

Before the Manawatu-Whanganui Regional Council Hearing Commissioners
Application No. APP-2013016147.00

Under the Resource Management Act 1991

In the matter of a discharge under Section 15(1)(a) of the Act to discharge
stormwater to a channel connecting Lakes Pauri and Wiritoa
from the Whanganui Prison

Between **Ara Poutama Aotearoa - Department of Corrections**

Applicant

Response to Minute Direction 9: Ara Poutama Aotearoa
(Department of Corrections)

Date: 3 March 2021



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MAY IT PLEASE THE PANEL:

Introduction

- 1 The purpose of this memorandum is to respond to Minute Direction 9. In that Minute, the Panel has questioned the efficacy of the proposed conditions for achieving potential remediation of nutrient loading effects within Lake Wiritoa and Lake Pauri and sought clarification from the Applicant on those conditions.
- 2 This memorandum provides clarification in response to the issues raised and an updated version of condition 9.

The question raised

- 3 The Panel has questioned whether the conditions, as drafted, ensure a net positive outcome is achieved. The view expressed is that, at best, the conditions do not currently preclude a net positive outcome.
- 4 The Panel has also sought a redrafted version of condition 9 that:
 - a. addresses the apparent shortcoming in expressly enabling a net-positive outcome – in particular, we note that clauses (a) and (c) are geared toward achieving neutral nutrient loads from the prison contribution only, and there is no clear indication as to whether the greater or lesser of (a) or (c) would apply; and
 - b. is less wordy – for example, there is duplication and slight variation in the language used in the first sentence of the condition and in clause (a); and
 - c. targets nutrient loading reductions in the lakes themselves, rather than the wider catchment.

Applicant's response

- 5 As previously drafted, condition 9(a) requires that the equivalent of an annual load of 7.7kg of phosphorus be removed from either Lakes Wiritoa and Pauri or their catchments, or an annual load as calculated in accordance with subsection 9(c) of the condition.

- 6 This has been described by Corrections in evidence and submissions as resulting in a net positive benefit for the lakes. Corrections maintains that this assertion is accurate.
- 7 The full package of mitigation/remediation works proposed will achieve a net positive benefit for the lakes for two reasons:
- 7.1 The conservative approach taken in the calculations to determine the requirement to remove the equivalent of an annual load of 7.7kg of phosphorus, which will likely exceed the prison's actual discharge; and
- 7.2 The prison discharge is diluting (and post installation of the treatment device, will dilute further) the concentration of nitrogen in the lakes, because it is at lower concentrations than current lake water quality.
- 8 Both of these matters are addressed in more detail below.

Conservative Approach to Phosphorous Calculation

- 9 A conservative approach has been adopted in calculating 7.7kg of phosphorous as the amount that needs to be removed from the lakes or their catchments as a baseline pre-treatment. 7.7kg of phosphorous represents the assumed current (ie prior to the installation of the proprietary treatment device) contribution of phosphorus from the prison to the lakes. The actual contribution is very likely to be less than 7.7kg. Any removal greater than this actual contribution will be a net benefit.
- 10 The estimated annual load of 7.7kg of phosphorous was calculated by averaging the results of three sampling events. The data used to calculate nitrogen and phosphorus included relatively high results from the December 2019 sampling round, which was the earliest set undertaken prior to the relining works of the stormwater network that has now been fully completed. Mr Cochrane discusses this at paragraph 100 and 101 of his evidence. If the December results are disregarded in favour of May and July, which are likely more indicative of actual

levels, it is a discharge of 38.8 kg of nitrogen per year and 4.8 kg of phosphorous per year. This compares to the 50.4kg nitrogen and 7.7 kg phosphorous (without treatment) Mr Cochrane has based the 7.7kg load removal amount on.

11 In other words, Mr Cochrane's calculated load could be 1.3 times lower for nitrogen and 1.6 times lower than for phosphorous. Only 4.8 kg of phosphorous therefore is likely required to be removed per year to achieve neutrality rather than 7.7kg. The difference between the two figures is a net positive benefit.

12 This 7.7kg load removal will occur until the proprietary device is installed. From then, the calculation in condition 9(c) can occur, which it is accepted is aimed at removing the equivalent loads as discharged (subject to the proposed amendment to address this issue, as described below). The flexibility inherent in condition 9 is to reflect that the calculation in 9(c) cannot occur until after the proprietary device is installed, yet the load removal of phosphorous is to occur both in advance of that installation and after that installation.

