the east and west, before discharging to the surface through springs and seeps.
- (e) Some groundwater is also likely utilized by vegetation on either side of the ridge line - consumed by plants as transpiration.
- (f) Springs occur both on the east and west side of the ridgeline, including some on the Appellant's property, and others outside the property boundary. These springs mostly occur at an elevation of approximately 830 – 835 m Australian Height Datum (AHD). This is a similar elevation to the intake zone of the proposed extraction bores, and it is therefore very likely that the bores would intercept water that otherwise flows to these springs. Geological features such as fracturing and/or lithological contact between the basalt and underlying rhyolite, likely play a significant role in controlling the location of the springs. For example, groundwater may be forced to the surface where relatively permeable fractured basalt contacts with low permeability rhyolite below. The springs contribute water to local streams, which ultimately flow to Twin Falls (on the east) and Natural Arch (on the west).

Bores:

- 8. A number of local bores intersect the aquifer(s), including three on the subject land⁹⁹ (although the depths of all 10 of the bores on the subject site, including the pumping bores, is not established in the evidence).
- 9. The three proposed extraction/pumping bores are located near the western boundary of the site near the top of the ridgeline (at surface level the bores are at approximately 910 m elevation) as shown in Figure 3 of the Groundwater JER.

Groundwater springs

- 10. Groundwater springs occur on the site at approximately 830 m elevation¹⁰⁰ and flow year-round.
- 11. Groundwater springs occur to the west of the site at approximately 830-835 m elevation.¹⁰¹

Wet and dry season impacts

- 12. There is a marked difference in rainfall during the wet season (December-March) and the dry season (June-August).

⁹⁹ Groundwater JER, Point of Agreement 1.

¹⁰⁰ Affidavit of Elanor Marie Fenge, 5 November 2021 (eCourt Doc #38), [8]-[21].

¹⁰¹ Affidavit of Elanor Marie Fenge, 5 November 2021 (eCourt Doc #38), [22]-[32].

13. Springs and streams on the site and surrounding area flow perennially, meaning they continue flowing even in the absence of significant rainfall and are thus groundwater dependent with flow in the dry season being entirely or mostly dependent on groundwater flow.

Climate change impacts

14. Australia, south east Queensland and the Springbrook Plateau are characterized by seasonal rainfall and high variability in year-to-year rainfall, especially in winter and severe droughts. A long-term drying trend is now evident based on the observed rainfall records.¹⁰²
15. Climate change is driving further winter drought and extreme heatwave conditions.¹⁰³
16. The best available climate projections point to a continuation in south east Queensland of the current observed drying trend.¹⁰⁴

Highly sensitive location of site

17. The subject site is in a highly sensitive location that:
- (a) has considerable ecological value as habitat and corridors protected under the planning scheme,¹⁰⁵ and
 - (b) contributes to the integrity of the Outstanding Universal Value (**OUV**) of the nearby Gondwana Rainforests of Australia World Heritage Area.¹⁰⁶
18. The proposed bores are located within 100 m of national park to the south, and within 430m to the north, 570 m to the west and 820 m to the east of national park and the Gondwana Rainforests of Australia World Heritage Area.¹⁰⁷

¹⁰² Climate Change JER (redacted), point of agreement 3.

¹⁰³ Climate Change JER (redacted), [20].

¹⁰⁴ Climate Change JER (redacted), [28].

¹⁰⁵ Ecology JER, [27].

¹⁰⁶ World Heritage JER, [6]-[8] (Dr Kooyman), accepted by Mr Moffit at [23]; and Dr Kooyman individual expert report at [8]-[13], [25]-[49] and [54].

¹⁰⁷ See the Ecology JER, pp 72 and 73.

**SCHEDULE 3: GROUNDWATER FACTS / PREMISES / ASSUMPTIONS
AND OPINIONS IN DISPUTE AND NOT ESTABLISHED ON ADMISSIBLE
EVIDENCE OR NOT SUFFICIENTLY LIKE THE MATTERS
ESTABLISHED TO RENDER THE OPINION OF ANY VALUE**

In summary, as relevant to these objections, the following facts/premises/assumptions or opinions, ARCS submits are not common ground between the three groundwater experts, and/or not established on the admissible evidence (and facts that the Court ought not to exercise its discretion under r 25 of the Rules to admit), and/or not sufficiently like the matters established to render the opinion of any value.

This summary is intended as a broad guide only and is without prejudice to the more detailed grounds of objection in Schedule 1 or submissions at trial.

