

Comments on Conditions	Susannah Vesey (reporting officer)	Mike Freeman's Comments – Inserted from Ohau Downs CRC061154	Meridian Comments Inserted from Ohau Downs CRC061154 Overall view is, like the Investigating Officer, that the proposed conditions are not adequate to avoid or mitigate significant adverse effects  MEL has tried to avoid duplicating the comments of the Investigating Officer	SHL Comments	SHL Suggested Amendments
1. Water for irrigation shall only be used on or applied to land that is subject to a memorandum of encumbrance that complies with the requirements of the agreement entitled "Agreement in Relation to the Allocation of Water for Irrigation" between Meridian Energy Limited and the Mackenzie Irrigation Company Limited dated the 31 <sup>st</sup> of October 2006.	See comments in my addendum report, paragraph 142(c)	"Applied to" is not RMA terminology.		Agree with MF  Delete "...or applied to..."	Water for irrigation shall only be used on land that is subject to a memorandum of encumbrance that complies with the requirements of the agreement entitled "Agreement in Relation to the Allocation of Water for Irrigation" between Meridian Energy Limited and the Mackenzie Irrigation Company Limited dated the 31st of October 2006.
2. The consent holder shall, six months prior to this consent being exercised, provide to the Canterbury Regional Council a certificate from the Consent Holder's solicitor certifying that the memorandum of encumbrance provided for in Condition 1 is registered on the computer registers for the land shown on Plan A, and any other evidence of registration as the Canterbury Regional Council may require (if any).		Where is Plan A? Need to establish a standard term and definition for the property to be used in various conditions.  A reference to a plan needs to include an assurance that the plan is "...attached to and forms part of this consent."		Agree Plan A needs to be included. Don't believe there would be need to further define property if Plan A contains sufficient detail. If not then should include other references such as map references.  Agree with comment re: plan "...attached to and forms part of this consent."	The consent holder shall, six months prior to this consent being exercised, provide to the Canterbury Regional Council a certificate from the Consent Holder's solicitor certifying that the memorandum of encumbrance provided for in Condition 1 is registered on the computer registers for the land shown on Plan A, <a href="#">which is attached to and forms part of this consent</a> , and any other evidence of registration as the Canterbury Regional Council may require (if any).
3. The consent holder shall, take all practicable steps to: (a) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity (b) Avoid leakage from pipes and structures; and (c) Avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips. (d) If the irrigation system used to distribute water taken in terms of this permit is used to distribute effluent, fertiliser or any other added contaminant, a backflow preventer manufactured in accordance with AS 2845.1 (1998) or the American Society of Sanitary Engineers standards shall be installed within the pump outlet plumbing or within the mainline, to prevent the backflow of water containing contaminants into the fresh water source. (e) The backflow preventer shall be tested to the standard set out in AS 2845.3 (1993) or an equivalent method within one month of its installation and annually thereafter by a suitably qualified independent person. A test report shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within two		Typo – 'numbering'. "and" missing.  (c) and (d) need to be re-written as either a new condition or a separate sub-condition. Not appropriate to be prefaced by "all practicable steps". A backflow preventer in such circumstances is essential. All practicable steps conditions should only be used in circumstances when some factors are beyond the control of the consent holder. Intro/grammar of (d) wrong. Needs fixing and linking properly to (c). Typo - "or" should be "of". Backflow prevention condition should start	a) The condition should reference irrigation depths and return period for soils as outlined in the table from the previous conditions; or  b) To ensure the objective in the FEMP is adhered to the system should be designed and operated to ensure field capacity is not exceeded, by classifying the properties of soils, irrigation depth and irrigation return period.  We also seem to have two	Agree with MF that (d) and (e) should be separate conditions or sub-conditions.  Consider all practicable steps is appropriate but agree that backflow preventer, or other suitable alternative, is required where water is used to distribute effluent and/or fertilizer.  Agree to alternative condition provided by MF via email 14/07/10 regarding backflow prevention. Condition is inserted, with some minor changes suggested.	The consent holder shall, take all practicable steps to: (a) Ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity; and (b) Avoid leakage from pipes and structures; and (c) Avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.  3B. <a href="#">If the irrigation system used in association with taking water in terms of this permit is used to distribute effluent, fertiliser or any other added contaminant, one of the following shall be installed upstream of the point of addition of the effluent, fertiliser or other added contaminant prior to the commencement of irrigation for the purposes stated in this condition:</a>

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	weeks of each inspection.		with: "A backflow prevention device shall be installed and tested in accordance with section 9 (pressure vacuum breakers) or section 12 (reduced pressure zone devices) of Australian/New Zealand Standard AS/NZS 2845.1 Water supply - Backflow prevention devices, Part 1: Materials, design and performance requirements"....	condition (a)'s	Matters raised by MEL are provided for in the design and additional conditions are not necessary.	<ul style="list-style-type: none"> <li>(i) a reduced pressure zone device (RPZD), or</li> <li>(ii) a pressure vacuum breaker (PVB), or</li> <li>(iii) an air gap backflow prevention system.</li> </ul> <ul style="list-style-type: none"> <li>(a) Installation of a RPZD or a PVB shall be in accordance with section 9 (PVB) or section 12 (RPZD) of Australian/New Zealand Standard AS/NZS 2845.1 Water supply - Backflow prevention devices, Part 1: Materials, design and performance requirements, or an equivalent standard.</li> <li>(b) An air gap backflow prevention system shall have an unobstructed vertical air gap separation of at least twice the diameter of the inlet pipe, from the lowest point of the inlet pipe to the flood level rim of the receptacle into which it discharges.</li> <li>(c) Field testing and maintenance shall be carried out of an RPVD or a PVB at commissioning of the use of the system for application of effluent or fertiliser and annually afterwards, in accordance with AS 2845.3 Water supply—Backflow prevention devices, Part 3: Field testing and maintenance, or an equivalent standard.</li> <li>(d) An air gap backflow prevention system shall be tested at commissioning and annually afterwards. Maintenance shall be undertaken as necessary to ensure that backflow prevention is effective.</li> <li>(e) Installation, testing and maintenance shall be undertaken by a suitably qualified person. A report on the annual testing shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within <u>10 working days</u> of initial commissioning and within <u>10 working days</u> of each annual testing. Each report shall be accompanied with the name, qualifications and experience of the person who undertook the installation, testing or maintenance.</li> </ul> <p>Advice note 1: The discharge of effluent, fertiliser or any contaminant would require authorisation as a permitted activity or via a discharge permit. Contact the Canterbury Regional Council for advice regarding the relevant regional rules.</p>	<p><b>Comment [PG1]:</b> Note: N/A to this consent</p> <p><b>Deleted:</b> two weeks</p> <p><b>Deleted:</b> two weeks</p>	
	<b>Pre-irrigation monitoring</b>							
4.	Prior to the commencement of irrigation under this consent the consent holder shall: (a) Prepare and implement a groundwater monitoring plan for the purpose of confirming the distribution of flow between the groundwater and surface water of the Ahuriri River and		Confirming indicates a bias. Should be "assessing". Not clear what "distribution of flow" means. The technical question needs to be	This proposed condition is a new approach to that previously submitted by applicants and is generally supported by MEL. It	Agree with MF that further clarity required and suggested changes made in this regard.	Prior to the commencement of irrigation under this consent the consent holder shall: (a) Prepare and implement a groundwater monitoring plan for the purpose of <u>assessing</u> groundwater and surface		