Dilution of Nitrogen in the Lakes

13 Because the concentration of nitrogen in the discharge is significantly lower (2.75 times) than in water upstream (in Lake Pauri) and downstream (in Lake Wiritoa) of the discharge, then the discharge results in a net positive benefit by diluting the concentration of nitrogen in the receiving waters. This benefit will be increased post installation of the treatment device. Mr Cochrane describes this at paragraph 238 of his evidence.

14 Mr Hamill discusses this dilution effect and confirms it is an overall net benefit to lake water quality at paragraphs 34 and 65 of his evidence.

Changes proposed to the condition 9

- 15 **Appendix 1** includes an updated version of condition 9, which is offered by the applicant on an *Augier* basis. It is shown in track changes from the previous version, then in clean copy.
- 16 In direct response to the concerns raised in the Minute, the condition offered is now amended to increase both the pre-installation and post-installation annual Total Phosphorous (**TP**) to be removed. The following substantive changes are made to condition 9:
- 16.1 In 9(c) a **factor of x1.2 (ie an additional 20%) has been added** as the annual TP to be removed post installation of the treatment device. This will ensure a net positive benefit, and not just neutrality.
- 16.2 Although for the reasons set out above, a net positive benefit will already result from the removal of 7.7kg of TP prior to the installation of the treatment device, **this amount is proposed to be increased to 9.0kg** to be generally consistent with the factor of x1.2 proposed in 9(c). This will also secure with certainty a net positive benefit.
- 17 The following changes to condition 9 have been made to remove duplication and provide clarity:
- 17.1 Deletion of introductory text as repetition.
- 17.2 Use of abbreviation ‘TP’ throughout and clarification that it is TP that is targeted for removal under this condition.
- 17.3 Clarification at 9(a) that it is the annual amount of 9.0kg (being 20% above the calculated load pre-installation) of TP that is required to be removed until the time that the calculations in 9(c) occur, from which point, the calculated amount will be removed.

- 17.4 Clarification at 9(a) that there is the ability to remove the annual load of TP at any frequency. This is to ensure that the equivalent in annual removal applies to whichever method is adopted under the condition and allows flexibility for changing environmental conditions year to year.
- 17.5 Alignment of condition 9(c) with Condition 17, so that the first stormwater sampling under 9(c) occurs within one year of the installation of the proprietary filter stormwater device.
- 17.6 Deletion of the second sentence of 9(d) regarding frequency of implementation, as it is already referred to in 9(a).

Targeting condition 9 further

- 18 Para 11(c) of the Panel's Minute 9 asked that Condition 9 targets nutrient loading reductions in the lakes themselves, rather than the wider catchment.
- 19 However, the ability for wider catchment alternatives is important to the success of the nutrient removal programme. It is important given the potential for changing environmental conditions over the life of the consent that alternative methods to macrophyte harvesting (as discussed in section 6 of Mr Hamill's evidence) are retained in the condition. The details of such other methods, and confirmation of their performance, are required under condition 9(b) to be included in the Nutrient Removal Plan submitted to the Council.

Date: 3 March 2021



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S F Quinn / E L Manohar
Counsel for the applicant

Appendix 1 - amended version of condition 9

Ara Poutama Department of Corrections - Condition 9 (11 December 2020 Clean Version – amended 3 March 2021)

