

Date: 7 December 2007

To: Leo Fietje, Principal Consents Advisor, Environment Canterbury

From: Walter Lewthwaite, Environmental Engineer, URS

Subject: Central Plains Water Enhancement Scheme,
Section 92 questions, Fish Screens

In your letter of 2 November 2007 to the Central Plains Water Trust you asked for further information about fish screen design for the Central Plains intakes. Your comment was:

“There remains insufficient information on the methods and level of fish screening proposed from both the Rakaia and Waimakariri Rivers. More information is required regarding either the level of protection the screens will provide, or objectives of the screening and how these might fit in with other mitigation (i.e. reservoir mudfish populations).”

1. Preliminary comments

We addressed this in section 5 of our letter to you dated 21 March 2007, and I refer you again to that letter, and to section 3 of the Golder Kingett Mitchell report¹ which accompanied that letter. Essentially we outlined a process for design, which we considered was sufficient to meet the requirements of the RMA for consenting, subject to conditions. We understood until your letter of 2 November that this information was sufficient for your needs. You will also be aware that this level of detail was recently accepted by the Canterbury Regional Council as appropriate leading into the consent hearing for the proposed Hunter Downs Irrigation Scheme in South Canterbury, addressing take and use applications.

We are still in the position of not having established fish protection objectives and requirements, and therefore not identifying appropriate fish exclusion criteria. We can however provide you with an update on the design process, taking into consideration the recently released NIWA report on fish screening in Canterbury, and providing recommendations on appropriate processes. This is essentially an expansion and revision of what was provided in the AEE and in our letter of 21 March 2007.

Regarding mudfish our understanding is that the areas of main concern are in the Waianiwaniva Valley and around the Hororata River. The issues of concern for mudfish are separate from fish screening of the intakes, and we consider the mudfish issue is best handled on its own.

2. Applications so far

Central Plains Water has indicated so far (Section 3.4.3 of AEE, 23 June 2006) that “fish screens will be installed a short distance downstream from the sediment trap and flow control gates. The purpose of the screens will be to prevent entry of fish into the scheme race...” That section of the AEE also acknowledged guidelines in a report that had been presented to the ECan Fish Screen Working Party. The AEE that accompanied the application of December 2001 to take from the Rakaia and Waimakariri Bridge intake sites proposed by way of condition a maximum screen size

¹ Central Plains Water: Effects on the Rakaia River, Fish Screening Issues, and Reservoir Water Quality, Golder Kingett Mitchell, March 2007

of 5 mm (see section 7.3.1 and 7.3.2 of that AEE), but the upper Waimakariri applications of June 2005 did not mention a screen size.

3. Canterbury Fish Screen Working Party

Guidelines for best practice for fish screens on intakes on Canterbury rivers have been developed by a Working Party chaired by Canterbury Regional Council, and consisting of representatives of Fish and Game New Zealand, Irrigation New Zealand, and Department of Conservation. A final technical report was submitted to the Working Party by NIWA² in October 2007: I am sure you are familiar with that report. We understand that to date the report has not been officially endorsed by the whole Working Party or by the Regional Council.

The report notes (section 1.4) that the guidelines are intended to apply to intakes of up to 10 m³/s capacity (compared with Central Plains' up to 40 m³/s at each site), and it states that larger intakes "will require extra design consideration". But it also states that the "Principles included will be useful for larger intakes". We accept those comments as appropriate, and the report as a helpful contribution to the design of fish screening on CPW.

Amongst other points the report concludes (in the Summary) that a fish screen will only be effective when a number of listed features are implemented: we accept that list as appropriate to Central Plains. The report also presents (in section 4.3) a "Review of good practice design process for intakes" including the following points:

- 1) Section 4.3.1: "Fish protection objectives should be established through a process of reviewing the composition of the fish community and the potential impact on the fishery during the diversion operation. Seasonal changes in both the fish community and the diversion operation should be considered ... The selected protection objectives will strongly influence fish exclusion concept selection and the design development process. It must be given due attention to avoid later problems",
- 2) Section 4.3.3: Consideration of alternative intake designs. A decision table (Table 7) is given as an aid to selection, rating 10 design parameters against 14 fish barrier options in a rough qualitative form,
- 3) Section 4.3.4: Further guidelines for applying the decision table, including
 - Identifying the siting possibilities that could work for the specific application,
 - Identifying appropriate fish exclusion criteria ("a critical factor that will vary from site to site"),
 - Identifying acceptable levels of operation and maintenance requirements,
 - Identifying operational issues associated with debris and sediment,
 - Deciding whether application of unproven technology is an acceptable risk to the developer,
 - Determining whether capital costs are acceptable,

² Fish Screening: good practice guidelines for Canterbury, NIWA Client Report: CHC2007-092, October 2007

- Determining the applicable discharge range.

We accept those points as appropriate for Central Plains.

In addition the report presents (sections 4.1 and 4.2) specific guidelines relating to approach velocity, sweep velocity, fish bypass entry design, connection of the bypass with the river, screening materials, screen mesh sizes, and operation and maintenance.

In general we accept those guidelines as appropriate. However we note, relating to fish screen mesh sizes, that the NIWA report guidelines present sizes ranging from 2 mm to 5 mm, depending on the circumstances, and this will not necessarily fit with Central Plains' proposal. We have a concern that the smaller sizes may be expensive to build and difficult or even impractical to maintain, particularly with the likelihood of having to manage the alga didymo in the future.

The report also helpfully presents a range of potential types of fish screens. The outline plans supplied to you on 30 March 2006 (Drawing No C-206) assume a flat fish screen assembly as this is generally considered the cheapest way to achieve the common fish exclusion requirements for large screen assemblies.

4. Design process

Proceeding towards detailed design and construction we consider that a design team should be commissioned, consisting of people with the following expertise: someone with an understanding of the requirements of Central Plains, a fishery scientist to advise on the needs of the fishery of the river and site specific fishery requirements, and an engineer with expertise in designing, building and operating fish screens. This team should consult with relevant parties including Fish and Game New Zealand, Ngai Tahu and Department of Conservation, and should propose solutions specific to each site for approval of the Canterbury Regional Council.

5. Conclusion

Your request for further information about fish screen design for the Central Plains intakes repeats a request that was addressed earlier this year, and we understood CPW's response of 21 March 2007 provided enough information for your needs. The level of information supplied at that time has been accepted by Canterbury Regional Council as suitable for progressing consent applications to a hearing in the case of the current Hunter Downs Irrigation Scheme take and use applications. We therefore consider the information is suitable for advancing Central Plains also, as proposed in our letter to you of 21 March 2007.

The recently released NIWA report to the Canterbury Fish Screen Working Party provides guidelines that will be helpful in planning the requirements and details of Central Plains' fish screening assemblies. However in our view it is premature at this point of time to specify further details as the preliminary steps recommended in the NIWA report have not been conducted, including establishing fish protection objectives and requirements, site specific survey of fish activities, evaluation of engineering options, and costing. Rather we consider it is appropriate to specify the process of design and to accept that approval of details will be required later from the Canterbury Regional Council as the consenting authority.

Our proposal is that the consents should include a condition that an appropriate expert design panel be assembled to oversee the further development of details, and that technical approval be required from the Regional Council as consenting authority.