

**MEMORANDUM**

**To:** Joanna Gilroy, Consents Officer  
Environment Southland

**From:** Sarah Smith

**Date:** 22 January 2016

**Subject:** Matters Addressed from Pre-application review – Alliance Lorneville  
Wastewater and Associated Reports

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Dear Jo

Further to our Memorandum of 20 August 2015, please find outlined below a summary as to whether the issues raised in the pre-application review have been addressed. As per the August Memo, we have listed our comments under each report (appendix) reviewed.

**A. CONSIDERATION OF ALTERNATIVES – WAS PDP (DECEMBER 2014), NOW MITCHELL PARTNERSHIPS AEE (JANUARY 2016)**

**Issues Raised – Have they been addressed or do they need further clarification or assessment**

**Issue:** *However, there are other options that could have been assessed and comment on them or further assessment in the final report would be beneficial.*

1. *Land treatment was assessed in another report that was not provided for review. It may cover the further options that we think could have been considered. Land treatment was not considered further as it required 1,000 - 2000 ha of irrigation and would cost \$80 – 115M. However, there are a number of options within land treatment that could be looked at. These are:*
  - a. *Only applying to land in summer peak, i.e. using a combined land and water discharge (CLAWD). Ammonia toxicity is worst in summer at high temperatures and low dilution, so applying to land during this period and to water at other times would reduce impact on the River and reduce land area requirements;*
  - b. *Separating the high N load waste streams and applying these to land instead of a BNR plant. This could be as either land discharge only or in a CLAWD system, as above;*
  - c. *A full cut and carry regime would reduce land requirements if N is limiting rather than hydraulics. PDP used 150 kg N/ha/yr loading. This could be*



*doubled or tripled for cut and carry, reducing land area to 1/3 – 1/2 – it may depend on downgradient groundwater movement and use.*

**Addressed?:** This has not been covered but as they are moving away from land treatment of wastewater it is now not relevant.

**Issue:** *We note that a staged approach to the upgrade may require a staged consent, or a continuation of the existing consent and that microbial contaminant removal via UV is not actually proposed at this stage. An explanation as to why this is proposed to be delayed is required.*

**Addressed?:** UV is not proposed at this stage as the upstream receiving water quality is considered poor microbiologically and therefore they consider it is not appropriate to disinfect. It is to be reviewed every 10 years. Therefore it has been addressed.

**Issue:** *We have some concerns regarding the aeration of the Loop part of the treatment system. Is this system lined/sealed. It appears to be only 1.2 m deep. What is happening to the lining/sealing at the aerators?*

**Addressed?:** This does not appear to have been covered.

## **B. WASTEWATER IRRIGATION – WAS SOILWORKS (AUGUST 2014), NOW SOILWORKS (AUGUST 2015) (APPENDIX P OF AEE)**

### **Issues Raised – Have they been addressed or do they need further clarification or assessment**

**Issue:** *A hydraulic loading of 50 mm per application event (within 24 hrs) is possibly too high, resulting in forced drainage, even if the soils are less than field capacity. There was no information on soil water holding capacity (WHC) or profile available water (PAW). It is generally considered good practice that application depths are less than 50% of the WHC.*

**Addressed?:** This is not covered in Soilworks report. Irrigation applications were in the order of 48 mm per application. As the wastewater irrigation will cease in future, it is no longer that relevant.

**Issue:** *The report recommendations should be followed through, i.e. keep wastewater irrigation away from areas susceptible to leaching. Alternatively, the poorer draining Dacre soil areas should not be irrigated in winter or when soil moisture is greater than the application depth, i.e. deficit irrigate these areas only. The report does not provide the extent of these poorer Dacre soil areas, so whether this is practical from a wastewater management point of view will need to be assessed.*

**Addressed?:** This is covered via a map showing different soil types.

**Issue?:** *It is not apparent what sort of annual hydraulic loading could be achieved if the consent condition was changed. More drainage may result but the effects of this may not be*



*more than minor on the environment as there is not too much difference between control and irrigated areas for drainage volumes and N leaching (there are some instances when there are differences) and groundwater monitoring is showing little effect to date. We suggest the applicant be requested to look at what the effects may be at pushing the irrigation system a little harder to reduce water discharges but change the management to little and often and more often during the irrigation season, if soil moisture is less than field capacity.*

**Addressed?:** The system loading was increased (143 mm cf to 75 mm and 127 mm in previous years) with little additional effect (leaching values were sometimes less than previous years). Further increases in loading would be interesting to monitor but as the proposal is to move away from irrigation, it is now not that relevant.