<p>Omarama Stream Sub Catchments. This shall generally be in accordance with the plan described in the Water Quality Study (GHD, 2009). The period of monitoring must include one year of data gathering prior to the commencement of irrigation under this consent.</p> <p>(b) Provide a report to the Canterbury Regional Council on the groundwater monitoring results, including:</p> <p>(aa) a summary of the data collected; and</p> <p>(bb) a description and assessment of the level of variance in the groundwater distribution from the expected outcomes reported in the Water Quality Study (GHD, 2009).</p> <p>The calculation of (bb) shall be by the method set out in Appendix B.</p> <p>(c) Prepare and implement a periphyton monitoring plan that includes monthly monitoring at each sub-catchment node for the purpose of establishing the current maximum annual periphyton biomass at those nodes. The monitoring shall include:</p> <p>(aa) monthly waterflow gaugings and continuous water level records;</p> <p>(ab) monthly water quality measurements (specifically temperature, dissolved oxygen and black disc water clarity shall be measured), nutrient analysis (SIN, SRP and alkalinity), periphyton biomass (measured as ash free dry matter and chlorophyll a concentrations per unit area) and composition, and the community of macroinvertebrate grazers at each node.</p> <p>(ac) an assessment to measure the likely biomass contribution of Didymo, in those nodes where Didymo is present.</p> <p>(ad) methods for assessing periphyton biomass accrual can include glass slides. Periphyton biomass shall also be described on natural substrates at hard-bottomed stream / river nodes.</p> <p>(ae) the period of the monitoring shall include at least one year of data gathering prior to the commencement of irrigation under this consent.</p> <p>(d) Provide a report to the Canterbury Regional Council on the periphyton monitoring results, including:</p> <p>(i) a summary of the data collated;</p> <p>(ii) the maximum monthly and annual periphyton biomass (with a separate description for Didymo where it is present) at each node;</p> <p>(iii) the relationship between nutrients (SIN, SRP), flood frequency (FRE3), macroinvertebrate grazers, periphyton biomass and the floristic composition of periphyton shall be modelled on the basis of the monitoring data collected.</p> <p>(iv) the identification of the following parameters:</p> <p>(aa) a 25% increase in annual periphyton biomass</p>		<p>properly and quantitatively defined.</p> <p>What plan? – needs to be specific.</p> <p>Without some detailed methodological requirements this doesn't amount to anything really. Any study could be done. A one year investigation may produce a result that is not representative of the longer term - could be a waste of money and opportunity for many consent applicants.</p> <p>Provide a report – when? “Level of variance in the groundwater distribution” – this is not a technically robust description. Appendix B is not adequately specific. Either a significantly greater level of specificity is needed or a rigorous expert opinion method needs to be developed with a default route. Not clear what “current maximum annual periphyton biomass” is? Is this meant to be maximum periphyton biomass? Gaugings and flow estimation – to what standards? What detection limits and methods? When would this be implemented? Alkalinity is not a nutrient. An assessment to measure? Monitoring shall include... “methods for assessing”? (ad) just 'describe' biomass? When does the report have to be provided? No requirement to provide the original data? Annual periphyton biomass? (d)(iii) is potentially a major scientific undertaking. (d)(iv) Not 'parameters'. They are modelled estimates. (d)(iv)(ab) Farm nutrient loads won't result from periphyton biomass.</p>	<p>includes “one year of data gathering prior to the commencement of irrigation under this consent”. It includes groundwater, periphyton, nutrient loading/discharges, etc.</p> <p>MEL supports the involvement of qualified experts.</p> <p>By way of clarity there are references to nutrient loading - is this the same as NDA? If not, it should be defined.</p>	<p>“Distribution of flow” replaced by “assessing ground and surface water interaction”.</p> <p>The Aqualinc Study is specific and provides sufficient detail regarding methodology to ensure appropriate monitoring.</p> <p>A one year investigation is considered sufficient given the matters that are being assessed (i.e. interaction of ground and surface water).</p> <p>Consider that provision of raw data to CRC is appropriate and should be required under this condition. Also timeframe required for report to be provided.</p> <p>Agree with MF that the loading figures in the FEMP need to be adjusted, however, the figures are accurate within this consent.</p> <p>Regarding MELs comment on nutrient loading v NDA, these are not the same. A comparison between the two determines compliance.</p> <p>Farm nutrient loading is the discharge as modeled by OVERSEER</p> <p>NDA is the Nutrient Discharge Allowance</p> <p>Definitions for these terms are now provided as advice notes.</p> <p>Condition 4(i) has been included to require map references for monitoring locations.</p>	<p>water <a href="#">interaction in</a> the Ahuriri River and Omarama Stream Sub Catchments. <a href="#">The monitoring undertaken and parameters assessed shall be in general accordance with the Upper Waitaki Basin Groundwater Proposed Monitoring Programme (Aqualinc, 2010).</a> The period of monitoring must include one year of data gathering prior to the commencement of irrigation under this consent.</p> <p>(b) <a href="#">Within one month of the completion of monitoring in accordance with condition 4(a), provide a report, prepared by a suitably qualified and experienced independent expert,</a> to the Canterbury Regional Council on the groundwater monitoring results, including:</p> <p>(aa) a summary of the data collected; and</p> <p>(bb) a description and assessment of the level of variance in the groundwater distribution from outcomes reported in <a href="#">the “Upper Waitaki Basin Groundwater Proposed Monitoring Programme (Aqualinc, 2010).”</a></p> <p>The <a href="#">methodology for the assessment of conditions 4(a) and 4(b) is</a> set out in Appendix B;</p> <p>(c) Prepare and implement a <a href="#">surface water quality</a> monitoring plan that includes <a href="#">various calibration points in the catchment for the purposes of establishing the magnitude of farm nutrient losses in the receiving environment and monthly monitoring</a> at each sub-catchment node for the purpose of establishing the current <a href="#">monthly and annual</a> maximum periphyton biomass at those nodes.</p> <p>(d) The monitoring shall include:</p> <p>(i) monthly flow gaugings and continuous water level records;</p> <p>(ii) monthly water quality measurements (specifically temperature, dissolved oxygen, <a href="#">alkalinity</a> and black disc water clarity shall be measured), nutrient analysis (<a href="#">nitrate, DIN, DRP, TN and TP</a>), periphyton biomass (measured as ash free</p>
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<p>above the current maximum at each node; and</p> <p>(ab) the farm nutrient loads that would result from a 25% maximum annual periphyton at the node ("maximum annual periphyton load").</p> <p>(e) For the purposes of 4(d), a suitably qualified independent expert must be satisfied that the current national predictive equations are scientifically robust and will accurately predict the relationship between nutrient concentration, flood frequency and accumulated biomass of periphyton including Didymo.</p> <p>(f) Prepare and implement a monitoring plan for the purpose of confirming total farm nutrient loading (N and P). The period of monitoring must include one year of data gathering prior to the commencement of irrigation under this consent.</p> <p>(g) Provide a monitoring report to the Canterbury Regional Council that includes the following:</p> <p>(i) an estimate of the annual average existing N and P discharges from the farm using a minimum of 3 years of information, including the information from the 12 month monitoring period required by (e) above ("existing total farm nutrient loading");</p> <p>(ii) an estimate of the proposed nutrient loading that would occur as a product of the proposed farming system to be adopted (as described in the Farm Environmental Management Plan), including proposed mitigation ("proposed farm nutrient loading"); and</p> <p>(iii) the sum of the existing and the proposed total farm nutrient loading.</p> <p>The calculations for (i) and (ii) shall be derived in accordance with the method set out in Appendix C.</p> <p><b>(h) Prepare and implement a farm environmental monitoring plan for the purpose of identifying on farm conditions, including groundwater and surface water quality prior to the commencement of irrigation. This will form part of the monitoring requirements set out in Sections 6 - 12 of the Farm Environmental Management Plan (FEMP) for Killermont (WHL).</b></p>		<p>Usually it's the other way round!</p> <p>(e) Who determines what constitutes "suitably qualified"?</p> <p>Using what methods?</p> <p>What equations?</p> <p>(f) "confirming" inappropriate term.</p> <p>(g) Report required when?</p> <p>(g)(i) Discharges or loads?</p> <p>(g)(ii) Has already been done.</p> <p>See comments on Appendix C</p> <p>Monitoring plans should not be at the discretion of the consent holder. Should specify what needs to be done at the outset.</p> <p>FEMP loading figures have not been adjusted as part of proposed 'Needs plus buffer' change.</p>		<p>dry matter and chlorophyll a concentrations per unit area) and composition, and the community of macroinvertebrate grazers at each node.</p> <p>(iii) an assessment <u>of the</u> biomass contribution of Didymo, <u>at</u> those nodes where Didymo is present.</p> <p>(iv) <u>an assessment of the</u> periphyton biomass on natural substrates at <u>sub-catchment nodes with</u> hard-bottomed stream <u>beds</u>.</p> <p>(v) <u>a</u> period of the monitoring <u>encompassing</u> at least one year of data gathering prior to the commencement of irrigation under this consent.</p> <p>(e) <u>Within one month of the completion of monitoring under Condition 4(c) of this consent</u> provide a report to the Canterbury Regional Council on the <u>surface water</u> monitoring results, including:</p> <p>(i) the original/raw data collected;</p> <p>(ii) a summary of the data collated;</p> <p>(iii) the maximum monthly and annual <u>maximum</u> periphyton biomass (with a separate description for Didymo where it is present) at each <u>sub-catchment</u> node;</p> <p>(iv) the relationship between nutrients (<u>DIN</u>, <u>DRP</u>), flood frequency (<u>FRE3</u>), macroinvertebrate grazers, periphyton biomass and the floristic composition of periphyton modelled on the basis of the monitoring data collected;</p> <p>(v) the identification of the following parameters:</p> <p>(aa) a 25% increase in annual periphyton biomass above the current <u>annual</u> maximum at each <u>sub-catchment</u> node; and</p> <p>(ab) the <u>change in catchment</u> nutrient loads <u>at the node</u> that would <u>give rise to</u> a 25% annual <u>maximum</u> periphyton <u>biomass</u> at <u>each sub-catchment using the equation in Biggs (2000) for calculating annual average</u></p>
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[periphyton biomass or an empirical equation based on the relationship in e\(iii\).](#)

- (e) For the purposes of 4(d), a suitably qualified [and experienced](#) independent expert must be satisfied that the [equation in Biggs \(2000\) for calculating annual average periphyton biomass or an empirical equation based on the relationship described in \(d\)\(iv\)](#) is scientifically robust and will accurately predict the relationship between nutrient concentration, flood frequency and accumulated biomass of periphyton including Didymo.
- (f) [Within one month of the monitoring required by Condition 4\(d\)](#) prepare a [nutrient budget report](#) for the purpose of confirming total farm nutrient [modeled losses](#) (N and P). [This budget report shall be prepared](#) prior to the commencement of irrigation under this consent.
- (g) [Within one month of the monitoring required by Condition 4\(d\)](#) provide a report [on the nutrient budget referred to in Condition 4\(f\) prepared by a suitably qualified and experienced expert](#) to the Canterbury Regional Council that includes the following:
- (i) an estimate of the annual average existing N and P [losses](#) from the farm ("existing total farm nutrient loading");
  - (ii) an estimate of the proposed nutrient loading that would occur as a product of the proposed farming system to be adopted (as described in the Farm Environmental Management Plan), including proposed mitigation ("proposed farm nutrient loading"); and
  - (iii) the sum of the existing and the proposed total farm nutrient loading.

The calculations for (i) and (ii) shall be derived in accordance with the method set out in Appendix C.

