

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

**AND**

**IN THE MATTER** A hearing of application APP-1994001032.01 for resource consent in relation to the discharge of treated meat works effluent to the Oroua River, Discharge of treated wastewater onto and into land that may enter groundwater, Discharge of odour and aerosols into air, Land Use Consent for a discharge structure in the bank of the Oroua River and a bed level control structure in the Otoku Stream from the AFFCO Plant, Feilding.

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**Supplementary Report of Logan Brown, Freshwater and Partnerships Manager for  
Manawatu Wanganui Regional Council**

**16 November 2016**

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## A. QUALIFICATIONS / EXPERIENCE

1. My full name is Logan Arthur Brown. My qualifications and experience are covered in my original 442A report dated the 5<sup>th</sup> October 2016.
2. This evidence is prepared to respond to a number of issues that have been raised through the course of the hearing. Many of the issues have now been dealt with through proposed consent conditions and therefore are only dealt with below out of completeness and to provide reasoning.

## B. FLOWS AT THE TIME OF DISCHARGE:

3. Mr Hill in his evidence attached photographs taken at various flows within the Oroua River. I assume that these photos were included to reflect the river conditions at the time that the discharge would be occurring. These photos are useful in that they provide context as to what condition the river looks like (clarity) during various flow conditions. They however, do not appear to align with paragraph 15 of Mr Hills' evidence which states (bolding added) "I appreciate and respect the preference of some submitters not to see any wastewater discharged to surface water. However, if there is to be a discharge I believe it is more acceptable to do it under appropriate river flow conditions, when the effects of the discharge are minimized. This is an aspect of the proposed river discharge that I believe is not clearly understood by some submitters. **Typically, the AFFCO discharge will be under flood or very high flow conditions, and usually above the 20th Flow Exceedance Percentile, as described in evidence of Mr Lowe and Dr Ausseil.** I have attached a series of photographs (Attachment B) that show the condition of the Oroua River in the AFFCO vicinity under different flow conditions. **To me it is clear that certain uses of the river that some submitters are concerned about, such as contact recreation, will not be occurring under the conditions and during the flows that AFFCO will be discharging**". It is correct that the discharge will operate at times when the flows are above the 20<sup>th</sup> FEP and as shown in the photos provided by Mr Hill the Oroua River during these times is highly discoloured and fast flowing making it unsuitable for primary recreational opportunities (and periphyton growth). However, the competent of the application that appears to have been overlooked in Mr Hills evidence is the discharge of wastewater at flows between median and the 20<sup>th</sup> FEP flows. The photos provided show that the water runs clear and suitable for use and periphyton growth between those flows. Since the hearing has started it has now been proposed to have a best endeavours approach to have the discharge out of the Oroua River in April and May when flows are below the 20<sup>th</sup> FEP. April and November are still recognised as months that have value for contact recreation within the Horizons region; with the contact recreation monitoring programme running from the 1<sup>st</sup> November to 30<sup>th</sup> April each year and as shown in my original s42A report April and May are months that the Oroua River experiences high periphyton biomass levels. These proposed changes reduce the potential effects from the discharge even

further for the times when primary contact recreation is likely to be occurring and that periphyton would be able to reach nuisance levels.

### **C. PHOSPHORUS LIMITATION**

4. At paragraph 74 of Mr Lowe's evidence reference is made to the Oroua River being phosphorus limited and that such a statement exists within the One Plan. I'm not aware of the One Plan identifying the Oroua River as being phosphorus limited and that this was the key determinant in encouraging the development of periphyton within the Oroua River. In fact the technical documents sitting behind the One Plan recommend that nutrient limitations need to be made on both nitrogen and phosphorous within our rivers to manage periphyton (this is to take into consideration the point at which a discharge occurs but also the downstream receiving environments) hence both nitrogen and phosphorus targets being present in the One Plan for each of the management zones.