**Issue:** *For all monitoring data it would be useful for comparative purposes to include summary statistics for each site and analyte. The report notes trends and discusses the nutrient and hydraulic rates that were actually applied compared to consent limits. A detailed evaluation of the consented versus actual loads, and how the effects might differ should be included in this report if it is not included elsewhere in the consent application documents.*

**Addressed?:** Generally covered.

**Issue:** *Further discussion of the suction cup sampler results is needed to critically evaluate the results provided. The use of suction cup samplers for determining nitrogen leaching typically requires multiple replicates for each treatment (control and irrigated) since only a small soil volume is sampled, and since the sampled volume may not include macropore flow (most likely to contain leached nutrients). The sampling design may result in a risk of underestimation of leached mass and this should be addressed for future monitoring recommendations. The report suggests lateral flow has influenced the suction cup results which may also indicate issues with the sampling design.*

**Addressed?:** This was not covered in Soilworks report.

Note that the proposed upgrade will result in the staged stopping of irrigation of wastewater, so this section becomes less relevant in future.

### **C. GROUNDWATER AND SURFACE WATER MONITORING – WAS PDP (APRIL 2015), NOW (OCTOBER 2015) (APPENDIX Q OF AEE)**

#### **Issues Raised – Have they been addressed or do they need further clarification or assessment**

**Issue:** *Table 1 in the report shows both BHB and BHD are screened deeper than the top of the groundwater and therefore may not be intercepting any contaminant plume should there be stratification occurring. However, the driller's log for BHD shows the screen above the water table.*



**Addressed?:** This was not covered.

**Issue:** *The report says that groundwater is flowing in a general west to south westerly direction. However, both piezometric contour maps show groundwater direction in the vicinity of the wastewater ponds is to the northwest. It therefore cannot be concluded that the monitoring bores are downgradient of the ponds, with the Makarewa River being directly downgradient.*

**Addressed?:** This was not covered. The March 2015 contour map shows gradient more westerly near the ponds but still with slight west-north-west direction.

**Issue:** *BHA has elevated chloride, nitrogen, sodium and suspended solids compared to the other bores. This appears upgradient of the ponds. Further discussion on the likely reasons for the elevated concentrations is required.*

**Addressed?:** Mostly answered but not that critical to effects assessment.

**D. PROPOSED CONTINGENCY BIOSOLIDS/SHEEP MANURE SOLIDS MONOFILL  
– WAS PDP TECHNICAL AEE (MARCH 2015), NOW PDP TECHNICAL AEE  
(OCTOBER 2015 (APPENDIX S OF AEE))**

**Issues Raised – Have they been addressed or do they need further clarification or assessment**

**Issue:** *The WAS and SYS are said to meet the 2003 Biosolid Guidelines. There is no description as to how this will occur, i.e. stabilised for one year, heat treated, etc. It is apparent the WAS will be delivered to the monofill without further treatment from the WWTP and therefore cannot be classified as a biosolid. If the WAS is to receive further treatment to meet biosolid guidelines, then this needs to be provided in the report.*

**Addressed?:** This issue is partly covered. There is no description of any treatment applied to the WAS or SYS given other than dewatering. Appendices J and S outline expected characteristics based on results achieved within a similar Alliance meat processing site (Alliance Pukeuri) or based on literature. No description is given as how these results are achieved. No guarantees (that WAS and SYS will meet the biosolids guidelines) supported by a description of implemented treatment processes can therefore be expected. The report has been changed from saying that the material will meet the 2003 Guidelines to "*the 2003 Biosolids Guidelines are only guidelines for management of sewage based sludge*".... "*The use of term biosolids is not intended to confuse with the term utilised in the 2003 Biosolids Guidelines (MfE, 2003)*" ... "*The guidelines are not deemed as standards and/or regulations that require the restriction of the use of the term biosolids*".

We do not agree that the term "biosolids" can be applied to anything – it infers a certain standard of stabilisation and is therefore confusing. The Guidelines are currently being updated to encompass all organic wastes and biologically treated agro-industrial waste will be included and will have the same requirements for stabilisation that are discussed in the existing guidelines. The sludge should be referred to WAS/SYS.



**Issue:** *The alternatives section is brief but acceptable, as there are not too many options and this is merely a contingency.*

**Addressed?:** Apart from the disposal of biosolids to land, three other alternatives to land disposal are considered in Appendix J, of which one is discarded (composting for garden use), one is deemed achievable but too expensive (disposal to landfill). Only the "Disposal to Monofill" is considered as viable but still to be used as a contingency alternative.

**Issue:** *Table 4 does not identify whether the concentrations are for dry solids or wet solids, however later text on nitrogen identifies it as dry.*

**Addressed?:** Yes. Table 4 in Appendix S showing expected biosolids characteristics has a note indicating that "all units (are) in g/100 g DS dry solids".

**Issue:** *Operation and management appear appropriate.*

**Addressed?:** Does not need addressing.

**Issue:** *The assessment of leakage does not give confidence regarding the leakage from A1 – B2. In addition, the reference to the other PDP report and no evidence of leakage to the south – see comments on that report, as most leakage likely to be north-west. As the ponds are disused, the integrity of the naturally formed liner cannot be guaranteed.*

**Addressed?:** Although Section 4.3.2 talks about estimate of seepage from monofill cells, the issues reported above regarding direction of groundwater flow and picking up leakage from the ponds have not been addressed.