						<p>(h) Prepare and implement a farm environmental monitoring plan for the purpose of identifying on farm conditions, including groundwater and surface water quality <u>and ecology</u> prior to the commencement of irrigation. This will form part of the monitoring requirements set out in Sections 6, <u>8</u>, <u>10</u> and <u>12</u> of the Farm Environmental Management Plan (FEMP) for <u>WHL Killermont</u>.</p> <p><u>(i) All monitoring plans and reports required in accordance with condition 4 shall identify locations for monitoring, including map references.</u></p> <p><u>Advice Note 2:</u> <u>For the purpose of interpreting conditions of this consent, Farm nutrient loading means the nutrient discharge as modeled by OVERSEER.</u></p> <p><u>Advice Note 3:</u> <u>For the purpose of interpreting conditions of this consent, NDA means Nutrient Discharge Allowance.</u></p>
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5.	<p>Copies of the monitoring plans (including the groundwater monitoring plan referred to in Condition 4(a), the periphyton monitoring plan in Clause 4(c) and the farm environmental monitoring plan in Clause 4(h)) must be provided to the Canterbury Regional Council for certification at least 20 working days prior to implementation of the plans. All plans and reports referred to in Condition 4 must be undertaken by a suitably qualified independent expert.</p>		<p>Certification' against what standard? What would the basis be for 'certification'? What happens if the CRC does not "certify"? This issue repeats throughout the proposed conditions. Refer to MfE/QP consent condition guidelines on certification</p>		<p>Conditions contain specific requirements for monitoring and reports and this would form the basis for certification by CRC.</p> <p>The purpose and intent of the certification process is to ensure that the methodology to be employed accords with accepted scientific practice. It is simply not practicable to specify specific standards for the monitoring, indeed it why the certificate is required from a "suitably qualified and experienced independent expert." In relation to the last matter, the certificate is now proposed to be issued with the draft report. The there is no need for a 'contingency'/'conflict resolution' process.</p>	<p>Copies of the monitoring plans (including the groundwater monitoring plan referred to in Condition 4(a), the <u>surface water</u> monitoring plan in Clause 4(c) and the farm environmental monitoring plan in Clause 4(h) must be provided to the Canterbury Regional Council 20 working days prior to implementation of the plans. All plans and reports referred to in Condition 4 must be undertaken by a suitably qualified independent expert shall be:</p> <p><u>(i) prepared by a suitably qualified and experienced independent expert; and</u> <u>(ii) issued with a certificate from a suitably qualified and experienced independent expert, that certifies that the monitoring methodology proposed accords with accepted scientific practice.</u></p>
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Pre - Irrigation thresholds					
6.	<p>The consent holder may not commence irrigation under this consent unless:</p> <p>(a) In relation to Killermont (WHL) groundwater distribution generally accords with the Water Quality Study (GHD, 2009) for the Ahuriri River and Omarama Stream sub catchments.</p> <p>(b) The proposed total farm nutrient loading is estimated to be consistent with or less than the values set out in Table 1 Appendix A; and</p> <p>(c) In relation to Killermont (WHL) the proposed total farm nutrient loading is not estimated to result in an exceedance of the sub catchment nutrient thresholds set out in Table 3 or Table 5 of Appendix A (as adjusted in accordance with condition 4(d)(dd))</p>	<p>How would 'generally accords' be determined? Who would determine it?</p> <p>(a) "generally accords" would be determined by who, how, when?</p> <p>(b) Estimated by who, how, when?</p> <p>Tables don't make sense. No units.</p> <p>Easy to propose a nutrient loading consistent with Table 1, the real issue should be the requirement to comply with that nutrient management regime.</p> <p><b><i>This proposed condition and many other similar conditions would effectively provide the consent holder with the ability to make unfettered determinations rather than to have quantified thresholds that can be certified and independently verified.</i></b></p>	<p>This again is a new approach and is generally supported by Meridian.</p> <p>This proposed condition links the commencement of the consent to three standards – groundwater, nutrient loadings on farm, and nutrient loadings at sub-catchments.</p> <p>This links the nutrient loadings to the table(s) in Appendix A rather than having the appendix in the conditions (as per previous versions) – a more efficient approach.</p> <p>It is noted Table 3 does not include the reference location column. Meridian suggests that for certainty it would be appropriate to locate and identify the nodes.</p> <p>The condition refers to "Table 3 or Table 5". The condition needs to be clear that both nutrient thresholds must be met (i.e. "and" rather than "or") (this also applies elsewhere in the proposed consent conditions).</p> <p>Furthermore, the tables need units and methodology (e.g. how the annual loading can be derived from a nutrient concentration measurement).</p> <p>Farm nutrient load vs NDA?</p>	<p>Amended condition proposed based on concerns expressed.</p> <p>Believe that use of "in general accordance" is appropriate as it allows for a very minor level of flexibility, without the need for a variation to the consent. If any uncertainty about whether it was in general accordance this would be confirmed by CRC. We also note for completeness, that the term 'generally accords with' is commonly used throughout New Zealand.</p> <p>Agree with comments that tables are not correct. These should be updated.</p> <p>In reference to MEL's comment re: tables in Appendix A do not see this as an issue given that it is referred to in many different conditions.</p> <p>Condition 6(c) can be deleted as not required.</p> <p>Disagree with comments of MF regarding ability of consent holder to make unfettered determinations. The conditions as proposed with suggested amendments all refer to specific detail and requirements.</p>	<p>The consent holder may not commence irrigation under this consent unless:</p> <p>(a) <a href="#">The report required by Condition 4(b) of this consent confirms that the groundwater distribution generally accords with the Upper Waitaki Basin Groundwater Proposed Monitoring Programme (Aqualinc, 2010), being the report that which describes the assumptions employed in the modeling and the testing needed to confirm groundwater distribution</a> for the Ahuriri River and Omarama Stream sub catchments; and</p> <p>(b) The <a href="#">report required by Condition 4(h) confirms that the difference in total farm nutrient losses between current and proposed are</a> consistent with or less than the <a href="#">PDNA</a> values set out in Table 1 Appendix A; and</p>
7.	<p>If in the event that the variance in groundwater distribution is such that distribution does not generally accord with the Water Quality Study</p>	<p>See above comments. Uncertain terminology is not</p>	<p>This again requires more involvement of qualified</p>	<p>Amendments made to</p>	<p><a href="#">7A.</a> If <a href="#">one or all of the matters listed in Condition 6 of this consent are not met, such that irrigation is not</a></p>

**Deleted:** In relation to Killermont (WHL) the proposed total farm nutrient loading is not estimated to result in an exceedance of the sub catchment nutrient thresholds set out in Table 3 or Table 5 of Appendix A (as adjusted in accordance with condition 4(d)(dd))

<p>(GHD, 2009) for the Ahuriri River and Omarama Stream sub catchments, then a report shall be prepared by two appropriately qualified and independent experts, one of which is to be appointed by the Canterbury Regional Council and the other by the consent holder. The report prepared shall be provided to the Canterbury Regional Council for certification upon its completion. The purpose of the report shall be to address the following matters:</p> <p>(a) An assessment of the significance of the variance (if any) on the estimated nutrient loading at the sub catchment node points listed in Table 3 or Table 5 of Appendix A;</p> <p>(b) The proposed total farm nutrient loading set out in Table 1 Appendix A (including any adjustment if necessary); and</p> <p>(c) A recommendation on whether the consent holder may commence irrigation and if so, on what basis.</p>	<p>robust. Who will make that determination? How? Should not be appointed by CRC. Could be nominated by CRC. Uncertain. See Appendix comments. "address ... an assessment of... nutrient loading"? Inadequate specification of node points. Significant monitoring sites missing such as Wairepo Creek upstream and downstream sites.</p> <p><b>On what basis would such a recommendation be made - environmental, financial, etc? What specific requirement would need to be satisfied?</b></p>	<p>experts which is supported.</p> <p>This has moved in sub-clause (b) to "total farm nutrient loading" as a term, rather than the previous use of "total farm nutrient discharge allowance (NDA)". MEL is unclear on the difference in these terms and would for consistency prefer the use of one term.</p>	<p>address these comments.</p> <p>Agree that CRC should be responsible to nominate rather than appoint independent expert.</p> <p>In reference to comments by MF regarding basis on which a recommendation to commence irrigation may occur, any recommendation would have to accord with Part 2 of the Resource Management Act 1991.</p>	<p><u>able to commence, a further</u> report shall be prepared by two appropriately qualified and <u>experienced</u> independent experts, one of which is to be <u>nominated</u> by the Canterbury Regional Council and the other by the consent holder. The purpose of the report shall be to address the following matters:</p> <p>(a) An assessment of the significance of the variance (if any) on the estimated nutrient loading at the sub catchment node points listed in Table 3 <u>and</u> Table 5 of Appendix A;</p> <p>(b) The proposed total farm nutrient <u>losses and thresholds</u> set out in Table 1 Appendix A (including any adjustment if necessary); and</p> <p><u>(c)</u> A recommendation on whether the consent holder may commence irrigation and if so, on what basis.</p> <p><u>7B. The consent holder shall forward a copy of the report required by Condition 7A to the Canterbury Regional Council within 5 working days of its completion. Upon receipt of the report the Canterbury Regional Council shall appoint a suitably qualified and experienced independent expert to review and certify the report. The certifier shall only issue their certificate if they are satisfied that the conclusions drawn and recommendations made in the report are scientifically valid and robust.</u></p>
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8.	In the event that the report provides a recommendation that the consent holder may commence irrigation and the report recommendation is accepted by the Canterbury Regional Council, then the consent holder may commence irrigation in accordance with that recommendation.	<p>With what statutory power could ECan accept or not accept? On what basis would ECan accept or decline?</p> <p><b>Uncertain and ultra vires. CRC does not have a consent authority outside of the consent process. Needs a proper certification process.</b></p>	<p>Needs to reference report (i.e. report produced in accordance with condition 7). This relates to what actions are required if the groundwater doesn't match predictions.</p> <p>Further, is there also a need for a condition which address if the second two preconditions are also not met?</p> <p>There could be more clarity between this condition and condition 6 above.</p>	<p>Suggested condition 7A details basis on which certification is to be issued and suggested Condition 8 requires independent expert to certify. Changes to conditions provide process and certainty for certification.</p> <p>Suggested changes provide adequate reference to reports.</p> <p>Adequate links provided between Conditions 6 and 7.</p>	In the event that the report <a href="#">required by Condition 7A of this consent</a> provides a recommendation that the consent holder may commence irrigation and <a href="#">that recommendation is certified by the certifier appointed in accordance with Condition 7B of this consent</a> then the consent holder may commence irrigation in accordance with that recommendation.
9.	In the event that the Canterbury Regional Council notifies the consent holder that it does not accept the recommendation to commence irrigation contained in the report, it may review the conditions of the Consent, including but not limited to the condition 4(g).	So what would happen in the interim? Not clear. Review process could take years.	This is a type of Section 128 review clause but it is unclear why condition 4(g) is specifically mentioned.	<p>Suggest deleting reference to condition 4(g) – this no longer appears relevant and was part of an earlier set of conditions.</p> <p>These reports are required prior to commencement of irrigation so nothing would happen in the interim.</p>	In the event that the Canterbury Regional Council notifies the consent holder that <a href="#">the certifier appointed in accordance with Condition 7B of this consent will not certify the report as being scientifically valid and robust</a> , it may review the conditions of the Consent, <a href="#">pursuant to Section 128 of the RMA</a> .
10.	In the event that the report does not provide a recommendation that the consent holder may commence irrigation, or the recommendation is not acceptable to the consent holder, the consent holder may seek to vary the conditions of consent to allow commencement of the Consent.	Which similarly, could take years.	<p>Such a condition appears to be inappropriate and otherwise <i>ultra vires</i>.</p> <p>Presuming that the reference is to a section 127 variation, then there is no need to anticipate or in anyway pre-empt such an application.</p> <p>i.e. the right to make an application for a variation is already sufficiently spelt out in the RMA – it does not need reference in the consent.</p>	Agree with comments of MEL that this condition is not required.	Condition deleted

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<b>Operational Monitoring Reportage</b>					
In conjunction with the sub catchment and Lakes monitoring and reportage required by conditions 35 to 50, the consent holder shall continue the groundwater monitoring and reporting required by condition 4(a) and 4(b) during the exercise of the consent. Conditions 7, 8, 9 and 10 shall apply with all necessary modifications.		Carry on groundwater monitoring for 34 years even if not needed?	The wording of this condition is quite unclear what is met by - ... <i>Conditions 7, 8, 9, 10 shall apply with all necessary modifications</i> ?	Condition is unnecessary and can be deleted as all necessary monitoring and reporting provided for elsewhere in consent.	Condition deleted

