

From: [Alicia Brunke](#) on behalf of [Alex Booker](#)
To: [Plan Hearings](#)
Subject: Plan Change 7 - Templeton Pegasus Ltd - evidence
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Attachments: [Al Toitū CarbonZero_480px1.png](#)
[Statement of Evidence - Andrew Webster \(Templeton Pegasus Ltd\).d.pdf](#)

Hi Tavisha

Please find **attached** for filing on behalf of Templeton Pegasus Limited:

- Statement of Evidence - Andrew Webster (company representative)

Attachments to Mr Webster's evidence can be found in the Share File link below.

Share File Link:

https://files.al.nz/public/folder/txz5Mg2M0K0xn1W2_XKw/Statement%20of%20evidence%20of%20Andrew%20Webster%20for%20Templeton%20Pegasus%20Limited%20with%20attachments

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Regards
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Before the Commissioners
Appointed by Canterbury Regional Council

Under the Resource Management Act 1991

In the matter of a submission made by Templeton Pegasus Limited on
Proposed Plan Change 7 to the Canterbury Land and Water
Regional Plan

Statement of Evidence of Andrew Webster for Templeton Pegasus Limited

17 July 2020

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**anderson
lloyd.**

Introduction

- 1 My name is Andrew Webster. I am General Counsel at Templeton Group and have held that position since December 2019. This is a continuation of the General Counsel role I held at Todd Property Group.
- 2 Todd Property Pegasus Town Limited (**Todd Pegasus**) made a submission and further submission on Proposed Plan Change 7 (**PC7**) to the Canterbury Land and Water Regional Plan. At the time of making the submission Todd Pegasus was the owner and developer of Pegasus Town development which includes the artificial Pegasus Lake, consented as part of the Pegasus Town development with the primary purpose and function of controlling stormwater. Use for secondary contact recreation was incidental.
- 3 Templeton Pegasus Limited (**TPL**) purchased these interests from Todd Pegasus in December 2019 and succeeded the submission and further submission. Resource consents relating to Pegasus Lake were transferred to TPL on 8 July 2020.
- 4 The purpose of this statement is to provide information to assist the Commissioners to understand water quality issues experienced at Pegasus Lake, some of the likely reasons for those issues, and the scientific and technical limits facing the consent holder in respect of improving water quality to the standards required in Plan Change 7 within the timeframes.
- 5 My knowledge of Pegasus Lake issues is from documents provided to me in my roles held. Relevant documents are appended to this statement.

Scope of evidence

- 6 I have prepared evidence in relation to:
 - (a) Background to Pegasus Lake;
 - (b) Pegasus Lake Resource Consent Applications and Decision;
 - (c) Conditions of Consent;
 - (d) Annual Reporting;
 - (e) Non-compliance with consent conditions;
 - (f) Management options; and
 - (g) Conclusions.

Background to Pegasus Lake

- 7 Pegasus Lake is a 5.3-metre-deep, 14 ha artificial lake. Water for the Lake is sourced primarily (>90%) from groundwater from the base and the sides of the lake. Groundwater is supplemented by rainwater and treated stormwater discharge from the surrounding commercial area. Pegasus Lake's surface outflow is to the wetland on the eastern side of the site, known as the Eastern Conservation Management Area (**ECMA**). The Lake includes infrastructure such as beaches, jetties and a bridge.
- 8 Pegasus Town, including the Lake, is a residential community conceived and originally developed by Pegasus Town Limited (**PTL**). In addition to the lake it includes residential properties, a school, childcare centres, parks and reserves, a golf course and commercial/retail premises servicing the local community. The residential properties have been and continue to be sold to third parties.
- 9 The construction of Pegasus Lake was included in the suite of resource consents granted in 2006 in relation to the Pegasus Town development by a decision of the hearing commissioners on applications to the Canterbury Regional Council (**ECan**) and Waimakariri District Council (**WDC**).
- 10 PTL was placed in receivership in 2012. Todd Pegasus acquired the balance of Pegasus Town land still owned by PTL, including Pegasus Lake and associated resource consents and the ECMA, from the receivers in 2012. In September 2019, TPL's parent company agreed to acquire most of the land development assets of the Todd Property group, including most of Todd Pegasus' remaining interest in the Pegasus Town development. The Pegasus Lake and associated assets are now owned by TPL. The ECMA is now owned and managed by Te Kohaka o Tuhaitara Trust. My understanding is that Pegasus Lake was developed with the expectation that ownership would transfer to WDC when it was completed and separately titled. Todd Pegasus and WDC had discussions and correspondence in relation to WDC taking ownership of the lake and associated resource consents, but arrangements for the transfer have not been resolved.