9	<p>The consent holder shall undertake works to remove at least the equivalent of the annual load of phosphorous discharged from the stormwater into Lake Wiritoa and Lake Pauri catchment in accordance with the requirements below.</p> <p>a. The consent holder shall undertake such measures to remove at least the equivalent of the annual load of <u>total</u> phosphorous (TP) discharged from the stormwater from the prison, from either Lakes Wiritoa and Pauri or their catchments. This shall be <u>removal of an annual amount of 9.0kg based on either an annual load of 7.7 of phosphorus TP or shall be as until</u> calculated in accordance with <u>(iii) c.</u> below, <u>at which point the calculated amount shall be removed.</u> <u>Such measures</u> may include, but <u>is are</u> not limited to, removing of lake macrophytes from either Lake Wiritoa or Lake Pauri, <u>This may be undertaken at any frequency as suitable to achieve the equivalent in annual removal.</u> <u>The removal of the equivalent annual load of phosphorus TP may also be undertaken by lake macrophyte harvesting, the</u> construction of detainment bunds in the catchment, or such other works or combination of works. <u>The removal of at least the equivalent of the annual load of TP under this condition may be undertaken at any frequency to achieve the equivalent in annual removal.</u></p> <p>b. Within 6 months following the granting of consent, the consent holder shall submit to the Manawatū-Whanganui Regional Council a Nutrient Removal Plan which as a minimum shall require:</p> <ul style="list-style-type: none">i) The work or works required to implement this condition and a programme <u>and frequency</u> for undertaking those works.ii) Where <u>nutrient TP</u> is removed through macrophyte harvesting, a methodology to establish the nutrient concentrations of <u>phosphorus TP</u> contained in the macrophytes to be harvested.iii) Where <u>nutrient TP</u> is removed through macrophyte harvesting, the volumes of macrophytes that are required to be harvested to remove the equivalent annual <u>phosphorus TP</u> load discharged to the lakes from the prison.iv) Where <u>nutrient TP</u> is removed through macrophyte harvesting, the consent holder shall include procedures to address biosecurity.v) Where <u>nutrient TP</u> is removed through a method other than macrophyte harvesting, landowner approval and appropriate agreements eg. A covenant on the title to secure the method for the necessary duration (where relevant) and a
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certification from a suitably qualified person that the method to be used will remove the equivalent annual phosphorus TP load discharged to the lakes from the prison.

- c. Within one year following the installation of the proprietary filter stormwater treatment device, and at three yearly intervals thereafter, the consent holder shall undertake sampling to ~~Once every three years the consent holder shall undertake investigations to reconfirm~~ determine the annual load of total phosphorus TP that is discharged to the lakes and is required to be removed through macrophyte harvesting or by other means. These investigations shall include but not be limited to The annual load of TP shall be calculated as follows:
- i) The concentration of contaminants (including TP, TN, NNN, DRP, and ammoniacal-N) in the discharge shall be calculated over at least three discharge events where there has been at least 48 hours with less than 0.5mm of precipitation prior to the stormwater monitoring event. Stormwater samples shall be collected according to best practice stormwater sampling. A minimum of six samples representing the entire duration of the rainfall event shall be analysed for the parameters outlined. Each sample shall be weighted (by relatively rainfall depth recorded as per condition 3 over the duration the sample represents) and averaged over all results to provide a volume proportional event mean concentration.
 - ii) ~~The establishment of~~ The annual TP loads discharged shall be based on the calculated volume and measured concentrations information collected above.
 - iii) The TP load to be removed shall be the amount calculated under condition 9c(ii) x1.2.
- d. Works to remove the equivalent annual load of phosphorus TP shall be undertaken by the consent holder in accordance with the methodology and programme in the Nutrient Removal Plan submitted to the Manawatu-Whanganui Regional Council. ~~Removal of the equivalent load of phosphorous may occur on an annual basis or at such other frequency as set out in the Nutrient Removal Plan.~~
- e. The Nutrient Removal Plan may be amended by the consent holder and submitted to the Manawatu-Whanganui Regional Council, where an alternative method or programme is proposed, or where the equivalent annual load of phosphorus TP is calculated using the methods set out in c) of this condition.
- f. In the event that macrophyte harvesting for the purposes of nutrient TP reduction is undertaken by the Manawatu-Whanganui Regional Council for any particular year or years, then as an alternative to undertaking the work itself, the consent holder shall pay to the Council on an annual basis an equivalent monetary sum for undertaking the macrophyte harvesting itself in lieu of it doing the work. Where such payment is made, then no further work is required to be undertaken by the consent holder for that year or years under this condition. The equivalent monetary sum shall be calculated by applying market rates for macrophyte harvesting of the equivalent annual load of phosphorous TP discharged from the prison stormwater.