**Issue:** *The proposed monitoring of the same five new bores – comments above apply, i.e. a downgradient bore is required.*

**Addressed?:** Issue of downgradient (N-W) bore not addressed.

**Issue:** *Effects assessment is generally sufficient. Still some doubt about groundwater monitoring.*

**Addressed?:** Does not need addressing apart from a downgradient bore to the Northwest.

#### **E. BIOSOLIDS LAND DISPOSAL ASSESSMENT – WAS PDP (NOVEMBER 2014), NOW PDP (OCTOBER 2015) (APPENDIX J OF AEE)**

##### **Brief Summary of Report**

Arising from a proposal to reduce the impact of the discharge of process wastewater to the Makarewa River from the Alliance Lorneville plant, the report addresses the application of sludge ("biosolids") from a new biological nutrient removal ("BNR") plant to land.



The report considers nitrogen to be the limiting component of the biosolids for sustainability of land application, and addresses both the nitrogen content and the leaching to groundwater implications of the proposal. Using OVERSEER and other modelling tools, a biosolids loading rate of 250 kg TN/ha/y on the soils of the proposed application site is demonstrated to result in nitrogen leaching between 10 and 20 kg N/ha/y. This in turn is shown to be comparable with the nitrogen leaching resulting from the present use of the proposed application site for meatworks wastewater application with high intensity sheep grazing of otherwise un-fertilised pasture.

Comment [RP1]: To be deleted

### Issues Raised – Have they been addressed or do they need further clarification or assessment

**Issue:** *A bit of caution should be used in the adoption of the term "biosolids" since while the material is from a biological process, the influent characteristics may be substantially different to those described in the Biosolids Guidelines (NZWWA, 2003).*

**Addressed?:** As above, they have addressed this but we do not agree with the terminology. Their use of terms of WAS, SYS and biosolids is not consistent through the documents.

**Issue:** *The report does not address exactly where or when the biosolids are to be applied, and appears to leave open the possibility of application to areas receiving wastewater irrigation.*

**Addressed?:** Yes. The new report indicates that 272 ha of land has been selected as being potentially available for "biosolids" and currently consented stockyard solids disposal including the areas currently earmarked for wastewater irrigation. The new report gives general information on the disposal area management type and indicates that the existing wastewater irrigation would cease once the biosolids disposal commences following the wastewater treatment plant upgrade.

**Issue:** *Material characterisation – is there likely to be any source of mercury or organics as given in the Guidelines, Table 4.2 in the Alliance Lorneville biosolids? In the absence of pathogen analysis (Table 4.1 of the guidelines) can some information be supplied about risk of pathogen contamination and mitigation measures? Are there any pathogens which are not included in the Guidelines which are specific to the waste-stream, especially considering the waste is from the same type of animals that will graze the biosolids amended pasture? There has been, for example, attention paid by ES to Salmonella in the context of other meatworks effluent sludge land applications, but this matter has not been addressed here.*

**Addressed?:** Partially. The Mercury/organics issue was not covered. A brief comment is made regarding zinc and that the levels in the sludge are less than the 2003 Guidelines Grade "b". However, it is the levels in the soil that are critical, particularly as they have been irrigated for a number of years, and the updated guidelines are proposing to drop the "b" criteria in the biosolids and focus on soil levels. An assessment of effects on human health covers the risks and mitigation measures (Section 4.11.1). No details are given on any pathogens specific to the waste stream, or on Salmonella related risks. With regard to



## Comments on Alliance Lorneville Wastewater and Associated Reports

Page 7 of 7

grazing, there is reference to the stock withholding periods being greater than DoH 1992, however, those guidelines were superseded by the 2003 Guidelines.

**Issue:** *Material characterisation is proposed in the PDP report to be monitored by "an annual review". Two issues to consider further here are that the 3 relevant nitrogen species may be the only ones needing monitoring (since no other parameters are considered to be limiting) and that a single analysis is unlikely to reflect the variability in concentrations. For example, it has been our experience that fortnightly analyses for nitrogen content in meatworks effluent sludge show a range from below 1,000 g N/m<sup>3</sup> to over 2,000 g N/m<sup>3</sup>, and that a spread of sampling times through the production year is necessary to adequately monitor the character of the material.*

**Addressed?:** Yes. Section 5.2 "monitoring Programme" and Section 5.3 "Biosolids Management Plan" cover the biosolids characterisation.

**Issue:** *What is the loading, effects and management of phosphorus (i.e. if soil retention is being relied upon what is the site life)?*

**Addressed?:** Not covered

**Issue:** *What volume/mass of material do they expect annually to apply to the application site? What area will be needed annually, and what return interval will there be for repeat applications?*

**Addressed?:** Yes.

**Issue:** *What cultivation, crop, animal withholding period is proposed? How will application information (site, time, amount) be determined and recorded? What monitoring of the receiving environment is proposed?*

**Addressed?:** Yes. These issues are covered within various sections of the report: Section 2.2; Section 5.2; and 5.3.

Regards,

Rob Potts