Pegasus Lake resource consent application and decision

- 11 TPL holds resource consents (now CRC210133, CRC210113 and CRC210131) which authorise taking and using of groundwater, the taking and diversion of surface water, and the damming of water in relation to Pegasus Lake.
- 12 It is clear when reviewing the Pegasus Lake resource consent applications (dated December 2005) (the **Application**) that:

- (a) it was known that Pegasus Lake would be predominantly fed by groundwater and that there was an existing high level of contamination in the groundwater¹;
 - (b) nutrient levels within the groundwater mean there was risk of high algal growth in the lake. As the levels of nutrients in the groundwater cannot easily be limited, some options to control algal growth were identified²; and
 - (c) there is a strong relationship between groundwater quality and surface water quality (i.e. the groundwater in the area is shallow and impacts on the lake)³.
- 13 Water samples taken and included in the Application from a trial lake in 2005 (phosphorus, and nitrogen)⁴ were already indicating nutrient limits higher than those proposed in Table 8-6: Water Quality Limits and Targets for Waimakariri Lakes in PC 7 for Pegasus Lake.
- 14 The Application (excluding attachments) is attached as **Appendix 1**.
- 15 The primary function of Pegasus Lake is to control stormwater. It is clear from the decision (dated 25 August 2006) on the Application (the **Decision**) that the Independent Commissioners who granted consent to the Pegasus Town development accepted that water quality in the lake would not always meet a high standard.
- 16 The Decision recorded:
- (a) The eventual water quality in the lake and what it will be able to be used for as a result was problematic. The Commissioners did not expect long term water quality in the final lake to be of a quality suitable for primary contact recreation⁵. It was expected to be slightly turbid, grey-green in colour, with would suffer some microbial contamination⁶.
 - (b) Future uses of the lake would depend on water quality. ECan's officer considered that the applicant's proposed approach of monitoring water quality to determine future available uses was appropriate. This approach

¹ Application at 2.6.2, 4.5, and Table 2.1.

² Application at 3.3.3: Lake and ECMA.

³ Application at 5.2.6.

⁴ Application at 2.6.3, Table 2.2.

⁵ Decision at [63] and [189].

⁶ Decision at [31], [186] and [189].

was not opposed by the WDC, in whom the lake and ECMA will eventually be vested⁷.

- (c) WDC's view was that establishing water quality standards then could be "setting (a future consent holder) up to fail". This is a view the Commissioners sympathised with⁸.
- (d) Many of the factors that would determine water quality were outside the control of the applicant, including "most importantly the quality of the groundwater that will fill the lake as it is excavated", and "the eventual nutrient status of the lake which if elevated could lead to green algae in the water column reducing clarity and aesthetic values". The Decision acknowledged that a draft lake management plan would include how some of the factors under the control of the Applicant are proposed to be managed⁹.
- (e) ECan's officer acknowledged water quality in the lake may not meet ecosystem health guidelines, but he did not have any significant concern about that. He believed that the Applicant's suggested approach of monitoring to find out what can be achieved with regard to water quality was appropriate¹⁰; and
- (f) WDC conceded that it had sufficient assurance as to the performance of the lake to withdraw its opposition to the application¹¹.

17 A copy of the Decision is attached as **Appendix 2**.

18 The consent holder was required to develop a Lake Management Plan which covers the ongoing operation of the lake and ECMA including the wider lake edge reserve and lake assets generally. The Lake Management Plan was to include objectives and mitigation measures for improving water quality.