			Should precondition 6 also still apply at the beginning of each season?  This condition (and the pre-irrigation monitoring conditions above), don't include any of MEL's suggestions about monitoring.	Groundwater monitoring under conditions 4(a) and 4(b) would not need to continue, however monitoring under conditions 35-50 would.	
<b>Operational Thresholds</b>					
Subject to conditions 37 and 43, the consent holder may exercise this consent provided that: (a) Groundwater distribution generally accords with the Water Quality Study (GHD, 2009) for the Ahuriri River and Omarama Stream sub catchments; (b) The proposed total farm nutrient loading is estimated to be consistent with or less than the values set out in Table 1 of Appendix A as adjusted in accordance with condition 4(f); (c) Compliance with the environmental thresholds in Table 3 and Table 5 of Appendix A (sub nodal and lakes thresholds).		This is repeating most of condition (6) with slightly different wording at the start and for (12)(c). See earlier comments. Not clear why it needs to be repeated. As noted above, easy for the proposed loads to comply with Table 1.  <b>See earlier general comments.</b>	Nutrient load rather than NDA again.  This condition does link the onsite thresholds with the sub catchment and lake thresholds which MEL generally supports.  Table 5 needs to include a TLI trigger, not just the nutrient concentrations as this relies on the modelling being accurate.	This condition relates to the continuation of irrigation once it has commenced. Suggest adding this for clarification.	Subject to conditions 37 and 43, the consent holder may <u>continue to</u> exercise this consent provided that: (a) The report required by Condition 4(b) of this consent confirms that the groundwater distribution generally accords with the Upper Waitaki Basin Groundwater Proposed Monitoring Programme (Aqualinc, 2010) which describes the assumptions and testing to confirm groundwater distribution for the Ahuriri River and Omarama Stream sub catchments; and (b) The report required by Condition 4(h) confirms that the difference in total farm nutrient losses between current and proposed are consistent with or less than the PDNA values set out in Table 1 Appendix A; and (c) Compliance with the environmental thresholds in Table 3 and Table 5 of Appendix A (sub nodal and lakes thresholds).
<b>Staging (optional)</b>					
For a period of 5 years from the commencement of irrigation, the farm operations may only utilise up to 80% of the proposed farm nutrient discharge allowance for N and P set out in Table 1 Appendix A.		What are "farm operations"? What does "utilise" mean? What five years?	MEL supports the general approach of initially restricting irrigation development, water supply and NDA to allow monitoring to check what is happening.  NDA is included here and not Total farm nutrient load which is the correct term?	"Farm operations" is an appropriate term which refers to activities associated with the functions of farming.  We consider that 'utilise' is also an appropriate term.  NDA is the appropriate term in this instance, particularly with the now recommended definition of this term in the advice notes.	No alternative condition required

<p>Subject to compliance with the environmental thresholds in Table 3 or Table 5 of Appendix A in the first five years of operation, the consent holder may then utilise 100% of the proposed farm nutrient discharge.</p>		<p>Cannot determine what is intended in the tables e.g., Table 5 information is obviously incorrect. Therefore, the condition cannot function as intended. Table 3 <b>or</b> Table 5? Should be "and".</p> <p><b><i>This proposed approach would defeat one of the apparent reasons for this proposal, i.e, a five year reduced load period and associated monitoring. A threshold could be met in the first year but effects would not have had a chance to work through.</i></b></p>	<p>The condition could be clearer if it said "After 5 years of continuous compliance" but only where it is understood that effects will become apparent within the 5 year time frame.</p> <p>In almost all instances it will be necessary to also link this condition to the groundwater residence time as the lag in nutrient travel could be much greater than 5 years.</p>	<p>Refer to previous comments regarding tables.</p> <p>Due to monitoring locations five years is considered sufficient time to detect any likely exceedences. Changes in groundwater conditions are likely to be detected within 1-2 seasons and therefore any likely trend would well be detected within 5 years.</p>	<p>Subject to compliance with the <a href="#">sub-node and lake</a> environmental thresholds in Table 3 <a href="#">and</a> Table 5 of Appendix A <a href="#">during</a> the first five years of operation, the consent holder may then <a href="#">after</a> utilise 100% of the proposed farm nutrient discharge.</p>	
<p>15.</p>	<p>If the environmental thresholds in Table 3 or Table 5 of Appendix A have not been complied with during the first five year period, due in part or in whole to the farming operations of the consent holder, the consent holder shall provide a report with recommendations on the most appropriate future proposed NDA (the "Staging report") to the Canterbury Regional Council for certification and approval.</p>		<p>As above. Errors in tables. Should stay below thresholds not comply with them.</p> <p>On what basis would recommendations be made? On what basis would CRC 'approve' or 'decline'?</p>	<p>It is unclear who determines whether the consent holder's farming operations are causing none, part or all of the non-compliance?</p> <p>Again needs to be compliance with both tables 3 and 5. At the moment the condition provides little guidance as to what is actually intended to be achieved.</p> <p>Unclear on the effect of natural perturbations in the environment and how these should be included in this period.</p>	<p>The proposed amendments in response to the concerns expressed include:</p> <p>(a) amending condition to delete reference to 'non-compliance as a result of farming operations'; and</p> <p>(b) the insertion of certification by an independent expert on scientific validity and robustness.</p>	<p>15A. If <a href="#">monitoring undertaken in accordance with the applicable conditions of this consent determines that the sub node and lake</a> environmental thresholds in Table 3 and Table 5 of Appendix A have not been complied with during the first five year period, the consent holder shall provide a report with recommendations on the most appropriate future proposed NDA (the "Staging report") to the Canterbury Regional Council. <a href="#">The Staging report shall be completed within 3 months of the end of the fifth year of irrigation under this consent.</a></p> <p><a href="#">15B. The consent holder shall forward a copy of the staging report required by Condition 15A to the Canterbury Regional Council within 5 days of its completion. Upon receipt of the report the Canterbury Regional Council shall appoint a suitably qualified and experienced independent expert to review and certify the report. The expert shall only provide their certificate if they are satisfied that (i) the conclusions drawn and recommendation made in the Staging report are scientifically valid and robust; and (ii) that recommended 'pDNA' will enable farm operations that comply with all other applicable conditions of consent.</a></p>
	<p>If the Staging report is approved by the Canterbury Regional Council, the consent holder may exercise the consent in</p>		<p><i>Ultra vires.</i></p> <p>What would the reference</p>		<p>Amendments are proposed to address the</p>	<p>If the Staging report is <a href="#">certified</a> by the <a href="#">expert appointed in accordance with condition 15B</a>, the</p>

	accordance with those recommendations contained in the Staging report provided that this complies with any other applicable condition of consent. Such report must be completed within 3 months of the end of the fifth year of irrigation under this consent.		points be for CRC approval or decline? All recommendations? Uncertainty for consent holder and consent authority.		concerns raised.	consent holder may exercise the consent in accordance with those recommendations contained in the Staging report.
	If the recommendations of the Staging report are not approved by the Canterbury Regional Council, the Canterbury Regional Council may immediately commence a review of the conditions of the consent including but not limited to conditions 11, 12 and 35 to 50.		So the environmental thresholds could be significantly exceeded but 80% operation would continue - doesn't seem logical or appropriate. A contested review process could take 3 - 6 years to resolve.	Section 128 review clause but unclear why those particular conditions are referenced.	Reference to conditions not significant as prefaced by "including, but not limited to...".  Concern expressed by MF is addressed by proposed condition 13 relating to operation thresholds. This condition makes it clear that once irrigation has commenced the compliance with thresholds is still required.	If the recommendations of the Staging report are not <a href="#">certified by the expert appointed in accordance with Condition 15B</a> , the Canterbury Regional Council may immediately commence a review of the conditions of the consent, <a href="#">pursuant to Section 128 of the RMA</a> , including but not limited to conditions 11, 12 and 35 to 50.
	If the recommendations of the Staging report are not acceptable to the consent holder, then the consent holder may: (a) exercise the consent in accordance with the recommendations or only with the approval of the Canterbury Regional Council, and/or (b) seek a variation to the conditions of the consent including but not limited to the NDA thresholds.		Isn't this a matter that the consent holder and their consultant would sort out beforehand? Consent holder's recommendations not acceptable to the consent holder???	What would guide ECAN to override the expert recommendations in the staging report?  Again, concerns around the inclusion of specific reference to a variation application.	As per previous conditions we suggest an independent expert provide review. It would then be the experts recommendations that need to be considered. If the expert made recommendations that were not satisfactory to the consent holder they have the option of applying for a variation under s.127. A condition stating that the consent holder may apply for a variation is not necessary as this option is available to them in any case. Alternative condition is not necessary, but provided should it be deemed necessary by the decision-maker.	If the recommendations of the expert reviewing the Staging report are not acceptable to the consent holder, then the consent holder may seek a variation to the conditions of the consent, pursuant to Section 127 of the RMA, including but not limited to the NDA thresholds
	<b>Farm Environmental Management Plan (FEMP)</b>					
19.	The consent holder shall implement the on site FEMP for Killermont (WHL) which is attached as Appendix D and forms part of this consent. The objectives of the FEMP are to: (a) Illustrate that the proposed farm system for Killermont (WHL) can meet the nutrient discharge allowances		Consent holder shall" clauses generally not needed. Some conditions would be clearer and shorter without that clause. FEMP loadings	Are the MGAPs the same as the mandatory on farm management conditions? If not, how are these known?	The use of term "The consent holder shall..." simply assigns responsibility.	

	<p>requirements set out in Table 1, Appendix A, and contribute to the achievement of the sub catchment nutrient discharge thresholds; and</p> <p>(b) Identify and mitigate other farm specific environmental risks that are unique to Killermont (WHL) and the farm management system that is proposed for this property.</p> <p>(c) Include Mandatory Good Agricultural Practices (MGAPs) that are to be implemented across the farm.</p> <p>(d) Construct a representative farm model and demonstrate the fulfilment of the nutrient mitigation requirements.</p> <p>(e) Develop an appropriate onsite monitoring and auditing plan for Killermont (WHL).</p>		<p>need to catch-up with the conditions.</p> <p>Why does this condition need a list of objective?</p>	<p>MEL considers that the conditions need to list the key objectives to ensure that the FEMP objectives are not departed from without a variation to the consent.</p> <p>Question whether the phrase “which is attached as Appendix D and forms part of this consent” is appropriate given that it would appear to ‘lock’ the entire plan in as a condition (and require a formal variation for any amendment to the plan)?.</p>	<p>The Mandatory Good Agricultural Practices (MGAPs) are constant to every farm, whereas mandatory on farm management conditions relate to individual properties.</p> <p>Agree loadings in the FEMP need to be updated. Loadings are accurate within this consent.</p> <p>Consider it appropriate to reference FEMP objectives in the condition, however do not consider that amendments to it would require a formal variation. Variation would only be required if the actual condition was sought to change and there is a specific condition which allows for changes subject to approval by CRC.</p>	
	<p>The consent holder shall ensure that the recommended site specific management measures outlined in the FEMP for Killermont (WHL) are adhered to, including the preparation and implementation of the on farm environmental monitoring plan, and the annual preparation of an auditing plan for Killermont (WHL).</p>		<p>What specific measures? Need to spell them out by specifying clauses.</p>		<p>Do not consider it necessary to repeat these measures given the FEMP forms part of consent.</p>	
	<p>The annual auditing process outlined in the FEMP, which is attached to and forms part of this consent, shall include the preparation of a report to be submitted to the Canterbury Regional Council.</p>			<p>A lot of the information is now in the FEMP appendix rather than in the conditions e.g. this condition used to set out how the auditing would occur, when, etc. This should be returned to the conditions</p> <p>Also this condition no longer includes any of the earlier provisions relating to consultation with interested parties or the list of measures to be included. The provision of external input to the plans should be included as a</p>	<p>Given FEMP is referenced in conditions as forming part of the consent there is little need to repeat the detail in the conditions.</p> <p>The FEMPs have been part of consent process and interested parties have already had opportunity to provide input.</p> <p>Minor changes are recommended in relation to the production and issue of a report on the auditing process.</p>	<p>The annual auditing process outlined in the FEMP, which is attached to and forms part of this consent, shall include the preparation of a report to be submitted to the Canterbury Regional Council.</p>