### **D. EVIDENCE OF DR AUSSEIL**

5. At paragraph 10 (e) Dr Ausseil references work undertaken to show that the predicated increases for DRP in the Oroua River are between 0.001 and 0.002 g/m<sup>3</sup>. My original reading of this was that these increases were not the limits that were proposed in the consent conditions. I have since raised this matter with Dr Ausseil who informs me that the 0.001 to 0.002 g/m<sup>3</sup> predicted increase is measured as a monthly average increase and not the instant increase of 0.005 g/m<sup>3</sup> that was fed into the model.
6. At paragraph 52 Dr Ausseil makes reference to the year to year analysis that I had undertaken as part of my s42A suggesting that the approach used by himself is more robust "*....This latter method presents the advantage of being based on a greater number of results, and thus provide a more robust and overall assessment as to whether a site meets the One Plan target or not*". I do not agree that the assessment undertaken by Dr Ausseil provides a more robust assessment against the One Plan targets for the following reasons:
  - a. In the Recommended water quality standards for the Manawatu-Wanganui Region report the following way was recommended to undertake assessments against the One Plan. "*Nutrient standards were defined as being the annual average concentration, based on monthly monitoring. The recommended approach to assess compliance with the nutrient standards is to compare the annual average concentration measured at the site with the standard*". (page 140).
  - b. Undertaking the assessment as done by Dr Ausseil doesn't allow patterns and changes to be seen in the data for the following reasons;

- i. Averaging data over the entire data collection period falls to take into consideration dry and wet years which we know influence water quality. These wet and dry years are then averaged out and don't allow patterns to be detected i.e. low river flows in the Oroua River are frequently associated with low SIN concentrations and higher flows with higher SIN concentrations. An annual analysis allows these climatic factors to be picked up and more accurately reflect the influence that point source discharges have on rivers.
  - ii. By continuing to average the data after any upgrades/changes have been made to a discharge it will take a long time to see any changes in the data as you are using all of the previous data. This misrepresents any changes that occur in the river and do not reflect what the river sees.
7. At paragraph 58 Dr Ausseil refers to the *E.coli* concentrations in the Oroua River upstream of the discharge point and those that are experienced downstream. In both of the scenarios presented there is a reduction in the compliance with the One Plan targets for *E.coli* (at a greater level of non-compliance downstream of the discharge). Dr Ausseil goes further to state that these differences were not statistically significant. I agree about the statistical significance but I'm unsure as to the reason for checking for statistical significance in regards to increasing *E.coli* levels. The point to take from the data is that the One Plan targets are not met upstream of the discharge point and the frequency of non-compliance increases further downstream of the discharge. The proportion of samples that are greater than the One Plan targets (based on the MoH/MfE guidelines) increase downstream of the discharge point so that there is an increased risk of infection downstream of the discharge point. The fact that the discharge may only contribute a small amount of *E.coli* (refer 73 of Dr Ausseil's evidence) doesn't take into account the background receiving environment in theory being over allocated if you considered the 550 mpn/100ml as an allocation above which there is an increased health risk to river users. However, the proposed changes to the April/May discharge regime reduce this effect further.
8. At paragraphs 91 and 92 Dr Ausseil makes reference to concentration increases in the Oroua River as referenced in my original s42A report. The reason I provided comment on this was in regard to the potential periphyton growth that could occur regardless of what the annual average nutrient concentrations. There are reasons for this of which I provide examples for below:
  - a. The most important factors in determining periphyton growth at any point in time is the hydrology of the stream at the time and also the time since the last fresh; and
  - b. The nutrient concentrations during the accrual phase. This ability of periphyton to grow in all seasons was recognised during the One Plan

development phase with the report entitled Recommended water quality standards for the Manawatu-Wanganui Region stating that “Periphyton can grow to nuisance levels in winter. The **nutrient controls** should apply **year round**. In particular, nutrient standards applying only during the summer period are inadequate to protect biodiversity values. Periphyton growth and vigour is influenced by antecedent water quality. Only flood flow conditions may be excluded from nutrient standards. Nutrient standards applying only at low flows are inadequate to reach the periphyton biomass targets”. (page 102).