19 A revised Pegasus Lake and ECMA Management Plan dated October 2016 (with a July 2019 amendment) is attached as **Appendix 3**. It includes a Plan of the Pegasus Lake. The Lake Management Plan records:

⁷ Decision at [31], [127] and [189]. As noted above, the ECMA has subsequently been transferred to Te Kohaka o Tuhaitara Trust.

⁸ Decision at [189].

⁹ Decision at [31], [186] and [192].

¹⁰ Decision at [127].

¹¹ Decision at [101].

- (a) Lake Management Objectives – being Lake Aesthetics (control weed growth, scum to be avoided, debris and rubbish removed, no odour and no unnatural colour) and recreational water contact (water quality is generally suitable for secondary contact recreation and a monitoring and management response plan is in place in the event of a toxic algal bloom)¹².
 - (b) Monitoring programme for resource consent compliance and summer recreational period monitoring (for the presence of potentially toxic blue-green algae (cyanobacteria) and E coli., and a bloom response protocol¹³. In July 2019 an additional section focusing on the prevention and management of reoccurring algal blooms was inserted.
- 20 The lake construction was completed in November 2009 in accordance with a design approved by WDC.

Conditions of consent

- 21 The relevant resource consents (CRC210133, CRC210113 and CRC210131) (the **Resource Consents**) include monitoring requirements, performance standards and reporting requirements for the lake, including relevantly:
- (a) Two monthly visual inspections of Lake aesthetics and reporting to Ecan Compliance and Enforcement Manager¹⁴;
 - (b) Performance criteria that the quality of the water in the lake shall meet is included in Condition 8 of the consents (**Performance Criteria**)¹⁵:
 - (i) It is suitable for the activities and uses for which the lake and its water are proposed in the Lake Management Plan to be used for;
 - (ii) It is generally suitable for secondary contact recreation;
 - (iii) It does not result in persistent seasonal stratification leading to oxygen depletion in the lake; and
 - (iv) It does not result in toxic or nuisance algal blooms.

¹² Lake Management Plan at 4.0.

¹³ Lake Management Plan at section 5, and Appendix E.

¹⁴ Condition 5.

¹⁵ Condition 8(a)-(d).

- (c) Requirement to prepare an annual report to ECan covering activities carried out under the consents¹⁶.

22 Copies of the Resource Consents are attached as **Appendix 4**.

Annual reporting

23 As a condition of resource consent, the Consent Holder of Pegasus Lake is required to report to ECan on activities carried out under the consents.

24 Recent reporting records a trend of deteriorating water quality in Pegasus Lake due to elevated nutrients from groundwater resulting in seasonal stratification of the Lake leading to oxygen depletion, and the development of cyanobacterial blooms which have resulted in closure of the lake for periods over the summer¹⁷. Lake stratification has occurred during the spring/summer period for the last seven years¹⁸.

25 The Lake was stated as being both thermally and chemically (Dissolved Oxygen) stratified. The 2019-2020 Annual Report records¹⁹ at 4.1 that:

Stratification is a phenomenon wherein the water column separates into three distinct thermal layers. This is a result of the sun warming the surface water causing density variation between the surface and bottom waters which results in the thermal layers. In Pegasus Lake, the relatively early establishment of stratification compared to other Canterbury Lakes may be due to the main inflows to the lake being derived from groundwater. Thermal stratification can lead onto chemical stratification, such as the DO [dissolved oxygen] stratification in Pegasus Lake. Such chemical stratification is a result of high bacterial activity in the bottom waters, which results in respiration driven depletion of oxygen and lowered diffusion, while continued circulation and primary production in the upper layers regenerates oxygen levels. In Pegasus Lake, the establishment of chemical stratification may be further enhanced by groundwater underflows if there is a large DO differential between the two waters.

¹⁶ Condition 12.

¹⁷ Annual Report 2019-2020 at 4.3.

