

**IN THE MATTER OF**

the Resource Management Act  
1991

**AND**

**IN THE MATTER OF**

applications by Central Plains Water  
Trust to:

Canterbury Regional Council for  
resource consents to take and use  
water from the Waimakariri and  
Rakaia Rivers and for all associated  
consents required for the  
construction and operation of the  
Central Plains Water Enhancement  
Scheme

Selwyn District Council for resource  
consents to construct and operate  
the Central Plains Water  
Enhancement Scheme

**AND**

**IN THE MATTER OF**

a notice of requirement by Central  
Plains Water Limited to:

Selwyn District Council for the  
designation of land for works  
associated with the construction and  
operation of the Central Plains  
Water Enhancement Scheme

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**BRIEF OF EVIDENCE OF HELEN ELIZABETH SHAW**

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**BUDDLE FINDLAY**  
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## **Qualifications and experience**

1. My full name is Helen Elizabeth Shaw.
2. I hold a Bachelor of Technology, majoring in Environmental Engineering, and a Masters of Engineering, majoring in Natural Resources Engineering. I am a Chartered Professional Engineer, and a member of IPENZ Engineers New Zealand.
3. I have been working in the field of Natural Resources Engineering for approximately 15 years, predominantly involved with stormwater and wastewater modelling and management, and am currently employed by URS New Zealand as a Senior Associate water resources engineer.
4. For the past 10 years I have been almost exclusively working on Integrated and Stormwater Catchment Management Planning. This field of work includes the development and design of stormwater management methods, focusing on minimising the effects of various land uses on the stormwater receiving environment; land, surface waterways or the coast.
5. I have read the code of conduct for expert witnesses set out in Environment Court practice note, and confirm that I have complied with the code in the preparation of my evidence.

## **Scope of Evidence**

6. I have been asked to comment on the proposed resource consent conditions developed by Environment Canterbury with respect to Consents CRC 102332, CRC102333 and CRC102334. These consents relate to the discharge of stormwater both during and following construction of the Central Plains Water Enhancement Scheme.
7. Consent conditions have been suggested with respect to the control of erosion and sediment discharge from the construction sites, during scheme operation and maintenance, and stormwater discharge from the completed works. Conditions refer to the Environment Canterbury 'Erosion and Sediment Control Guidelines' (ESCG) published in 2007, and updated in 2008.
8. My understanding of the proposed scheme works, based on information provided by Walter Lewthwaite from URS New Zealand, is that approximately 60km of headrace, and 440 km of supply canals or pipelines are to be constructed across an area of approximately 60,000 ha between the

Waimakariri and Rakaia Rivers, and between the Malvern Hills and State Highway 1. For sediment and erosion control purposes, it is possible that there could be up to 1,000 individual 'sites' within the works programme.

9. Topography across the area varies from hill sites to flat plains, and soils also vary, and include clay soils, loess, gravels and loam. Variable drainage also exists, however the majority of the plains is understood to be well drained, with a significant depth to ground water.
10. A number of small and large, ephemeral and perennial waterways cross the proposed irrigable area, however scheme canal and pipeline locations have been proposed that minimise crossing of the larger waterways.

#### Consent Conditions for CRC 102332 and CRC 102333

11. In my view, the proposed consent conditions appropriately require the ECan ESCG to be used for the development of an Erosion and Sediment Control Plan (ESCP) for the construction works. The ESCG contain checklists and flowcharts to ensure that Erosion and Sediment Control is undertaken in a step process, considering site specifics such as environmental values, construction methodology, soils, drainage, slope etc. A range of erosion and sediment control practices are discussed, and information presented relating to the benefits and appropriateness of each.
12. Contrary to the requirement to follow the ESCG, consent conditions 4,11,15,16,17,18,19,20,22,23,25,31,32, and 33 in consent CRC102332 dictate approaches to erosion and sediment control for construction works that would otherwise be site-specifically designed and incorporated in a plan developed using the guideline. A scheme of this size, with a variety of construction approaches and site conditions, requires considerable flexibility in the development of erosion and sediment control plans.
13. The intention of Central Plains Water is to produce a guideline for Erosion and Sediment Control Plans as part of an overall Environmental Construction Management Plan. This will be used for the development of ESCPs, completed by the earthworks contractor. Condition 13 of CRC 102332 requires the ESCP to be submitted one month prior to works. Given the likely small nature of some of the work sites, and the multiple ESCPs across the scheme, 10 days would seem a more reasonable timeframe, however one month would be an appropriate timeframe for reviewing the overall guideline document.