			condition  There are no longer any conditions requiring independent experts, this is left to the FEMP.		
22.	The consent holder may without changing the objectives of a FEMP seek the approval of the Canterbury Regional Council for any necessary amendment to such a plan on the following terms: (a) The review shall be undertaken in consultation with and be approved by the Canterbury Regional Council. (b) Such review is necessary to give effect to the purpose of the FEMP for Killermont (WHL).		This should be replaced by a condition that allows a specifically qualified person to certify that a change would not cause a breach of the relevant NDA.  MEL considers that the FEMP objectives should be included a condition, but after that there should be a reasonable level of flexibility (provided it can be demonstrated or certified that the objectives are being met).	Suggest amending condition to require certification from independent expert.  Including reference to FEMP as part of consent is appropriate and affords certainty regarding implementation, but that this current condition allows flexibility should there need to be adjustments to the FEMP.	The consent holder may, without changing the objectives of a FEMP, amend the FEMP on the following terms: (a) The <u>amendments shall be certified by a suitably qualified and experienced independent expert; and,</u> (b) <u>The certifier shall only certify the amendments if they (i) are necessary to give effect to the purpose of the FEMP for Killermont (WHL), and (ii) enable farm operations that comply with all other applicable conditions of this consent.</u>

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<p>The consent holder shall pay all actual and reasonable costs incurred by the Canterbury Regional Council in connection with its review of the FEMP for Killermont (WHL).</p>		<p>If the above suggested approach is followed this condition would be unnecessary.</p>		<p>Alternative wording suggested. 23A is not considered necessary, but should the decisionmaker decide that clarifying costs is appropriate then we have provided an alternative.</p>	<p><u>23A.</u> The consent holder shall pay <u>the</u> costs incurred by the <u>certifier appointed in accordance with Condition 22 of this consent.</u></p> <p><u>23B. A copy of the amended FEMP and the certifier's certificate shall be provided to the Canterbury Regional Council a minimum of 20 working days prior to implementation of the amended FEMP.</u></p>
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24.	The FEMP and the proposed total farm nutrient loading set out in Table 1 Appendix A shall apply to Killermont (WHL) and to any subsequent landholdings resulting from the subdivision of that property (including the partitioning of land from, or addition of land to that property holding) so long as that landholding relies on this consent. Should any changes to the land holding occur, the FEMP shall be reviewed and updated in consultation with and be approved by the Canterbury Regional Council to recognise the changed land area.		This wording is inappropriate or badly worded. The property NDA must stay with the whole property. Any land split up would require a consent transfer to transfer a part of the NDA. 'Approval' would be ultra vires. So if an area of land was split off and did not "rely on this consent" the balance would have the total nutrient load? I would have thought that there would have to be some sort of pro-rata system or would just have to be sorted via a transfer.	NDA vs Farm nutrient loading definitions	Comments of MF considered valid and condition has been revised to accommodate these.  The condition requires nutrient loadings to transfer with any land holdings that may result as part of future subdivision and this would be on a pro-rata basis.  NDA and nutrient loadings now defined in advice notes.	The FEMP and the proposed total farm nutrient loading set out in Table 1 Appendix A shall apply to Killermont (WHL) and to any subsequent landholdings resulting from the subdivision of that property (including the partitioning of land from, or addition of land to that property holding) so long as that landholding relies on this consent.
				There no longer appears to be a requirement in the conditions for a Farm Environmental Risk Assessment to be prepared. This should be retained	Farm Environmental Risk Assessment is included within the FEMP. Given the FEMP forms part of the consent there is no need to repeat this requirement.	
	<b>Mandatory On Farm Management Conditions</b>					
25.	The consent holder shall ensure that fertiliser is applied in accordance with 'The Code of Practice for Nutrient Management (With Emphasis on Fertiliser Use) NZFMRA 07'. Fertiliser spreaders shall be tested and calibrated by the consent holder at least annually, and every 5 years by an independent and appropriately qualified auditor and the results of testing shall be provided to the Canterbury Regional Council by 30 September following the five yearly test.		Provisions of this COP are not enforceable. Sounds good but Code is just advice.		SHL supports reference to COP. The COP is the guiding document for best practice. We suggest reference be made to any succeeding document to ensure that developments in industry standards are considered.	The consent holder shall ensure that fertiliser is applied in accordance with 'The Code of Practice for Nutrient Management (With Emphasis on Fertiliser Use) NZFMRA 07' <u>or its successor</u> . Fertiliser spreaders shall be tested and calibrated by the consent holder at least annually, and every 5 years by an independent and appropriately qualified auditor and the results of testing shall be provided to the Canterbury Regional Council by 30 September following the five yearly test
26.	The consent holder shall ensure that all new irrigation infrastructure is designed according to the NZ Code of Practice for Irrigation Design and certified by a suitably qualified independent expert, and installed in accordance with the certified design. Copies of certified design documents shall be provided to the Canterbury Regional Council.		Proper reference needed for COP	MEL supports the link to a code of practice.	Additional references to documents added.  We also suggest inclusion of date for submission of certified documents to CRC.	The consent holder shall ensure that all new irrigation infrastructure is designed according to the <u>Irrigation Code of Practice and Irrigation Design Standards INZ 2007</u> and certified by a suitably qualified independent expert, and installed in accordance with the certified design. Copies of certified design documents shall be provided to the Canterbury Regional Council <u>within 20 working days of certification</u> .

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27.	If existing irrigation infrastructure is being used, the consent holder shall obtain an evaluation report prepared by a suitably qualified, independent expert. The evaluation shall determine the system's current performance in accordance with the Code of Practice for Irrigation Evaluation. This report shall be obtained within three months of the first exercise of the consent. Any recommendations identified in the report shall be implemented within five years from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council.		Proper reference needed for COP	MEL supports the link to a code of practice.	Additional detail for COP included.  Suggest including timeframe for submission of report to CRC.	If existing irrigation infrastructure is being used, the consent holder shall obtain an evaluation report prepared by a suitably qualified <u>and experienced</u> , independent expert. The evaluation <u>report</u> shall <u>describe</u> the system's current performance in accordance with the Irrigation Evaluation <u>Code of Practice INZ 2006</u> . This report shall be <u>prepared</u> within three months of the first exercise of the consent. Any recommendations identified in the report shall be implemented within five years from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council <u>within 20 working days of completion</u> .
28.	The consent holder shall ensure that all irrigation infrastructure shall be tested once within 12 months of the first exercise of this consent and then thereafter every 5 years in accordance with the Code of Practice for Irrigation Evaluation by a suitably qualified, independent expert. The independent expert shall prepare a report outlining findings and recommendations. Any recommendations identified shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council within 3 months of the report being completed.		General comment – terminology re consent holder should be changed to: "All irrigation infrastructure shall...."  The requirement is to do or not to do something, not to ensure that it does or does not happen. The CH should not have an out!	MEL supports the link to a code of practice.	Reference to "...consent holder shall..." has been deleted, although this is not considered problematic.  The condition provides sufficient certainty regarding the use of any existing irrigation infrastructure and the condition provides a mechanism to require changes should an expert determine that some kind of modification is required.	<u>All</u> irrigation infrastructure shall be tested once within 12 months of the first exercise of this consent and then thereafter every 5 years in accordance with the Irrigation Evaluation <u>Code of Practice INZ 2006</u> by a suitably qualified <u>and experienced</u> independent expert. The independent expert shall prepare a report outlining findings and recommendations. Any recommendations identified shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council within 3 months of the report being completed.
29.	The consent holder shall maintain ongoing and complete records for Killermont (WHL) in relation to the type of crop, cultivation methods, nutrient inputs, stock movements and yields. Such records are to be used as inputs to the approved method (such as OVERSEER), and shall be made available to the Canterbury Regional Council on request.		Need to define the standards e.g., for nutrient inputs. To the nearest kg, tonne?  Who has approved the method? "...are to be..." should be "...shall be..."	In relation to the approved method (such as Overseer) who approves the nutrient assessment method?  This comment applies in several conditions.	It is appropriate to offer an alternative to OVERSEER to make allowances for developments in technology and the like. The proposed wording refers to OVERSEER, but provides an alternative option that would require approval by the regional council.  Requirements for soil testing are contained within the FEMP, which forms part if the consent. There is no need to duplicate these requirements.	The consent holder shall <u>collect and</u> maintain ongoing and complete <u>farm</u> records for Killermont (WHL) in relation to the type of crop, cultivation methods, nutrient inputs, stock movements and yields. Such records <u>shall</u> be:  (a) sufficiently accurate so as to enable the application of OVERSEER, or other method approved by the Canterbury Regional Council)  (b) <u>used</u> as inputs to the <u>nutrient budgeting model for assessing compliance with farm NDAs; and</u>  (c) <u>shall</u> be made available to the Canterbury Regional Council on <u>their</u> request.

