SUMMARY STATEMENT OF JEREMY SANSON FOR WAIMAKARIRI IRRIGATION LIMITED

INTRODUCTION

1. My full name is Jeremy Lawrence Sanson. I am a Water Resources Engineer with Pattle Delamore Partners Limited and have prepared this summary statement to provide a brief overview of the key points from my evidence in chief for Waimakariri Irrigation Limited dated 17 July 2020, as well as providing several comments arising from my participation in the expert caucusing that resulted in the groundwater Joint Witness Statement (JWS) subsequent to my statement of evidence. My qualifications and experience are provided in my evidence in chief. My comments here are divided into the following themes:

    1.1 Comments on the groundwater Joint Witness Statement;

    1.2 A comparison between ECan's solution and the WIL solution package; and

    1.3 The starting point for N leaching reductions.

JOINT WITNESS STATEMENT FOR EXPERT GROUNDWATER CAUCUSING

2. Subsequent to my evidence being provided, I participated in the groundwater expert conferencing for WIL. I would like to expand on some of the information from the JWS as it impacts on my evidence in chief.

3. In the JWS it is recorded that Dr Rutter, Mr Thomas and myself noted that modelled nitrogen concentrations at certain wells are consistently much higher than measured concentrations, which may reflect contradictory trends to what is predicted by modelling (Paragraph 43 of the JWS). I remain concerned that the modelled nitrate concentrations in groundwater are far higher than measured concentrations (see Figure 5 in the evidence of Mr Neil Thomas). Figure 5 shows that ECan's groundwater model predicts higher concentrations in 22 of the 23 (96%) Private Water Supply Areas and 11 of the 12 (92%) community drinking water supplies, compared with measured data. As discussed in Paragraph 43 of the JWS, I do not have a lot of faith in the model because the modelled concentrations do not match the measured data or the measured trends.

4. From my reading of the ECan technical reports, the model does not appear to be calibrated to actual nitrate concentrations. Figure 3-11 from Kreleger and Etheridge (2019), shows their comparison between modelled and measured concentrations for 14 shallow bores. This figure shows that the model underpredicts nitrate concentrations for seven bores. This is used as justification for the model doing a good job at predicting nitrate concentrations in the Waimakariri Zone (Paragraph 44 of the JWS).

5. It appears that the ECan scientists have only been able to identify seven bores where the modelled results are lower than the measured data. I have tried to find out how many wells had higher modelled nitrate concentrations and how many wells had lower modelled nitrate concentrations, compared with measured concentrations within the Waimakariri Zone. Unfortunately, this information does not appear to be available in any of the ECan technical reports. Accordingly, based on Figure 5 in the evidence of Mr Neil Thomas, I am only aware of seven bores where modelled concentrations are less than measured data.

6. From the JWS, it appears that there are effectively two expert views: one that places reliance on the model, which is said to support flow under the river; and one which relies on measured data and which concludes that flow under the river has not been proven (Paragraphs 33-36 of the JWS).

7. I am of the view, and to confirm my position in my evidence in chief and comments in the JWS, that more reliance should be placed on measured data, instead of the uncertain modelling exercise. Mr Neil Thomas discusses deep groundwater levels in his evidence. The measured data indicates flow parallel to the river and does not appear to support the theory for flow under the river (Paragraph 17 of the JWS).

8. I am of the view that it would be prudent to focus on improving water quality to address water quality issues within the Waimakariri Zone, instead of focussing on flow under the river, which has not been proven.

ENVIRONMENT CANTERBURY'S SOLUTION

9. The ECan solution relies solely on nitrate load reductions from farmers to achieve the water quality outcomes. Because their technical work is based on their model, which I consider to be highly uncertain because it significantly overpredicts nitrate

concentrations, the proposed reductions are substantial – up to 90% beyond the Good Management Practice rate.

10. ECan have proposed five nitrate priority sub areas, as shown in Figure 1 of my evidence and also in my presentation to the hearing panel. The shape of the sub areas is largely controlled by groundwater flow direction (i.e. whether groundwater flows left or right). This is an imprecise science. In my opinion there are a few anomalies with the drawing of these sub areas:

    10.1 The "worst" sub area (sub area E, requiring six stages of reductions) is in some cases directly adjacent to the "best" area (sub area A, requiring 2 stages of reductions). This is solely due to the modelling, but does not appear to be logical.