14. Amendments to ESCPs can be expected as construction progresses. The amendment clause, Condition 14, should also allow for transition to less intensive erosion and sediment control as construction progresses. In the case of emergencies (e.g. failure of systems), an allowance should be provided to amend the plan with immediate effect.
15. Performance standards are a good way of providing an aim for ESCPs. The calculation in condition 24 of the zone of non compliance is different to the calculation in the ECan NRRP for sediment discharge to water bodies, and the origins of this alternative calculation are Rule WQL6 of the NRRP, relating to stormwater discharge. It is suggested that either an agreed non-compliance distance is set for each site, or the calculation in Chapter 4 Schedule 1 Part 2 of the NRRP be used, although units for the calculations will need to be agreed. Note the calculation presented in the proposed conditions should be multiplied by 25.
16. Monitoring of this performance standard as per condition 26 would be part of the developed guidelines for ESCP's, however monitoring could only take place if conditions were safe to do so. For example, measuring turbidity in the Waimakariri River during storm flows at night may not be practicable.

#### Consent Conditions for CRC 102334

17. This consent relates to stormwater discharge from the completed scheme (e.g. access tracks, buildings and hardstand areas)
18. In order to be consistent with the conditions set out for CRC 102332 and 102334, the consent would refer to relevant guidelines for stormwater treatment. However, there are no specific ECan guidelines for this purpose, although Christchurch City Council 'Waterways and Wetlands Drainage Guide' and Auckland Regional Council TP10 'Design Guideline Manual for Stormwater Treatment Devices' are commonly used in Canterbury. Once again, variations in topography, receiving environment and soils in the Central Plains Scheme area indicate that guidelines, or the suggested detailed consent conditions will not always be suitable, and individual stormwater management design would be more appropriate than a standard design for the whole scheme, although there are benefits to using a small number of treatment and disposal methodologies.
19. CRC 102332 requires that the ESCP and any amendments be certified by a suitably qualified and experienced engineer as being adequate to achieving the performance standards, and consistent with the conditions of consent.

This type of clause would also be useful for Consent CRC 102334, referring to the performance targets set out in condition 14. Preferences for types of treatment could be stated, and these would then be used where appropriate and practicable.

20. Performance standards for stormwater retention are useful, however specifications for soak pit, land cover and infiltration design (conditions 5, 6 and 7) would not be necessary within the consent if designed by a suitably qualified professional. Relating to this, and to maintain consistency through the consents, submission of as-built plans, rather than a signed certificate by a Chartered Professional Engineer, would be adequate to show compliance with the stormwater design and consent conditions.
21. Condition 12 may need to be reworded. The use of vegetation for stormwater treatment is to facilitate filtration of stormwater contaminants, or to enhance evapotranspiration of stormwater. Vegetation in an infiltration basin is not necessary (unless desired for aesthetic reasons), as the soil and gravel in the basin provide a medium for removal of stormwater associated contaminants.
22. Performance standards are a good way of providing an aim for ESCPs. The calculation in condition 14 of the zone of non compliance is different to the calculation in the ECan NRRP for sediment discharge to water bodies, and the origins of this alternative calculation are Rule WQL6 of the NRRP, relating to stormwater discharge. It is suggested that either an agreed non-compliance distance is set for each site, or the calculation in Chapter 4 Schedule 1 Part 2 of the NRRP be used, although units for the calculations will need to be agreed. Note the calculation presented in the proposed conditions should be multiplied by 25.
23. In summary, I believe that the use of ECan's Erosion and Sediment Control Guidelines, along with documented performance standards will result in the development of a number of different Erosion and Sediment Control Plans for the Central Plains Water Scheme. As such, detailed consent conditions relating to Erosion and Sediment Control practices would not, in my opinion, produce the most effective outcome on a site by site basis. Appendix A of this evidence contains a suggested amended set of consent conditions for CRC 102332 (CRC 102333 contains the same conditions, and it is suggested that these are amended in the same manner).

24. Additionally, a number of changes to the consent conditions of CRC 102334 would result in the development of a more robust, site specific stormwater management plan for the Central Plains Water Scheme, targeted to meet performance standards. Appendix A also contains a suggested amended set of consent conditions for CRC 102334.

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**Helen Elizabeth Shaw**