¹⁸ Annual Report 2019-2020 at 3.3.

¹⁹ Annual Report at 4.1.

- 26 In addition to the inflow of groundwater, the reporting records development of algal blooms are influenced by external elements such as temperature, rainfall and possibly wind which also cannot be controlled by the lake owner²⁰.
- 27 Due to excessive nutrients and high phytoplankton biomass the lake is currently classified as being hypertrophic (which means excessively enriched with nutrients). Dissolved nutrients are being released by microbial breakdown of organic matter under anoxic conditions²¹.
- 28 The three latest Annual Reports are recorded below and attached as **Appendix 5**.
- (a) 2019 - 2020 Annual Report for Water Quality in Pegasus Lake (Golder, July 2020);
 - (b) Annual Report for Water Quality in Pegasus Lake 2018-2019 (Golder, May 2019); and
 - (c) Annual Report for Water Quality in Pegasus Lake 2017-2018 (Golder, April 2018).
- 29 I understand through discussions with consultants that statistical analysis of water quality is not straightforward. Large datasets are required, along with a good understanding of the wider environment, before any trends over time could be considered and future targets set. Monitoring data collected and provided to the Canterbury Regional Council has been compared against the targets set in Plan Change 7. This comparison of water quality information is attached as **Appendix 6**.
- 30 The monitoring data is limited and is not a complete picture of the existing water quality of Lake Pegasus. Indications are that:
- (a) total phosphorous and total nitrogen do not meet national bottom lines;
 - (b) maximum cyanobacterial biovolumes exceed the proposed plan change limit and national bottom lines;
 - (c) samples indicating annual median and maximum values for Chlorophyll-a do not meet the proposed plan change limits;

²⁰ This is also acknowledged in the WDC Website, public notice May 2018: <https://www.waimakariri.govt.nz/your-council/news-and-information/2016/lake-pegasus-the-things-you-need-to-know>.

²¹ Annual Report 2019-2020 at 4.3.

- (d) Trophic Level Index records, temperature and dissolved oxygen limits specified in the plan change are not being achieved.

Non-compliance with conditions of consent

- 31 The Annual Report 2019-2020 records that water quality results have failed (over the last six years) to meet the Performance Criteria set out in the relevant Resource Consents. It is noted:
 - (a) *Suitability for activities and uses as set out in Lake Management Plan* (compliant);
 - (b) *Suitability for secondary contact recreation* (partially compliant) – the lake was suitable for secondary contact recreation for much of the year, except for the cyanobacterial bloom closure December 2019 – March 2020;
 - (c) *No persistent seasonal stratification leading to oxygen depletion* (not compliant) - Strong temperature and DO stratification had become established in the lake by October 2019 and remained present in the lake throughout summer. This resulted in anoxia in the bottom >3m waters of the lake. Lake stratification during the spring/summer is consistent with the previous six years. CRC now regard that persistent seasonal stratification has been occurring in Pegasus Lake; and
 - (d) *No toxic or nuisance algal blooms* (not compliant) – summer blooms have occurred over the last six years. CRC regard this as non-compliant.
- 32 There is currently no indication that the persistent seasonal stratification and summer blooms are likely to reverse.
- 33 I am aware of recent enforcement action taken by ECan against the previous consent holder, Todd Pegasus, in relation to the water quality of Pegasus Lake and breaches of conditions relating to Performance Criteria.

Management options

- 34 Todd Pegasus had been working with WDC, ECan and other stakeholders and industry experts to implement measures to improve water quality. A workshop was held with WDC and CRC to facilitate discussions and interchange of ideas in response of potential management strategies for Pegasus Lake²².
- 35 These discussions resulted in Golder producing a report which assessed potential management options for cyanobacterial blooms in Pegasus Lake October 2018

²² Management Option Report, Executive Summary.

(Lake Management Options Report). The Lake Management Options Report is attached as **Appendix 7**.

