

**BEFORE A HEARINGS PANEL OF THE GREATER WELLINGTON REGIONAL
COUNCIL AND MASTERTON DISTRICT COUNCIL**

[GWRC Ref: WAR 070077]

IN THE MATTER of resource consent applications to
Greater Wellington Regional Council
pursuant to section 88 of the
Resource Management Act 1991

AND

IN THE MATTER of a Notice of Requirement to
Masterton District Council pursuant to
section 168, 168A and 181 of the
Resource Management Act 1991

BY Masterton District Council

FOR the proposed upgrade of the
Masterton Wastewater Treatment
Plant

JOINT STATEMENT OF EVIDENCE OF DR STEPHEN PALMER AND ANDREW BALL

Introduction

1. This evidence is a joint statement of Dr Stephen Palmer and Andrew Ball to clarify our previous evidence to the hearing. Unfortunately, the panel and the public were left with some uncertainties and some concerns which have now been resolved.
2. The issues raised by Dr Palmer in regard to Mr Ball's evidence were:
 - (a) Mr Ball's report was not a Health Impact Assessment (**HIA**) and several issues expected in an HIA were not addressed.
 - (b) The report/evidence did not account for the uncertainty of the risk assessment outcome.
 - (c) The 2003 MfE/MoH Microbiological Water Quality Guidelines (**Guidelines**) based on *E. coli* monitoring and catchment assessment should be used to assess the risk to bathers rather than the quantitative risk assessment based on pathogens.
 - (d) Use of notified disease statistics.
 - (e) Lack of discussion with Public Health over Mr Ball's report and evidence.
3. We have since met and discussed all of these issues and have resolved them to our mutual satisfaction. The views expressed here reflect our objective independent opinions regarding the issues.
4. The report upon which the assessment was based does not constitute a Health Impact Assessment but was a Quantitative Health Risk Assessment (**QHRA**), which would be a small component of an HIA. This is an issue of the title of the report, which wrongly referred to the report as an HIA.
5. Mr Ball notes however, that it was not portrayed as an HIA in his discussions with the Health Protection Officer (Rebecca Fox) with whom Mr Ball liaised regarding this matter.
6. Mr Ball was not briefed to carry out an HIA. Mr Ball's evidence to the panel did not portray his report as being an HIA. The main purpose of the QHRA was to

assess the risks from the Wastewater Treatment Plant (**WTP**) pre and post upgrade to river users and to compare the estimated risks to the acceptable risk in the Guidelines.

7. Dr Palmer accepts that the report provides useful information to the panel about health risk but not about health impacts. In particular it does not deal with impacts on Maori health. Dr Palmer is still of the view that a HIA would be of great assistance to MDC, Wairarapa DHB and to this hearing, particularly in relation to Maori health and health disparity.
8. We are satisfied that the issues surrounding uncertainty of the risk have been dealt with. This disparity arose because of the different approaches we use to deal with uncertainty.
9. The appropriate means of portraying the risks from recreational water usage in ordinary circumstances are clearly defined in the Guidelines. This is by means of the Suitability for Recreation Grade (**SfRG**), which is in turn derived from two components:
 - (a) the Microbiological Assessment Category (**MAC**), which is based on the 95th percentile *E. coli* concentration from the water quality monitoring programme conducted over several bathing seasons; and
 - (b) the Sanitary Inspection Category (**SIC**), which is derived from a sanitary inspection of the catchment upstream of the recreational site.
10. However, there are two facets of the situation that cloud this straightforward application of the Guidelines:
 - (a) First, the Guidelines are subject to a caveat to the effect that the Guidelines should not be directly applied to assess the microbiological quality of water that is impacted by a nearby point source discharge of treated effluent (particularly from oxidation ponds or after disinfection) without first confirming that they are appropriate. In this situation this means that we cannot rely on the *E. coli* indicator to predict risk of infection.
 - (b) Second, the MAC is made on the basis of monitoring of water quality at the recreational sites during successive swimming seasons using all of

the relevant data to determine the 95th percentile from which the MAC is determined. This does not really fit the situation here where it is proposed to intermittently discharge to the river. This situation, which is not covered by the Guidelines, has contributed to the different approaches we took to assess the risk.