    10.2 The receptors for the "worst" sub area (sub area E, requiring six stages of reductions) are Cust Main Drain and Ohoka Stream. However, as discussed in the evidence of Ms Laura Drummond, temporal trends (2011-2015) calculated by ECan in the current state and trends report (Table 3-26: Greer & Meredith 2017) show that statistically significant decreasing trends in dissolved inorganic nitrogen (DIN) and NNN have occurred in Cust Main Drain and Ohoka Stream.

THE WIL SOLUTION

11. The WIL Solutions Package includes four key components: (1) managed aquifer recharge and targeted stream augmentation; (2) achievable reductions in nitrogen leaching from land-use activities, relative to observed trends in water quality; (3) localised habitat improvement initiatives (biodiversity projects); and (4) an improved monitoring programme.

12. WIL is already investigating MAR and TSA options within their command area. Figure 8 from my evidence indicates that the estimated total MAR and TSA water requirements to achieve the water quality outcomes are within the range of water available from the Waimakariri River utilising existing abstraction consents.

13. MAR can contribute to a general improvement in groundwater quality in a more targeted and faster manner than the farmland leaching changes proposed by

ECan. Furthermore, TSA activities can achieve surface water quality targets in a much faster time period than currently proposed by ECan.

14. The implementation of MAR and TSA, as well as the biodiversity projects and improved monitoring programme, can only occur if there is a strong WIL organisation to support and fund those activities. Table 8-9 as currently drafted will not allow for these activities. WIL have proposed a modified Table 8-9, as shown in Figure 9 of my evidence. WIL agrees with the proposed reductions in 2030 and it contemplates further reductions in 2040, should monitoring indicate that they are required.

15. WIL's modified Table 8-9 means that the definition of sub areas is not required. There are some very good reasons for this. Firstly, as discussed already, the sub areas are based on ECan's groundwater model, which is highly uncertain. Secondly, WIL is of the view that both spare water from the wider scheme and funding would be much more challenging were they seen to be benefiting only a select few shareholders. Having all shareholders 'share the pain' is likely to be the best means of achieving the environmental outcomes sought.

STARTING POINT FOR N LEACHING REDUCTIONS

16. WIL have always calculated their scheme nitrogen load using representative farms (i.e. the MRB methodology), which is discussed in my evidence. This approach has been accepted by ECan during two separate consent application processes (including their current scheme consent). It is not possible for WIL to prepare individual nitrogen baselines for their shareholders given the length of time that has passed since the nitrogen baseline period (i.e. 2009-2013). Therefore, PC7 needs to allow for WIL to continue using the MRB methodology (as now updated and reflected in the approved 'Matrix Method') to calculate their 'starting point'.

IMPROVED MONITORING PROGRAMME

17. As discussed in Paragraphs 62 and 63 of the JWS, the groundwater experts agree that "it is critically important that a specifically designed ongoing monitoring programme needs to be established to assess whether the nitrate targets are being met, or are likely to be met, to determine when no further nitrate loss reductions are required" and "The experts agree that the current monitoring programme is unlikely to be suitable for this purpose."

18. WIL has prepared a more detailed monitoring programme, in consultation with ECan, which includes groundwater, surface water and ecological monitoring, and this monitoring has now commenced. The WIL Board has committed approximately $160,000 per annum to this monitoring, which shows a huge commitment from the Board.

19. The improved monitoring programme will provide better characterisation of water quality issues and trends and the effects of land use activities so that appropriate and effective management and mitigation measures can be implemented to improve water quality.

CONCLUDING COMMENT

20. The WIL Solution (including MAR, TSA and reductions in nitrate leaching from land use activities in 2030 and, if required, 2040) is expected to achieve the proposed water quality targets. Within those timeframes, the WIL Solution is intended to be (at worst), no worse than under Environment Canterbury's Solution because the proposed land use reductions are the same at 2030 and further reductions of up to the same are also possible at 2040 should outcomes not be, or be on track to being, met. In practice, water quality targets are expected to be met quicker because the WIL Solution incorporates MAR and TSA.

Jeremy Sanson

11 November 2020