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| | <p>g. Where macrophyte harvesting is used, the consent holder shall monitor and report to the Manawatū-Whanganui Regional Council the wet weight of weed removed on an annual basis (or such other frequency as set out in the Nutrient Removal Plan). Samples of lake weed shall be analysed for total recoverable nitrogen and total recoverable phosphorus, with a minimum of six samples per weed removal event. This shall be provided to Manawatū-Whanganui Regional Council in the annual report required in condition 27.</p> |
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Ara Poutama Department of Corrections - Condition 9 (3 March 2021 clean version)

9	<p>a. The consent holder shall undertake such measures to remove at least the equivalent of the annual load of total phosphorous (TP) discharged from the stormwater from the prison, from either Lakes Wiritoa and Pauri or their catchments. This shall be removal of an annual amount of 9.0kg of TP until calculated in accordance with c below, at which point the calculated amount shall be removed. Such measures may include, but are not limited to, removing of lake macrophytes from either Lake Wiritoa or Lake Pauri, the construction of detainment bunds in the catchment, or such other works or combination of works. The removal of at least the equivalent of the annual load of TP under this condition may be undertaken at any frequency to achieve the equivalent in annual removal.</p> <p>b. Within 6 months following the granting of consent, the consent holder shall submit to the Manawatū-Whanganui Regional Council a Nutrient Removal Plan which as a minimum shall require:</p> <ul style="list-style-type: none">i) The work or works required to implement this condition and a programme and frequency for undertaking those works.ii) Where TP is removed through macrophyte harvesting, a methodology to establish the nutrient concentrations of TP contained in the macrophytes to be harvested.iii) Where TP is removed through macrophyte harvesting, the volumes of macrophytes that are required to be harvested to remove the equivalent annual TP load discharged to the lakes from the prison.iv) Where TP is removed through macrophyte harvesting, the consent holder shall include procedures to address biosecurity.v) Where TP is removed through a method other than macrophyte harvesting, landowner approval and appropriate agreements eg. A covenant on the title to secure the method for the necessary duration (where relevant) and a certification from a suitably qualified person that the method to be used will remove the equivalent annual TP load discharged to the lakes from the prison. <p>c. Within one year following the installation of the proprietary filter stormwater treatment device, and at three yearly intervals thereafter, the consent holder shall undertake sampling to determine the annual load of TP that is discharged to the lakes. The annual load of TP shall be calculated as follows:</p> <ul style="list-style-type: none">i) The concentration of contaminants (including TP, TN, NNN, DRP, and ammoniacal-N) in the discharge shall be calculated over at least three discharge events where there has been at least 48 hours with less than 0.5mm of precipitation prior to the stormwater monitoring event. Stormwater samples shall be collected according to best practice stormwater sampling. A minimum of six samples representing the entire duration of the rainfall event shall be analysed for the parameters outlined. Each sample shall be weighted (by relatively rainfall depth recorded as per condition 3 over the duration the sample represents) and averaged over all results to provide a volume proportional event mean concentration.
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	<ul style="list-style-type: none"> i) The annual TP load discharged shall be based on the calculated volume and measured concentrations information collected above. ii) The TP load to be removed shall be the amount calculated under condition 9c(ii) x1.2. <p>d. Works to remove the equivalent annual load of TP shall be undertaken by the consent holder in accordance with the methodology and programme in the Nutrient Removal Plan submitted to the Manawatu-Whanganui Regional Council.</p> <p>e. The Nutrient Removal Plan may be amended by the consent holder and submitted to the Manawatu-Whanganui Regional Council, where an alternative method or programme is proposed, or where the equivalent annual load of TP is calculated using the methods set out in c) of this condition.</p> <p>f. In the event that macrophyte harvesting for the purposes of TP reduction is undertaken by the Manawatu-Whanganui Regional Council for any particular year or years, then as an alternative to undertaking the work itself, the consent holder shall pay to the Council on an annual basis an equivalent monetary sum for undertaking the macrophyte harvesting itself in lieu of it doing the work. Where such payment is made, then no further work is required to be undertaken by the consent holder for that year or years under this condition. The equivalent monetary sum shall be calculated by applying market rates for macrophyte harvesting of the equivalent annual load of TP discharged from the prison stormwater.</p> <p>g. Where macrophyte harvesting is used, the consent holder shall monitor and report to the Manawatū-Whanganui Regional Council the wet weight of weed removed on an annual basis (or such other frequency as set out in the Nutrient Removal Plan). Samples of lake weed shall be analysed for total recoverable nitrogen and total recoverable phosphorus, with a minimum of six samples per weed removal event. This shall be provided to Manawatū-Whanganui Regional Council in the annual report required in condition 27.</p>
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