11. For these reasons quantitative risk assessments are carried out in such situations and this is why the QHRA was carried out in this case.
12. We have agreed on a common approach to this problem, which looks at four scenarios:
 - (a) the present discharge,
 - (b) post-upgrade with no direct discharge,
 - (c) post-upgrade when direct discharge occurs, and
 - (d) zero discharge during high flows.
13. The outcomes are expressed in terms of the SfRG. In making this assessment it has been necessary to make assumptions about the MAC and SIC because at the time the QHRA was conducted, the sanitary inspection of the catchment had not been carried out by the Regional Council so the Ruamahanga sites were unclassified. To our knowledge, this is still the case. However, we have made indicative assessments of the SICs using Figure H3 in the Guidelines.
14. **At present:** the MAC is category D and the indicative SIC is Very High, which indicates an SfRG of *Very Poor*.
15. **Post-upgrade when direct discharge occurs:** the MAC is assessed as either C or D (on the basis of the QHRA and MAC respectively) and the SIC indicatively assessed as High, which indicates an SfRG of *Poor* or *Very Poor*. We understand that the flow statistics indicate that flows above median occur on average for 33% of the time during the summer period (however the discharge would operate for most of this time). We also note that at these flows the river is unused for bathing for most of the time because of the high flows and turbidity. Accordingly there are very low exposure rates and therefore a low risk of disease. We also note that the primary contributor of *E. coli* at these flows is

upstream contamination, but that the discharge will add to the theoretical risk (as it does at present).

16. Dr Palmer is of the view that people should be advised not to swim in the river at times when there is a direct discharge. He is of the view that it needs to be made explicitly clear that the river should not be used for bathing during time of direct discharge and the stand down period. His view is that appropriate media such as signs etc will need to be used to convey this.
17. **Post-upgrade with no direct discharge: (at flows below median)** by using the 95th percentiles from the QHRA and the levels of risk in the Guidelines it is possible to move the MAC to C. With no direct discharge occurring the SIC would be assessed as *Low to Moderate* and the SFRG would be *Fair*. At this SFRG it is considered to be *generally satisfactory for swimming* where warning signs are not required. Using the 95th percentiles from the QHRA addresses most of Dr Palmer's concerns around uncertainty.
18. We understand that the flow statistics indicate that this situation applies on average for 66% of the time during the summer period. However, we are of the view that for some of this period (at least 24 hours after discharge in Dr Palmer's view) there should be a post discharge "stand down time".
19. This conclusion is backed up by the predicted *E. coli* concentrations for when there is no discharge, as presented by Chris Hickey (these are based on monitoring upstream of the current discharge during low flows). Using the 95th percentile of the predicted *E. coli* concentrations the MAC would be categorized as B, however, this prediction does not take into account leakage of pathogens from sewage ponds whereas the QHRA does. A precautionary approach has been taken and therefore greater weight has been given to the QHRA.
20. The Guidelines require sites with this SFRG (*Fair*) to be monitored weekly. We also note that at these low flows the primary source of contamination will be from upstream because there will be no direct discharge from the site.
21. The monitoring data for times when there is no direct discharge will be important in terms of identifying pollution events requiring a temporary warning. In particular monitoring after freshes and discharge events will determine how long warnings should remain in place. (Monitoring data for periods of high flow when direct discharge is occurring should not be included in the assessment.) Once

sufficient monitoring data is accumulated and if the 95th percentile for the *E. coli* levels is sufficiently low, then it may be possible to categorize the MAC to being B or even A. This could lead to an SfRG being re-graded to *Good* or *Very Good*. It may take two to three years to accumulate the minimum 100 data points required to improve the MAC. However, *E. coli* data from Chris Hickey suggests that re-grading from *Fair* to *Good* is likely. This data suggests that at flows below median the upstream water quality is good and in the absence of a discharge, the downstream water quality is likely to be good. Nevertheless this will need to be confirmed by monitoring.

22. It is noted that MDC is not proposing monitoring of *E. coli* levels at the Cliffs - that is carried out by the Regional Council.
23. Dr Palmer notes that Wardells Bridge is not a designated swimming site. If in the future it is proposed to be designated as a swimming site, it would need go through the grading process to determine the SfRG. The contact recreation Guidelines stipulate the Medical Officer of Health is the final arbitrator of this grading and there would need to be robust evidence to confirm that this site would be safe for contact recreation.

Zero discharge at high flows

24. We have also considered what the situation would be if there was no direct discharge to the river at summer flows above median. As noted above the post upgrade grading for summer flows above median when discharge occurs would be *Poor - Very Poor*. If no discharge occurred the SfRG would remain at *Poor - Very Poor* unless upstream contamination was substantially reduced. It would remain inadvisable to swim at those flows.

Improvement as a result of the upgrade

25. We are agreed that at the summer flows where most contact recreation occurs the current grading should be *Very poor* and should improve to at least *Fair* and most likely to *Good* after being verified by monitoring after the upgrade is completed. This is because at these flows there will be no direct discharge and upstream contamination is low. (The river is not currently graded at the Cliffs.)
26. We are agreed that at higher flows when discharge occurs, the current health risk will not be reduced (and will be increased slightly from present because of lower

dilution rates). However, at these times few people are expected in the river so there ought to be little actual risk.