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			There were earlier conditions about the testing of the soil and these appear to have		
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			been removed. MEL does not support this removal.		
The consent holder shall ensure that nitrogen fertiliser is not applied to land between 31 <sup>st</sup> May and 1 <sup>st</sup> September in any year except for the use of nitrification inhibitors.		As noted above Could shift to end with other similar conditions. Does this include effluent?	Nitrification inhibitors are not fertiliser. This makes it unclear that all nitrogen fertiliser is excluded during this period	There is a brand of nitrification inhibitor that uses nitrogen when applied, and for this reason it is considered necessary to provide this clarification.  Condition does not address effluent. This is dealt with under the FEMP	
The consent holder shall ensure that fertiliser (organic and inorganic) applications and spreaders are tested and calibrated annually by the consent holder and then thereafter every 5 years by a suitably qualified independent auditor. The independent certified auditor shall report the coefficient of variation before and after tester calibration and advise the consent holder of recommendations should a transverse coefficient of variation of 85 % not be achieved. Any recommendations identified shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council within 3 months of it being completed. Consent holders using 'Spreadmark' accredited spreaders or contractors are compliant with this condition and shall present evidence of the spreadmark accreditation instead.		Applications or applicators! Annually and five yearly? "certified auditor"? "Spreadmark" needs to be defined. "Coefficient of variation" needs to be defined. "Spreadmark" needs to be defined.	Should delete "then thereafter" as this adds confusion, e.g. it could be interpreted that after 5 years of annual calibration it then becomes 5 yearly  Overlap with condition 26?	Requirements of condition are not clear. Suggest rewording to clarify role of consent holder and independent expert.  A definition for Spreadmark is now proposed within the advice notes.  Coefficient of variation also does not need clarification as this is an industry standard.  Condition 26 refers to irrigation water, rather than fertilizer and therefore no overlap.	The consent holder shall ensure that fertiliser (organic and inorganic) applicators and spreaders are tested and calibrated <u>annually by the consent holder and every 5 years</u> by a suitably qualified <u>and experienced</u> independent <u>expert</u> . The independent <u>expert</u> shall report the coefficient of variation before and after tester calibration and advise the consent holder of recommendations should a transverse coefficient of variation of 85 % not be achieved. Any recommendations identified shall be implemented within 12 months from the date of receipt of the report. A copy of the report shall be given to the Canterbury Regional Council within 3 months of it being completed. Consent holders using 'Spreadmark' accredited spreaders or contractors are compliant with this condition and shall present evidence of the spreadmark accreditation instead.  Advice Note 4: For the purposes of this consent 'Spreadmark' means: The Spreadmark Code of Practice for the Placement of Fertiliser in New Zealand which is a fertiliser spreading accreditation scheme that registers fertiliser-spreading companies with certified spreading machinery, trained operators and audited quality management systems.  Advice Note 5: Condition 31 does not require the consent holder to test and calibrate applicators and spreaders during the year that testing and calibration is undertaken by the independent expert.
The consent holder shall ensure that all fertiliser brought onto the property which is not immediately applied to the land is stored in a covered area that incorporates all practicable measures to prevent the fertiliser entering waterways.					
The consent holder shall identify within the property at least one fertiliser filling area the identified fertiliser area shall be at least		Needs tweaking to fix issue - would be OK if it is	Replace "a watercourse..." with "any	Agree – refer to amended condition	The consent holder shall identify within the property at least one fertiliser filling area the identified

<p>50m from a watercourse, spring or bore and will have no drains that discharge to clean water or that can discharge directly to groundwater. This area shall be utilised for the filling of all plant or machinery utilised for fertiliser spreading.</p>		<p>50m from one watercourse but could be closer to another.</p>	<p>watercourse..."</p>		<p>fertiliser area shall be at least 50m from <u>any</u> watercourse, spring or bore and will have no drains that discharge to clean water or that can discharge directly to groundwater. This area shall be utilised for the filling of all plant or machinery utilised for fertiliser spreading.</p>
<p>If liquid fertilisers, excluding liquid effluent, are used, the consent holder shall ensure that the fertiliser is stored in a banded tank, at least 110% of the volume of the tank to avoid any discharge to surface or groundwater and such that it is also protected from vehicle movements.</p>		<p>"Banded" needs defining.</p>		<p>Do not consider that "banded" needs to be defined, however some minor amendments are suggested to condition to add clarity.</p>	<p>If liquid fertilisers, excluding liquid effluent, are used, the consent holder shall ensure that the fertiliser is stored in a banded area or tank, at least 110% of the volume of the fertiliser storage tank to avoid any discharge to surface or groundwater and such that it is also protected from vehicle movements.</p>
<p><b>Sub-catchment Monitoring and Mitigation</b></p>					
<p>Prior to the use of any water in order to exercise this consent the consent holder shall prepare a sub catchment monitoring plan with respect to the necessary off farm monitoring as outlined in the Table 2 in Appendix A.</p> <p>(a) This sub catchment monitoring plan may be prepared in collaboration with other consent holders who are required to prepare a sub catchment monitoring plan for this sub catchment in order to better achieve integrated management.</p> <p>(b) The sub catchment monitoring plan shall demonstrate how the consent holder will undertake monitoring to achieve the nutrient thresholds set out in Table 3 in Appendix A.</p> <p>(c) The sub catchment monitoring plan shall specify an appropriate methodology for conducting all off farm monitoring.</p> <p>(d) The sub catchment monitoring plan shall be submitted to Canterbury Regional Council for certification. The consent holder shall implement this plan from the date upon which this consent is implemented and shall continue the monitoring for the duration of the consent.</p> <p>(e) The sub catchment monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.</p> <p>(f) This monitoring may be carried out on an individual or on a collective basis by a suitable independent body appointed by all relevant consent holders in the sub catchment and approved by the Canterbury Regional Council.</p> <p><i>Advice Note: If the monitoring is undertaken by a collective independent body then all necessary costs associated with this monitoring shall be met by the consent holders within the sub catchment on a basis proportional to the area of land that they irrigate within the catchment.</i></p>		<p>Plan should be provided now. Too much critical detail to leave to an uncertain and <i>ultra vires</i> "certification" process. Who determines what is necessary? A plan can't demonstrate. Methodology needs to be specified now and not left to the discretion of the consent holder. What happens if ECan doesn't "certify" the plan? "...achieve the nutrient threshold..."? How would monitoring achieve a threshold? Supposed to be trying to stay below the threshold! WQ variables and triggers have already been identified and agreed to in the right of reply to the commissioners, so why isn't the plan drafted now? More 'approvals' by CRC... No indication of the period for this monitoring.</p> <p>Inappropriate for a consent to imply that it can dictate how the costs of monitoring shall be apportioned.</p>	<p>There is no longer specific reference here to pre-implementation monitoring – presumably because it would be covered by the new pre-irrigation conditions above?</p> <p><b><i>In (b) the methodology needs to clearly demonstrate how a nutrient concentration sample is to be applied to show compliance with and annual nutrient load</i></b></p>	<p>Consider it appropriate to provide this information following the issue of consent</p> <p>SHL suggest certification of monitoring plan by independent expert.</p> <p>Methodology will be reviewed and certified by an independent expert, thereby giving certainty that the methodology is appropriate. There is no need to provide a monitoring plan prior to the issue of consent as long as there is an appropriate process for consideration of the merits of the plan and the independent expert provides this.</p>	<p>Prior to the use of any water in order to exercise this consent the consent holder shall prepare a sub catchment monitoring plan with respect to the necessary off farm monitoring as outlined in the Table 2 in Appendix A.</p> <p><u>a)</u> This sub catchment monitoring plan may be prepared in collaboration with other consent holders who are required to prepare a sub catchment monitoring plan for this sub catchment in order to better achieve integrated management.</p> <p>b) The sub catchment monitoring plan shall demonstrate how the consent holder will undertake monitoring to <u>show compliance with</u> the nutrient thresholds set out in Table 3 in Appendix A.</p> <p><u>c)</u> The sub catchment monitoring plan shall specify an appropriate methodology for conducting all off farm monitoring.</p> <p><u>d) The sub catchment monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.</u></p> <p>e) <u>This monitoring may be carried out on an individual or on a collective basis by a suitable independent body appointed by all relevant consent holders in the sub catchment.</u></p> <p><u>f) The sub catchment monitoring plan shall be certified by an appropriately qualified and experienced independent expert.</u></p> <p><u>g) The expert shall only issue the</u></p>

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					<p><a href="#">certificate if he/she is satisfied that the proposed monitoring methodology accords with accepted scientific practice. The certifier's certificate shall be submitted to Canterbury Regional Council within 20 working days of the issue of the certificate.</a></p> <p>h) The consent holder shall implement this plan from the date upon which this consent is implemented and shall continue the monitoring for the duration of the consent.</p>
<p>If the monitoring undertaken in accordance with the sub catchment monitoring plan in condition 35 indicates that the nodal readings of dissolved inorganic nitrogen, and/or dissolved reactive phosphorus and/or periphyton biomass have exceeded 90% of the thresholds limit specified in Table 3 of Appendix A then the sampling frequency at that node shall be increased to weekly and notification of the exceedance shall be provided to the Canterbury Regional Council within 2 days of it being recorded.</p>		<p>Neither TN nor TP are appropriate indicators for river nodal monitoring. Spelling of phosphorus! Not clear how the numbers in the appendix are derived. No units!</p> <p>Recorded??</p>	<p>Refers only to nitrate and phosphorous, (not to dissolved inorganic nitrogen and dissolved reactive phosphorous as MEL requested). It is unclear how 90% has been selected as a trigger.</p> <p>90% threshold for the 80% developed system allows a greater proportional discharge than the fully system. The threshold should be set at 72% for the staging period to allow the same proportional trigger.</p>	<p>Proposed amendments address some of the concerns raised.</p> <p>The 90% threshold relates to the water quality guideline and should remain as proposed. This condition is proposed to provide a warning should water quality be nearing the national water quality guideline.</p> <p>90% has been selected as the threshold needs to be sufficiently high to eliminate exceedences that may occur due to natural circumstances. If the threshold is too high then it will serve as little use</p> <p>The 80% referred to by MEL relates to the restriction on the nutrient discharge allowance. It is therefore not appropriate to reduce the threshold in this condition to 72%.</p>	<p>If the monitoring undertaken in accordance with the sub catchment monitoring plan in condition 35 indicates that the nodal readings of <a href="#">nitrate-N and/or DRP and/or nitrate-N for groundwater</a> have exceeded 90% of the thresholds limit specified in Table 3 of Appendix A then the sampling frequency at that node shall be increased to weekly and notification of the <a href="#">exceedence</a> shall be provided to the Canterbury Regional Council within 2 days of it being <a href="#">detected</a>.</p>
<p>If the increased monitoring undertaken in accordance with condition 36 determines that the average of five consecutive weekly results exceeds 90% of all or any one of the threshold limits specified in Table 3 in Appendix A then a report shall be prepared by two appropriately qualified and independent experts, one of which is to be appointed by the Canterbury Regional Council and the other by the consent holder. The report prepared shall be provided to the Canterbury Regional Council</p>		<p>Threshold limits in Table 3 are incorrect.</p> <p>What is the default if the experts don't agree? It would appear that no controls would apply.</p>	<p>Unclear how natural assimilative capacity will remain for natural events after irrigation development occurs</p> <p><b><i>It is unclear how 90% has been selected as a</i></b></p>	<p>90% has been used as appropriate given some nodes will already be close to the limit.</p> <p>Agree with MF that if experts don't agree this could present a problem.</p>	<p>37A. If the increased monitoring undertaken in accordance with condition 36 determines that the average of five consecutive weekly results exceeds 90% of all or any one of the threshold limits specified in Table 3 in Appendix A the <a href="#">consent holder shall notify the Canterbury Regional Council of these results within 5 working days.</a></p>

