

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of Proposed Private Plan Change 2 to  
the Hamilton City Operative District  
Plan: Te Awa Lakes Private Plan  
Change

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**STATEMENT OF REPLY EVIDENCE OF KEITH DAVID HAMILL FOR THE APPLICANT  
(WATER QUALITY)  
2 DECEMBER 2019**

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**1. INTRODUCTION**

1.1 My full name is Keith David Hamill.

1.2 I have the qualifications and experience as set out in section 2 of my primary statement of evidence dated 29 October 2019.

1.3 I reconfirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and to the extent that I am giving expert evidence, have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

**2. SCOPE OF EVIDENCE**

2.1 I have been asked to provide evidence in response to the statements of evidence of:

a) Paula Rolfe on behalf of Hamilton City Council as submitter; and

b) Darion Embling on behalf of the Waikato Regional Council.

2.2 I respond to each statement of evidence below by reference to the particular paragraphs within my area of expertise which require a response. Other matters addressed in that evidence outside my area of expertise have been addressed by other witnesses for the Applicant.

**3. RESPONSE TO SUBMITTER EVIDENCE**

**Hamilton City Council (as submitter)**

3.1 At paragraph 11 of her evidence, Ms Rolfe seeks to include a new objective into PPC2 that: *"The lakes within Te Awa Lakes Structure Plan area will be maintained to a swimmable standard"*. I do not support this definition as it may not be achievable all of the time if a strict interpretation of the proposed definition of 'swimmable' is applied.

3.2 I refer to my primary evidence at paragraphs 5.12 to 5.16 in relation to the definition of "swimmable" to be incorporated through PPC2, and paragraphs 5.26 to 5.28 in relation to the water quality which is sought to be achieved in the proposed Te Awa Lakes.

- 3.3 As I noted in those paragraphs, some of the targets within the definition of “swimmable” may not be achieved all of the time, as is the case with other shallow natural lakes. Ms Rolfe has at her sub-paragraph (d) noted that the Attribute State B for *E. coli* bacteria provides for exceedances of up to 10% of a given time, “*meaning that the definition does not require the lake to be “swimmable” at all times*”. My main concern with this position is that it ignores water clarity which also forms part of the proposed definition in the plan (but is not considered as part of “swimmable” in the NPS-FM). At my paragraph 5.27, I note that some of the natural lakes with the highest water quality in the Waikato still do not achieve a black disc clarity of 1.6m or equivalent five percent of the time. The water clarity at that point would not meet the definition of swimmable, even though it may be reasonably safe to do so (issues of water clarity relate more to aesthetics than human health, as I noted at my paragraph 5.13).
- 3.4 From an ecological point of view, I prefer the objective put forward by the applicant of “*the lakes within Te Awa Lakes Structure Plan area will provide a high level of recreational, amenity and ecological values*”. This allows a holistic approach to lake management, and reduces the risk of a managing the lake to achieve a single value (i.e. “swimmable”) to the exclusion of other ecological values. The management plans provide further detail with respect to managing the lake to provide swimmable water quality.

#### **Waikato Regional Council**

- 3.5 At paragraphs 61 to 64 of his evidence, Mr Embling draws attention to a potential inconsistency between the proposed mitigation put forward in my Lake Water Quality Assessment and Design Approach (and the Stormwater Management Plan prepared by Ms Rhynd), and that put forward in the Alligator Weed Management Plan prepared for the Applicant by Peter Russell of Better Biosecurity Solutions Ltd. In particular, he highlights the proposal by Mr Russell to “*line the lakes and their margins with a ‘water permeable woven, geotextile fabric like a weed mat’ to suppress any residual alligator weed fragments that may be present*” following construction.
- 3.6 I have discussed the matter with Mr Russell and in my view the use of permeable geotextile fabric to suppress alligator weed can be compatible with establishing aquatic plants and wetlands along the lake edge. This might be achieved through use of different treatments in different locations, or an alternative option would be to plant aquatic or

wetland plants in a substrate layer over the top of a liner. These details can be worked through at the detailed design phase.

### **Second lake outlet**

- 3.7 I understand there has been discussion about incorporating a second outlet to the northern end of the linear lake (i.e. evidence by Ann Williams); and that the Commissioners have asked a question as to whether there will be "*any consequential effects for the ecology of the lake by allowing two openings at 14.5m RL*". I am advised that the key focus of the discussion has been to achieve the maximum hydraulic gradient of 2% between the linear lake and the Waikato River and that there are a range of options to achieve this (which may include a second outlet). Introducing a second outlet would increase the risk of the introduction of pest fish (e.g. bullhead catfish) to the main lake in flood events. This is because it would provide two points of entry resulting in more water entering the lake during a flood.
- 3.8 Pest fish can have adverse effects on lake ecology and water quality, so reducing the risk of their entry to the lake would need to be carefully managed. However, I understand that these are matters which can be dealt with at the consenting stage, once greater certainty around the final geotechnical solutions is obtained.
- 4. CONCLUSION**
- 4.1 Having reviewed the evidence of Ms Rolfe, I remain of the opinion that the amendments proposed by Mr Olliver to PPC2 are appropriate.
- 4.2 Having reviewed the evidence of Mr Embling, I consider the need to construct a lake to achieve a high level of water quality can be compatible with the need to manage alligator weed.
- 4.3 A second lake outlet could increase the risk of pest fish entering the lakes during a flood. If this were to occur it would have substantial adverse effects on lake ecology and water quality.

**Keith Hamill**  
**2 December 2019**