- 36 The Lake Management Options Report contains five potential management options to address water quality issues at Lake Pegasus along with the potential costs of those options. These options were active sediment capping, algal turf scrubber, artificial mixing or aeration, flushing and adaptive management regime.
- 37 The Lake Management Options Report concludes several options could be combined in an attempt to provide more effective management of the lake. However, no single option or combination of options provides a solution to prevent both persistent stratification and cyanobacterial blooms, and that there is no evidence to suggest that stratification of the water column was the cause of bloom development in Pegasus Lake. Validation of management options (except adaptive management) would need to be carried out in the Pegasus environment using pilot-scale trials to determine the likelihood of success for each option.
- 38 Two SolarBee devices were installed in the lake at the time of its construction for mitigation of thermal and chemical stratification. These devices mix the surface water with the water at the bottom of the lake to seek to ensure adequate circulation is achieved. Monitoring results indicated they had not been successful in preventing stratification across the whole lake²³. Following the Management Options Report, Todd Pegasus lowered the height of the draw-tubes to determine whether adjusting the draw-tubes depth would result in more effective mixing of the water column and reduce or mitigate thermal and chemical stratification. Monitoring undertaken by Golder during the 2019-20 monitoring period indicated the change had no impact²⁴.

Conclusions

- 39 Pegasus Lake is predominantly fed by groundwater (> 90%) which is outside the control of TPL as lake owner.
- 40 The Lake was consented by ECan in full knowledge of the existing high level of nutrients in the groundwater and known risk of high algal growth and uncertain future water quality.
- 41 Pegasus Lake was consented with the primary purpose and function of controlling stormwater. Use for secondary contact recreation was incidental. The Lake was not expected to have long term water quality suitable for primary contact recreation.

²³ Management Option Report at 2.1.

²⁴ Annual Report 2019-2020 at pages 36-36.

Ecosystem health guidelines were exceeded at the time of resource consent application, and water quality standards were deliberately not set in the resource consent conditions so as to not "set (a future consent holder) up to fail".

- 42 Conditions of consent provide for performance criteria including compliance with a periodically updated Lake Management Plan, which includes objectives and mitigation measures for improving water quality.
- 43 Annual reporting shows a trend of deteriorating water quality and issues. The Lake has experienced stratification, algal blooms and closures to the public. As a result, it is now considered that Lake Pegasus isn't achieving some performance criteria conditions. Enforcement action has recently been taken by ECan against the previous lake owner.
- 44 The monitoring data for Pegasus Lake is limited and does not provide a complete picture of existing water quality. Indications are that that national bottom lines and PC 7 targets will not be met at Pegasus Lake for a number of water quality factors. Adaptive management is part of the solution for more effective management of Pegasus Lake, and potential management options for cyanobacterial blooms in Pegasus Lake are being explored. No single option will solve the water quality issues and provide a solution to prevent both persistent stratification and cyanobacterial blooms. However, the primary cause of the deteriorating lake water quality as I understand it is the nutrient inputs from land uses upstream which is a matter beyond the consent holders' control.
- 45 A rule regime requiring reduction over time of nutrient inputs to bring levels down to an acceptable level is supported as this is obviously an important part of the solution for restoring the water quality of the receiving environment in the catchment, part of which is Pegasus Lake. However, the classification, target and timeframe for the Lake itself needs to be realistic given the limited ability of the consent holder to affect change, and basis on which the consent was first granted.
- 46 It is unclear whether the scientific and technical capability currently exists to meet future limits set in PC 7 for Lake Pegasus. This will become problematic when existing resource consents are reviewed or renewed (required in 2021 and 2041).

Andrew Webster

Dated this 17th day of July 2020

Appendix 1: Original Lake Pegasus Resource Consent Application

Appendix 2: Commissioners' Decision

**Appendix 3: Pegasus Lake and ECMA Management Plan dated
October 2016 (with July 2019 Amendment)**

Appendix 4: Relevant Resource Consents

Appendix 5: Annual Reports – 2017- 2018; 2018-2019; 2019-2020

Appendix 6: Water Quality Information

Appendix 7: Management Options Report