Aquifers and cone of depression

1. Dr Johnson’s assumption that “the aquifer is uniform”¹⁰⁸ for the purpose of assessing impacts of the proposed development is not established.
2. Dr Johnson’s assumption that the aquifer (and piezometric surface) is flat and unaffected by the site topography or fracturing of the rock, as he assumes at [11]-[14] of his individual report in assessing the potential cone of depression and impacts of the proposed development is not sufficiently like the matters established to render the opinion of any value.
3. Groundwater flow patterns and hydraulic gradients have not been characterised in the area of the development sufficiently to allow assessment of the potential impacts of the proposed development on the site and surrounding areas, including:
 - (a) there are no water table or potentiometric surface maps. These are required to understand the impacts of drawdown caused by the production bores on groundwater flow and discharge to the surface (which may be environmentally important);¹⁰⁹ and
 - (b) hydraulic parameters, including transmissivity, hydraulic conductivity, porosity and storativity have not been reported for the site from the aquifer where extraction is proposed, or other adjacent aquifer units, noting that such parameters may be highly site-specific in fractured rock aquifers. These parameters may be highly variable and those estimated at 133 Repeater Station Road (using a pumping test) may not be representative for the area surrounding the bores in the current application,¹¹⁰ nor are these matters established by ‘the Hair Report’ of pump testing on the site in 2021.¹¹¹

Limits of impacts

4. Dr Johnson’s opinion that “the proposed water extraction will have no measurable impact on groundwater levels outside the boundary of the subject site”¹¹² is not

¹⁰⁸ Groundwater JER, Point of Disagreement 22e. See also Dr Johnson’s individual report at [11]-[12].

¹⁰⁹ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [8a]).

¹¹⁰ These points were raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [9a]).

¹¹¹ See grounds of objection 42 in Schedule 1 and references in them to the evidence.

¹¹² Joint Groundwater-Ecology JER, Point of Disagreement (14).

established and contradicts the point agreed by all groundwater experts that:

“The groundwater that would be extracted by the production bores at 263 Repeater Station Road would otherwise flow (via groundwater discharge from seeps and springs) to surface water sites at lower elevations, including any existing GDEs, as well as Twin Falls and Cave Creek, which are sites of considerable environmental and regional tourism significance.”¹¹³

5. Dr Johnson’s opinion that “there will be no change at a location more than 170 m from the pumping bores” and “there will be no measurable change at points more than 100 m away in any direction”¹¹⁴ is not established on admissible evidence is and/or not sufficiently like the matters established to render the opinion of any value.
6. Dr Johnson’s opinion assumes the relevant focus for assessing impacts is primarily (or entirely) on the effect of the extraction on the water table level. However this is only one component of the impact on groundwater that would arise from the extraction. Equally, or more important than the change in water table level, is the effect of the extraction on the discharge of water to the surface – that is, how much flow from the aquifer to springs, seeps and any associated ecosystems will be reduced. This is critically important given the location of the site at the headwaters of a local sub-catchment, whereby springs from the aquifer feed the streams which flow into Twin Falls and Cave Creek.¹¹⁵

Aquifer recharge area

7. Whether the relevant aquifer recharge area is 309 ha as asserted and assumed by Dr Johnson¹¹⁶ or substantially smaller relevant to the impacts of the extraction on the site and the immediately surrounding areas is not established on admissible evidence is and/or not sufficiently like the matters established to render the opinion of any value.

Relevant scale to assess impacts

8. Whether the relevant scale to assess groundwater impacts is inflow into Little Nerang Dam, over 10km north of the site, as done in the SLR (2020) report relied upon by Dr Johnson, is disputed.
9. The use in assessing the impacts of the proposed development (in the SLR Consulting Report and relied upon by Dr Johnson) of streamflow data from the Numinbah gauge to estimate baseflow a significant distance downstream from the site and at far lower topographic elevation is disputed:
 - (a) This is unlikely to provide reliable estimates of groundwater recharge that are applicable for the aquifer at the site of the proposed bores.¹¹⁷
 - (b) Reliable estimates of groundwater recharge that are applicable for the aquifer at the site of the proposed bores would require other lines of evidence based on site-specific data, such as groundwater hydrographs and/or environmental

¹¹³ Groundwater JER, Point of Agreement 8, which was affirmed in the Joint Groundwater-Ecology JER at (12).

¹¹⁴ Joint Groundwater-Ecology JER, p 17 (Annexure A).

¹¹⁵ These points are made by Associate Professor Currell in his individual report at [3.5].

¹¹⁶ Groundwater JER, Point of Disagreement 1d, 18a.

¹¹⁷ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

tracers.¹¹⁸

Bores

10. The depth and lithology of the (3) pumping and (7) monitoring bores and which aquifer or aquifers they draw water from is not established in admissible evidence.