9. At paragraph 102 (a through to e) Dr Ausseil provides a useful summary of the SIN increase as you move down the catchment. However, the data presented I believe under represents the effects of the point source discharges that are discussed here (AFFCO and Feilding) for the following reason:
  - a. The assessment works on the basis that the SIN that is present makes its way to the most downstream monitoring point in this case being downstream of the Feilding WWTP. This we know is not to be the case as we see periphyton between these two points and if the SIN was to make its way to the bottom site then there would be no periphyton present in the river.
10. These limitations are correctly identified by Dr Ausseil in paragraphs 103 and 111 in his assessment of the cumulative effects in the Manawatu catchment. These also equally apply to paragraph 102 (a through to e) in that the contribution that is calculated at downstream of Feilding WWTP discharge will under represent the effects of the discharge as it assumes that all the SIN encountered at Apiti makes it way to this point.

#### **E. NPS assessment:**

11. The table below contains an assessment of the SOE monitoring sites in the Oroua catchment (it excludes downstream of point source discharges) and the Band that they would fall into under the NPS. The data used in the below assessment is from January 2011 to December 2015.

Site	Nitrate (toxicity) median	Value	Band
Oroua at Apiti Gorge Bridge	Median_Nitrate	0.05	A
Oroua at Almadale Slackline	Median_Nitrate	0.08	A
Oroua Trib at U/S Kimbolton STP	Median_Nitrate	0.45	A
Oroua at U/S AFFCO Feilding	Median_Nitrate	0.16	A
Oroua at U/S Feilding STP	Median_Nitrate	0.23	A
Oroua at Awahuri Bridge	Median_Nitrate	0.53	A
	<b>Nitrate (toxicity) 95th Percentile</b>		
Oroua at Apiti Gorge Bridge	Per_Nitrate	0.19	A
Oroua at Almadale Slackline	Per_Nitrate	0.504	A
Oroua Trib at U/S Kimbolton STP	Per_Nitrate	1.131	A
Oroua at U/S AFFCO Feilding	Per_Nitrate	1.0105	A
Oroua at U/S Feilding STP	Per_Nitrate	1.2285	A
Oroua at Awahuri Bridge	Per_Nitrate	1.476	A
	<b>Ammonia (toxicity) median</b>		
Oroua at Apiti Gorge Bridge	Median_Ammoniacal	0.0034	A
Oroua at Almadale Slackline	Median_Ammoniacal	0.0044	A
Oroua Trib at U/S Kimbolton STP	Median_Ammoniacal	0.0052	A
Oroua at U/S AFFCO Feilding	Median_Ammoniacal	0.0038	A
Oroua at U/S Feilding STP	Median_Ammoniacal	0.0087	A
Oroua at Awahuri Bridge	Median_Ammoniacal	0.1129	B
	<b>Ammonia (toxicity) 95th percentile</b>		
Oroua at Apiti Gorge Bridge	Max_AmmoniacalN	0.0287	A
Oroua at Almadale Slackline	Max_AmmoniacalN	0.0431	A
Oroua Trib at U/S Kimbolton STP	Max_AmmoniacalN	0.0637	B
Oroua at U/S AFFCO Feilding	Max_AmmoniacalN	0.0451	A
Oroua at U/S Feilding STP	Max_AmmoniacalN	0.2781	B
Oroua at Awahuri Bridge	Max_AmmoniacalN	0.8481	C
	<b>E.coli</b>		
Oroua at Apiti Gorge Bridge	Median_Ecoli	1	A
Oroua at Almadale Slackline	Median_Ecoli	52	A
Oroua Trib at U/S Kimbolton STP	Median_Ecoli	19	B
Oroua at U/S AFFCO Feilding	Median_Ecoli	110	A
Oroua at U/S Feilding STP	Median_Ecoli	120	A
Oroua at Awahuri Bridge	Median_Ecoli	7	A