

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of applications for consents (**APP-2005011178.01**) by the **TARARUA DISTRICT COUNCIL** to the **HORIZONS REGIONAL COUNCIL** for resource consents associated with the operation of the Eketahuna Wastewater Treatment Plant, including a discharge into the Makahi River, a discharge to air, and a discharge to landvia pond seepage, Bridge St, Eketahuna

SUPPLEMENTARY EVIDENCE OF JOHN MILTON CRAWFORD

WASTEWATER ENGINEER

4 April 2017

1 SCOPE

The scope of my supplementary evidence is to make a correction to a typographical error in my main evidence and to address a part of the paragraph 2.1 query in Minute number 2 from the Panel.

2 ERRATA

- 2.1 In paragraph 6.2 of my evidence, in the final line, I have written the mean effluent e.coli concentration as '1,0000' MPN/100ml. This is incorrect as I have inadvertently added an extra zero to the number and it should be 1,000 MPN/100ml. The exact number is 946 as shown in Table 3. I have rounded the number up conservatively in the text.

3 PROPOSED TREATMENT PLANT UPGRADES

- 3.1 The second minute from the Panel (paragraph 2.1) requests that the applicant states exactly what treatment is proposed for the wastewater before it is discharged to water.
- 3.2 In section 11 of my evidence, I have described the proposed (likely) process upgrades to EWWTP. These included: commissioning of the fine screening facility, installation of a tertiary clarification process, installation of a UV disinfection system and, probably, a tertiary wetland which may or may not have a tangible treatment function.
- 3.3 It is not the role of my evidence, nor, in my opinion, should it be the role of this consent process to determine exactly what the treatment processes will be but rather to provide guidance on the process upgrades that could be used to deliver the likely minimum requirements of the discharge consent.
- 3.4 At this stage of the Eketahuna WWTP development, some conceptual design work has been undertaken for the purpose of ascertaining some comparative cost relationship between options. No preliminary or detailed design work has been undertaken.
- 3.5 Due to the uncertainties of the resource consent process, the paucity of available data and the need to maintain 'commercial tension' in the WWTP procurement process, it would be rare for detailed design work to be undertaken prior to the consent process or indeed the setting of conditions.
- 3.6 To choose, absolutely, the process to be used, prior to the consent process and setting of conditions would, in my opinion, be to second guess the outcomes of consultative work, the hearing process itself and the additional influent monitoring work that needs to be undertaken. Furthermore, more detailed design at this stage would risk significant abortive work and the

associated fee cost. In my opinion, this would not be fiscally prudent in a community with limited funding ability.

3.7 In my opinion it is most appropriate to apply for and grant a discharge consent, based upon a robust assessment of future flows, loads and effects and an understanding that there are reasonably obtainable processes that are available to match the required performance standards. This is as opposed to specifying in the consent conditions, what the actual processes 'shall' be. I have co-authored a paper¹ on this subject for the New Zealand Water and Waste Association and can make a copy available if required. Some key benefits of what I christened the 'Black Box' approach are as follows:

- (a) Is more effects based²;
- (b) There are more options for the type of procurement process;
- (c) Avoids the problem of the consent conditions being at odds with the owner's (particularly TLAs) competitive procurement requirements;
- (d) Allows for changes in viable technology that may eventuate during or following the consent process.
- (e) There is significant opportunity for innovation to reduce capital or operational costs or both;

3.8 A number of consents I have been involved with may serve as examples:

- (i) 1997 Anchor Products, Te Rapa Dairy Factory: Mahuta and Others vs Waikato Regional Council. The wastewater treatment processes were presented to the court on a generic basis, demonstrating that the waste could be treated to an acceptable standard. Procurement was able to take place on a fully competitive Design and Build basis and did not have to be constrained to consent prescribed processes.
- (ii) 1998 Waipa District Council, Te Awamutu WWTP before Waikato Regional Council. Guaranteed discharge standards were offered together with two or three process options that could achieve the required performance standards. The plant was able

¹ Crawford J, Dyet G (2004), 'BLACK BOX' Discharge Consents for Wastewater Treatment Plants: The Benefits And Pitfalls

² Urlwyn Trebilco, Environment Waikato (October 2000), The Black Box Approach to Consents – A discussion paper presented to the Waikato Region Consents Liaison Forum.

to be procured on a fully commercial design and build basis and has been compliant since installed.

- (iii) Waihi WWTP, Hauraki District. I was engaged to implement treatment plant upgrading in accordance with a renewed discharge consent that Council had already obtained. The new consent was very specific on the process required for phosphorus removal. This contravened Council's procurement policy and elected members and senior management would not allow procurement to proceed until we obtained a consent change that was non-specific with regard to this process. This added close to a year to the procurement process.

3.9 Some alternative, commonly available processes that could be considered at EWWTP are as described in the following table. However, for one reason or another, they may not be appropriate. The currently preferred options are shown in bold.

Target Pollutant	Alternative Process	Comment
scBOD ₅	Activated Sludge	Not necessary at EWWTP
Nitrogen	BNR Activated sludge	Not necessary at EWWTP
Phosphorus	Tertiary Lamella clarification	Cost effective. Favoured.
	BNR Activated Sludge	Very high CAPEX and OPEX
	Actiflo Ballasted Clarification	High CAPEX
	Alum dosing direct to ponds	Highly inefficient
	Coagulated micro-filtration	Very high CAPEX and OPEX. Can be subject to algal fouling.
TSS	Activated Sludge	Very high CAPEX and OPEX
	Actiflo Ballasted Clarification	High CAPEX
	Tertiary Lamella clarification	Cost effective. Favoured. A key benefit is the improvement in UVT for disinfection.
	Coagulated micro-filtration	Very high CAPEX and OPEX. Can be subject to algal fouling.
	Tertiary wetland	High CAPEX & OPEX. Potential for discharge site 2 in addition to other upgrades.
Pathogens	UV Light Irradiation	Effective. Moderate cost. Favoured.
	Chlorination	Rarely used in NZ. Nasty residuals
	Ozone	High Capex. Effective. Still uncommon on WW in NZ.
	Micro/ultra filtration	Very high CAPEX. Effective on bacteria but not so good on viruses

- 3.10 There is currently a proposal for the inclusion of a wetland between the WWTP and the point or zone of discharge. The form that this wetland would take would depend upon the discharge option chosen. Option 2 would provide additional room for a wetland with some treatment capability. This would be a bonus, in addition to the additional treatment provided by upgrades within the treatment plant. The wetland would be installed downstream of the UV disinfection system and it is very likely, due to natural causes such as rodents, water fowl and endemic vegetation e.coli, that the microbiological quality entering the receiving water will be diminished from that leaving the UV disinfection system.
- 3.11 In my opinion, the effluent standards proposed are achievable considering the technologies that are currently available, within the bounds of reasonable cost.

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