Applicability of groundwater studies at Mt Tamborine

11. Whether groundwater studies at Mt Tamborine (contained in Todd (2011) and relied upon in the SLR Report and by Dr Johnson) are applicable to the subject site and aquifer/s at Springbrook is not established.¹¹⁹

Adequacy of level of investigation

12. Whether “the level of investigation undertaken and the tools used for that purpose are adequate for the task and support the conclusions of URS, Peter Ramsay & Associates and Douglas Partners that extraction will have no adverse impacts on the aquifer”, as asserted by Dr Johnson, is disputed,¹²⁰ as is the admissibility, validity and adequacy of ‘the Hair Report’ of pump testing on the site in 2021.¹²¹
13. Dr Johnson fails to state the assumptions and criteria he applies to judge the “adequacy” of the level of investigation and conclusion as “no adverse impacts”¹²² in the context of the high level of protection afforded habitat and corridor values of the site and the surrounding area under the planning scheme.

Admissibility and validity of ‘the Hair Report’ on 2021 pump testing

14. The admissibility and validity of ‘the Hair Report’ on 2021 pump testing and the conclusions that can be drawn from it are disputed, in particular because (leaving aside legal issues concerning admissibility such hearsay and focusing on why the factual basis for the report is not established¹²³):
- (a) Bore construction details and lithology logs were lacking from the pumping test report. This means it is unclear how representative the monitoring bore water levels are of the aquifer drawdown caused by the pumping wells - i.e., it is unclear whether the monitoring and pumping bores are tapping the same depth and lithology within the aquifer. The aquifer is fractured and likely to be heterogeneous, and as such the geology needs to be carefully characterised to determine if monitoring bores are screening a horizon which is connected with the zone being pumped.¹²⁴
- (b) The pump test was affected by heavy rainfall and, therefore, the data from the

¹¹⁸ This point was raised at the time of the Groundwater JER by Associate Professor Currell (see Groundwater JER, [2b]).

¹¹⁹ As noted in objection 18.1 of Schedule 1, ARCS accepts that that the QUT study of Tamborine Mountain is part of the scientific literature that the groundwater experts may refer to but disputes that it has been established that Mt Tamborine is a “very similar geology to the Springbrook area” or that its results are applicable to assessing the impacts of the proposed development, as Dr Johnson asserts.

¹²⁰ Groundwater JER, Point of Disagreement 22e.

¹²¹ See grounds of objection 42 in Schedule 1 and references in them to the evidence.

¹²² Groundwater JER, Point of Disagreement 22e and later, similar statements by Dr Johnson in his individual report.

¹²³ See grounds of objection 42 in Schedule 1 for all grounds of objection to this report.

¹²⁴ This point was raised by Associate Professor Currell in the Joint Groundwater-Ecology JER, [18e].

test has become “worthless”.¹²⁵

Adequacy of conditions

15. The adequacy of the proposed conditions to manage groundwater and ecological impacts is disputed, including because:
- (a) Due to the aquifer being heterogeneous and fractured, it is more difficult than otherwise to establish monitoring bores that can adequately detect and map the drawdown caused by groundwater extraction. Monitoring the effects of groundwater pumping using two extraction bores and two monitoring bores on the Appellant’s property is highly unlikely to allow characterisation of the extent of impact in all directions. A monitoring network that includes sites both east and west of the extraction bores (as well as the existing bores to the north and south), and encompassing bores both close to (within 50 m) and further from (e.g. >250 m) the extraction bores, is required for this. The proposed monitoring plan would not allow changes in the water table to the west of the extraction bores to be measured.¹²⁶
 - (b) There is no proposal (in the draft conditions of approval) to monitor rates of water flow from springs, which are the primary surface expression of groundwater from the aquifer targeted by the proposed extraction. The proposed monitoring program therefore ignores one of the key hydrological impacts – the reduction in flows from springs. These springs flow into streams which provide habitat to aquatic ecosystems, and flow to sites of high natural, tourism and cultural significance in the nearby World Heritage Area (Twin Falls and Natural Arch). Under the proposed monitoring plan, there will be no way to assess the impact of the proposed extraction on these environmental features.¹²⁷

[END OF DOCUMENT]

¹²⁵ Tony McAlister makes this point in his individual report at [59] and [65], citing Kruseman and de Ridder (2000) ‘Analysis and Evaluation of Pumping Test Data’ (2nd ed), p 47. He states at [45] of his individual report that this “is a benchmark publication that is accepted around the world as a key guidance document in regard to groundwater pump tests.”

¹²⁶ These points are made by Associate Professor Currell at [4.3] of his individual report. See also [93] of Tony McAlister’s individual report.

¹²⁷ These points are made by Associate Professor Currell at [4.5] of his individual report. See also [94] of Tony McAlister’s individual report.