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<p>within one month of the receipt of such results. The purpose of the report shall be to determine whether or not the cause of the exceedance is likely to be because of natural influences, one off events, or land use practices. The report shall include an assessment of the likely reasons for the observed increase in nutrient levels, including likely source and contributors (natural sources, or land use influences). The report shall include an evaluation as to whether there is likely to be a continuation of the monitored results and whether the results are likely to trend toward an outright exceedance of the threshold limit over time.</p>			<p><i>trigger</i></p>	<p>The amendments proposed set out a process for certification which would resolve this issue. Again, the report must be issued with a certificate from an independent expert. Consequently, there is no need for a conflict resolution mechanism within the conditions of consent.</p>	<p><u>37B. If the average of five consecutive weekly results exceeds 90% of all or any one of the threshold limits as referred to in Table 3 of Appendix A the weekly monitoring referred to in Condition 36 shall continue for a further 8 weeks.</u></p> <p><u>37C. Following the completion of monitoring under Conditions 37A and 37B, a report shall be prepared by an appropriately qualified and experienced independent expert.</u> The purpose of the report shall be to determine whether or not the cause of the exceedance is likely to be because of natural influences, one off events, or land use practices. The report shall include an assessment of the likely reasons for the observed increase in nutrient levels, including likely source and contributors (natural sources, or land use influences). The report shall include an evaluation as to whether there is likely to be a continuation of the monitored results and whether the results are likely to trend toward an outright exceedance of the threshold limit over time.</p> <p><u>37D. The report shall be reviewed and certified by a separate appropriately experienced expert. The expert shall only issue his/her certificate if they are satisfied that its analysis and conclusions are scientifically valid and robust. The report and certificate shall be provided to the Canterbury Regional Council within 5 working days of the issue of the certificate.</u></p>
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<p>38.</p>	<p>If the monitoring and reporting undertaken in accordance with condition 37 predicts a trend toward an exceedance of the threshold limit over time and that the consent holder is either solely or partly responsible for the exceedance of all or any one of the threshold limits under Table 3 in Appendix A then:</p> <p>(a) the consent holder shall prepare, on either a collective or individual basis a Remedial Action Plan to ensure the threshold limit/s is/are not exceeded. This report shall be submitted to the Canterbury Regional Council within one month of the completion of the report prepared in accordance with condition 37.</p>		<p>This approach would not provide any certainty that specific environmental outcomes would be achieved. Monitoring and reporting by themselves can't predict anything – an expert may be able to make a judgement backed up by an appropriate methodology.</p> <p><b><i>The consent holder would have freedom to determine the content and scope of the RAP. Therefore there would be no assurance that specific adverse effects would be appropriately responded to. There is no absolute requirement to take effective action.</i></b></p>	<p>Meridian generally supports the use of the trend evaluation in condition 36 above to determine if a remedial action plan is needed, but it does still rely on the “solely or partly responsible” issue and therefore creates some uncertainty for the environment and the assimilative capacity (buffer) for natural events.</p>	<p>SHL considers that a report and review of the Remedial Action Plan by an independent expert would ensure valid and robust actions are in place (refer condition 39).</p> <p>Individuals should not be accountable for changes in the environment which they are not responsible for.</p>	<p>If the monitoring and reporting undertaken in accordance with condition 37 predicts (i) a trend toward an exceedance of the threshold limit over time, and (ii) that the consent holder is either solely or partly responsible for the exceedance of all or any one of the threshold limits under Table 3 in Appendix A then the consent holder shall <u>appoint a suitably qualified and experienced independent expert to</u> prepare, on either a collective or individual basis, a Remedial Action Plan to ensure the threshold limit/s is/are not exceeded.</p>
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39.	<p>The Remedial Action Plan shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected sub catchment to ensure that the exceedance in nutrient threshold limit/s under Table 3 of Appendix A at the affected node site are returned to and maintained at a level that is below the threshold limit/s identified in Table 3 in Appendix A for the subsequent irrigation seasons. The Remedial Action Plan shall illustrate, via an approved method such as OVERSEER, that the recommended actions will deliver the required nutrient reductions from the farm or farms. The Remedial Action Plan shall be reviewed by an appropriately qualified independent expert prior to being submitted to Canterbury Regional Council.</p>		<p>As above. Doesn't provide a real assurance that there would be any actual controls on nutrient loads to address WQ deterioration.</p>	<p>As previously mentioned who approves the nutrient assessment method?</p>	<p>As previously stated this approach does give assurance regarding nutrient loads.</p> <p>The certification process (refer condition 39) by independent expert provides assurance that any methods employed are scientifically valid and robust.</p>	<p><u>39A.</u> The Remedial Action Plan referred to in condition 38 shall <u>be prepared by a suitably qualified and experienced expert and</u> prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected sub catchment to ensure that the exceedance in nutrient threshold limit/s under Table 3 of Appendix A at the affected node site are returned to and maintained at a level that is below the threshold limit/s identified in Table 3 in Appendix A for the subsequent irrigation seasons. The Remedial Action Plan shall illustrate, via <u>OVERSEER (or other alternative method approved by the Canterbury Regional Council)</u>, that the recommended actions will deliver the required nutrient reductions from the farm or farms.</p> <p><u>39B.</u> <u>The Remedial Action Plan shall be reviewed and certified by a separate appropriately experienced expert. The expert shall only issue his/her certificate if they are satisfied that its analysis and conclusions are scientifically valid and robust.</u></p> <p><u>39C.</u> <u>This Remedial Action Plan and certificate shall be submitted to the Canterbury Regional Council within one month of the completion of the report prepared in accordance with condition 37.</u></p>
40.	<p>Once the Remedial Action Plan prepared in accordance with condition 39 has been received by the Canterbury Regional Council, the consent holder shall immediately implement any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 39 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance.</p>		<p>As above</p>		<p>As previously stated this approach does give assurance regarding nutrient loads.</p> <p>The certification process (refer condition 39) by independent expert provides assurance that any methods employed are scientifically valid and robust.</p> <p>Minor amendments suggested to clarify condition.</p>	<p>Once the Remedial Action Plan prepared <u>and certified, and issued to</u> the Canterbury Regional Council, the consent holder shall immediately implement any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 39 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance.</p>
41.	<p>If the report required in accordance with condition 37 finds that there is not likely to be a continuation of the monitored results or that the results do not predict a trend toward an outright exceedance of the threshold limits over time, no further remedial</p>		<p>As above</p>	<p>Appears sensible. Presumably this also means that monitoring goes back to its original</p>	<p>Clarification should be added that reference is to a "continuation of exceedances in the</p>	<p>If the report required in accordance with condition 37 finds that there <u>will not</u> be a continuation of <u>exceedances in</u> the monitored results, or that the results do not predict a trend toward an outright</p>

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	action is required.			level?	monitored results..." As per MEL comments, the monitoring will then return to original level.	exceedance of the threshold limits over time, no further remedial action is required <u>and the frequency of monitoring conducted by the consent holder can return to that set out in condition 35.</u>
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<p>If the monitoring undertaken in accordance with the sub catchment monitoring plan prepared under condition 35 indicates that any or all of the nutrient threshold limit/s outlined in the Table 3 of Appendix A above have been exceeded then:</p> <p>(a) The sampling frequency at that node shall be increased to weekly; and</p> <p>(b) If the average of five consecutive weekly results exceeds the thresholds limit/s in Table 3 of Appendix A above then notification shall be provided to the Canterbury Regional Council within one week of it being recorded. A report shall be prepared by an appropriately qualified independent expert and provided to the Canterbury Regional Council within one month of the receipt of such results. The report shall include an assessment of the likely reasons for the observed increase in nutrient levels, including likely source and contributors.</p>		As above	<p>Only 1 expert is required here but 2 experts were required under the 90% threshold above (condition 36). Why the difference?</p> <p>Also different wording is used in conditions 35 and 36 for the process – should be consistent e.g. 2 days for notification of CRC, contents of the report, etc.</p>	<p>Condition has been updated to require review by second expert as per previous conditions.</p> <p>Condition now has greater consistency.</p>	<p>If the monitoring undertaken in accordance with the sub catchment monitoring plan prepared under condition 35 indicates that any or all of the nutrient threshold limit/s outlined in the Table 3 of Appendix A above have been exceeded then:</p> <p>(a) The sampling frequency at that node shall be increased to weekly; and</p> <p><b>(b)</b> If the average of five consecutive weekly results exceeds the thresholds limit/s in Table 3 of Appendix A above the <u>consent holder shall notify</u> the Canterbury Regional Council <u>of the exceedences</u> within <u>5 working days</u> of <u>the fifth weekly test</u>. A report shall <u>then</u> be prepared by an appropriately qualified <u>and experienced</u> independent expert <u>within 20 working days of the fifth weekly test</u>. The report shall include an assessment of the likely reasons for the observed increase in nutrient levels, including likely source and contributors.</p> <p><b>(c)</b> <u>The report referred to in (b) above shall be reviewed and certified by a suitably qualified and experienced expert. The independent expert shall only certify the report if they are satisfied that it is scientifically valid and robust. The report and certificate shall be provided to the Canterbury Regional Council within 5 working days of its completion.</u></p>
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<p>If the monitoring and reporting undertaken in accordance with condition 42 determine that the consent holder is either solely or partly responsible for the threshold limit exceedance then:</p> <p>(a) the consent holder shall immediately take steps to reduce their actual or planned N and P losses (depending on the nutrient that has caused the breach) by 5% for the year that is current (May to May), or which commences subsequent to the identification of the exceedance;</p> <p>(b) the consent holder shall prepare, on either a collective or</p>		As above. Highly improbable that such a determination could be made and monitoring and reporting by themselves can't make determinations. A 10% compounding reduction that would apply to the nutrient load from the irrigation area would	<p>MEL supports the use of penalties for exceedance of the 100% limit.</p> <p>However, 5% seems a small and otherwise insignificant reduction. Could there be issues with this low level of reduction</p>	<p>A 5% compounding reduction is considered to be a significant deterrant considering the volumes that this would equate to.</p> <p>Condition has been amended to further clarify intention of a</p>	<p>If the monitoring and reporting undertaken in accordance with condition 42 determine that the consent holder is either solely or partly responsible for the threshold limit exceedance then:</p> <p><b>(a)</b> the consent holder shall immediately take steps to reduce their actual or planned N and P losses (depending on the nutrient that has caused the breach) by 5% for the year that is</p>
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<p>individual basis, a Remedial Action Plan, for the certification of Canterbury Regional Council within one month of the notification required under condition 42.</p>		<p>be an effective alternative conceptual approach.</p>	<p>if changes are slow in occurring? This level doesn't seem to be a deterrent to a breach. A higher starting level and a compounding approach if thresholds are not restored (as previously outlined in evidence of Ken Gimblett) is sought.</p> <p>The reduction in this condition is also not linked to reducing water take/use, only nutrients – the penalty should be about the water in both the current and the following season to be fully effective as a deterrent - these are water consents not nutrient use consents. The proposed regime outlined in conditions and evidence by Mr Kyle for Killermont and commented on in the Evidence of Mr Gimblett is seen as an active deterrent to breaching thresholds.</p> <p>It also needs to be clear that part (or full) responsibility can accrue even where individual on farm practices are ok. Is any reduction shared on a pro-rata basis or by the expected perpetrators or both... Could be very difficult to enforce if fingers are being pointed at each other.</p> <p>Very concerned about the general time delays in determining remedial action and the ability to continue to irrigate while plans are prepared etc.</p>	<p>compounding penalty.</p> <p>MEL's comments regarding penalties associated with nutrients rather than water are acknowledged. It is considered, however, that the actual issues are associated with nutrients and for this reason it is considered appropriate to use nutrients as the basis for penalties.</p>	<p>current (May to May), or which commences subsequent to the identification of the exceedance. <u>Where the breach has occurred too late in the year to permit a reduction in that season, the losses for the next season shall not exceed 95% of the current season, thus giving effect to the 5% reduction.</u></p> <p><u>(b) where exceedences in consecutive years are attributed to the property the ratchet is compounding, whereby a breach in a second year would require a further 5% reduction on the previous, and already reduced, year's losses.</u></p> <p><u>(c) an appropriately qualified and experienced expert shall prepare, on either a collective or individual basis, a Remedial Action Plan in accordance with condition 44.</u></p>
<p>The Remedial Action Plan shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected sub catchment to ensure that the exceedance in nutrient threshold limit/s under Table 3 of Appendix A at the affected node are returned to and maintained at a level that is below the threshold limit/s identified in Table 3 for the subsequent irrigation seasons. The Remedial Action Plan</p>		<p>As above</p>	<p>As above.</p>		<p><u>44A.</u> The Remedial Action Plan <u>referred to in condition 43</u> shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected sub catchment to ensure that the exceedance in nutrient threshold limit/s under Table 3 of Appendix A at the affected node are returned to</p>