27. Reducing the upstream pollution from farm run-off would make a significant contribution to ensuring a favourable re-grade of the SfRG.
28. We are agreed that post upgrade there will remain an elevated risk at flows above median and for a period after such flows. However we note that even with a zero discharge it would be inadvisable to swim in the river during or immediately following periods of higher flows.
29. In summary we are agreed that the improvement of the SfRG from *Very Poor* to at least *Fair* for low flow periods, when there will be no direct discharge, represents a significant reduction in overall health risk. We are agreed that at times of discharge the risks will remain similar to the risks at present.

Risk following periods of greater than median flow

30. Dr Palmer raised the issue of a period of elevated risk immediately following the cessation of the discharge, which had not been contemplated. This is a valid concern and needs to be addressed by risk management/risk communication. The stand-down period following the cessation of the discharge that is required for the risk to reduce to an acceptable level at the Kokotau and The Cliffs sites should be estimated and be noted in risk communication (eg signage).
31. It is accepted that risk at above median flows, will be a result of both the discharge and upstream contamination from run-off during a fresh. The “stand down“ period may be able to be revised based on monitoring after a fresh.
32. Mr Ball notes that as the flow recedes towards the median flow, the relative contribution of the discharge will increase as upstream contamination reduces. This is the time when the discharge will have the greatest impact on health risk.
33. Mr Ball is of the view that even if there was no discharge at flows above median, it would be inadvisable to swim in the river immediately following a fresh because of upstream contamination.

Signage

34. It is noted that the Guidelines recommend signage to warn the bathing public of additional risks at times when greater contaminant levels may be expected (eg at elevated river levels from runoff following heavy rain or, as in this case, intermittent discharge of treated wastewater) for sites where the SfRG is adjudged to be *Good*, *Fair* and *Poor*. Based on the Guidelines there should be signage at The Cliffs and Kokotau, both currently and post upgrade. There is currently no such signage. It is also noted that even if there was no discharge there should be signage to alert the public of the risk associated with rural and urban run-off following rainfall.
35. We are of the view that during the summer prospective users of the river should be informed of when direct discharge is occurring. This is not presently the case other than at Wardells Bridge.

Overall comment

36. The overall outcome of this assessment is not at odds with that stated in Mr Ball's evidence. The proposed intermittent discharge regime is a relatively new and innovative approach. Such novel approaches were not considered when the 2003 Guidelines were developed. We have now agreed on a robust approach that adequately addresses most concerns around uncertainty. The perceived contradiction is due to the complexity around using output from the Monte Carlo simulation and innovatively applying this to guidelines that were not written to be used in this way. It is our recommendation that these matters be clarified in the Guidelines to remove this ambiguity in future.
37. It would not have been appropriate to use these statistics to infer an absence of disease contracted from bathing in the Ruamahanga River due to a combination of the low likely infection rate (as inferred from both the MAC and the QHRA) even under the present discharge, the relatively small number of swimmers on a given day, and the low reporting rate of notified diseases. However, this was not claimed. Mr Ball quoted the notified disease statistics merely to demonstrate that the pattern of notified diseases in the Wairarapa district was similar to that observed nationally, and so there was no need to include a more detailed assessment of a particular pathogen in the QHRA.

38. It has been implied that if people were getting sick from bathing in the river then people would know this and would be reluctant to swim in the river. We do not think this would be the case. Even at a 5% risk of infection threshold (where the Guidelines recommend no swimming), the small daily usage and the fairly small proportion of infections that progress to symptoms would mean that the number of swimmers that would become ill from swimming on a given day would be small – probably too small for the river to be recognised as the cause of the infection among the other more widely recognised causes such as food poisoning and catching it from another person with similar symptoms. Outbreaks tend to be the only situation where people relate illness to a particular source, so any waterborne infections that may occur as a result of swimming in the river would appear to be sporadic and therefore go unrecognised. However, this does not mean that waterborne disease does not occur or that it is any the less important – just that it is not well recognised by most people.
39. We emphasise that the 5% figure relates to the current situation. The upgrade will significantly reduce the risk of disease since at the flows when the vast majority of contact recreation occurs, there will be no direct discharge and a negligible level of risk from the land discharge and leakage from the clay sealed ponds.
40. We apologise for the failure to discuss this assessment prior to the submission of the previous evidence. Mr Ball followed his normal procedure of discussing the risk assessment with the local Public Health Unit well prior to the hearing and, as he understood that no concerns were raised regarding the risk assessment, was not aware of the issues raised by Dr Palmer, nor indeed of his interest in this matter. Had he been they would have been addressed prior to the hearing. It is also acknowledged that these concerns were not raised in the submissions by the Public Health Unit in either 2007 or 2008. Dr Palmer accepts that Mr Ball's risk assessment has been available to the Public Health Unit since 2007 but was not brought to his attention until this year.
41. Mr Ball acknowledges that the Public Health Unit did not regard his QHRA report as an HIA. However, he was not briefed to carry out an HIA. and understands that a decision was made by the MDC project team that such a study was not required.

Dr Stephen Palmer (Medical Officer of Health) and Andrew Ball