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	shall illustrate, via an approved method such as OVERSEER, that the recommended actions will deliver the required nutrient reductions from the farm or farms. The Remedial Action Plan shall be reviewed by an appropriately qualified independent expert prior to being submitted to Canterbury Regional Council.					and maintained at a level that is below the threshold limit/s identified in Table 3 for the subsequent irrigation seasons. The Remedial Action Plan shall illustrate, via <u>OVERSEER (or other method approved by the Canterbury Regional Council)</u> , that the recommended actions will deliver the required nutrient reductions from the farm or farms.  <u>44B. The Remedial Action Plan shall be reviewed and certified by a separate appropriately experienced expert. The expert shall only issue his/her certificate if they are satisfied that its analysis and conclusions are scientifically valid and robust.</u>  <u>44C. This Remedial Action Plan and certificate shall be submitted to the Canterbury Regional Council within one month of the completion of the report prepared in accordance with condition 42.</u>	
45.	Once the Remedial Action Plan prepared in accordance with condition 44 has been certified by the Canterbury Regional Council, the consent holder shall implement immediately any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 44 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance. The consent holder shall also update their FEMP to include changes in farm management to be adopted in accordance with condition 44.		But after all of the above the WQ could still continue to deteriorate with no requirement to take corrective action.	This immediate action is some months after the exceedance of the 100% threshold occurs if you add up the times in the conditions above.  Need to ensure that the Remedial Action Plan is effective.	Proposed condition amended to refer to certification by independent expert.	Once the Remedial Action Plan prepared in accordance with condition 44 <u>has been certified by an an appropriately qualified and experienced independent expert and provided to the Canterbury Regional Council,</u> the consent holder shall implement immediately any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 44 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance. The consent holder shall also update their FEMP to include changes in farm management to be adopted in accordance with condition 44.	
				There is no longer any section 128 review condition linked to any of the sub-catchment monitoring as there was earlier.  A new condition is required to ensure this process for the trigger and NDA reduction are implemented every time there is a breach.	The general review conditions at end of consent allow for review to occur. There is no need to duplicate the requirements here.		
<b>Upper Waitaki – Lake Delta, Lake Arm and Lake Monitoring</b>							

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<p>Prior to the use of water in order to exercise this consent the consent holder shall prepare Lake Benmore monitoring plan in accordance with the methodology in Table 4 Appendix A and with respect to the necessary monitoring as outlined in Table 4 of Appendix A:</p> <p>(a) This Lake Benmore monitoring plan may be prepared in collaboration with other consent holders who are required to prepare a lake monitoring plan in order to better achieve integrated management.</p> <p>(b) The Lake Benmore monitoring plan shall specify any pre-consent implementation monitoring required to confirm baseline conditions. The consent holder shall implement the plan as it relates to pre-consent implementation upon receipt of the plan by Environment Canterbury.</p> <p>(c) The Lake Benmore monitoring plan shall specify an appropriate methodology for conducting all lake monitoring including identifying monitoring necessary in the Ahuriri Arm of Lake Benmore that is subject to any downstream discharge from Killermont (WHL).</p> <p>(d) The Lake Benmore lake monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.</p> <p><i>Advice Note:</i>  <i>If the Upper Waitaki Lake monitoring is undertaken on a collective basis then all necessary costs associated with this monitoring shall be met by the consent holders on a proportional basis.</i></p> <p><i>Where costs are to be met on a proportional basis, this means that an individual consent holder shall meet costs according to a ratio which accounts for the proportion of land irrigated by that consent holder as a percentage of all land irrigated in the Upper Waitaki Catchment.</i></p>		<p>Table 4 does not provide an adequate level of detail re the methodology. The proposed condition gives the consent holder inappropriate unfettered discretion to determine the content, scope and methodology of the monitoring plan.</p> <p><b><i>Inappropriate for a consent to imply that it can dictate how the costs of monitoring shall be apportioned.</i></b></p>		<p>Table 4 is considered to provide appropriate direction for lake monitoring and the methodology is required as part of the monitoring plan (refer part (c)).</p> <p>The amendments proposed would see the report prepared by an expert and therefore can be confident that the content, methodology etc would be robust. It is also proposed that the plan be reviewed and certified by a separate independent expert. Both of these steps are appropriate checks and balances.</p> <p>Agree that reference to apportioning costs associated with conditions should not be included in consent.</p>	<p>The consent holder shall <a href="#">appoint a suitably qualified and experienced expert, prior to the exercise of this consent, to prepare</a> Lake monitoring plan in accordance with Table 4 of Appendix A:</p> <p>(a) This Lake monitoring plan may be prepared in collaboration with other consent holders who are required to prepare a lake monitoring plan in order to better achieve integrated management.</p> <p>(b) The Lake monitoring plan shall specify any pre-consent implementation monitoring required to confirm baseline conditions. The consent holder shall implement the plan as it relates to pre-consent implementation upon receipt of the plan by Environment Canterbury.</p> <p>(c) The Lake monitoring plan shall specify an appropriate methodology for conducting all lake monitoring including identifying monitoring necessary in the Ahuriri Arm of Lake Benmore that is subject to any downstream discharge from Killermont (WHL).</p> <p>(d) The Lake monitoring plan will set out the methods by which the data will be collected and analysed by a qualified independent person/group.</p> <p><a href="#">46B. The lake monitoring plan is to be certified by an appropriately qualified and experienced independent expert. The independent expert shall only certify the plan if they are satisfied that the monitoring plan is scientifically valid and robust. The certifiers certificate and a copy of the monitoring plan shall be provided to the Canterbury Regional Council.</a></p>
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47.	Should the lake monitoring undertaken in accordance with condition 46 indicate that the triggers in Table 5 of Appendix A pertaining to the Ahuriri Arm of Lake Benmore or the Lake Benmore itself have been exceeded, then the consent holder shall appoint an expert review panel consisting of two qualified and independent experts to review the likely cause of the exceedance. One of the scientists is to be appointed by the Canterbury Regional Council, and the other by the consent holder. The expert panel shall prepare a report within one month of the breach, and the purpose of the report shall be to determine the likely cause of the exceedance. The report shall be submitted to the Canterbury Regional Council upon its completion.		Triggers in Table 5 are incorrect. Therefore it is difficult to provide any useful comment. If appropriate triggers are used, wording would need considerable modification to provide an adequate level of certainty. Contradictory wording re appointments, i.e., consent holder appoints both, then they are appointed separately.	Table 5 needs to reference the TLI not the nutrient concentrations predicted to achieve a TLI.  <b><i>A trigger response and reduction suite of conditions similar to 35 to 45 are required for managing lake threshold exceedances</i></b>	Some minor adjustments to condition are warranted. Conditions 46-50 are, however, appropriate.  Table 5 has been updated.	Should the lake monitoring undertaken in accordance with condition 46 indicate that the triggers in Table 5 of Appendix A pertaining to the Ahuriri Arm of Lake Benmore or the Lake Benmore itself have been exceeded, then the consent holder shall appoint an expert review panel consisting of two qualified and independent experts to review the likely cause of the exceedance. One of the <a href="#">experts</a> is to be <a href="#">nominated</a> by the Canterbury Regional Council, and the other by the consent holder. The expert panel shall prepare a report within one month of the breach, and the purpose of the report shall be to determine the likely cause of the exceedance. The report shall be submitted to the Canterbury Regional Council upon its completion.
48.	If the report undertaken in accordance with condition 47 determines that the consent holder is either solely or partly responsible for the threshold limit exceedance, then the consent holder shall prepare, on either a collective or individual basis, a remedial action plan ("Remedial Action Plan"). The extent to which the actions emanating from this Remedial Action Plan apply to any given consent holder in the catchment shall depend on the exceedance detected and whether this has occurred in a Lake Arm and the effect is confined to that Arm or whether the effect has presented more widely within the Lake. The Remedial Action Plan shall be completed within one month of the completion of the report required by condition 47.		Same reservations as outlined above for sub-catchment monitoring.	Same reservations as outlined above for sub-catchment monitoring.  Needs to have a response linked. It may be difficult to determine responsibility at the far end of a very complicated system	While minor adjustments to wording of condition 48 are appropriate, the scope of the condition is appropriate.	If the report undertaken in accordance with condition 47 <a href="#">concludes</a> that the consent holder is either solely or partly responsible for the threshold limit exceedance, then the consent holder shall prepare, on either a collective or individual basis, a remedial action plan ("Remedial Action Plan"). The extent to which the actions emanating from this Remedial Action Plan apply to any given consent holder in the catchment shall depend on the exceedance detected and whether this has occurred in a Lake Arm and the effect is confined to that Arm or whether the effect has presented more widely within the Lake. The Remedial Action Plan shall be completed within one month of the completion of the report required by condition 47.
49.	The Remedial Action Plan shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected lake arm or lake catchment to ensure that the exceedance in nutrient threshold limit/s under Table 3 at the affected lake monitoring site are returned to and maintained at a level that is below the threshold limit/s identified for the subsequent irrigation seasons. The Remedial Action Plan shall illustrate, via an approved method such as OVERSEER, that the recommended actions will deliver the required nutrient reductions from the farm or farms. The Remedial Action Plan shall be reviewed by an appropriately qualified independent expert prior to being submitted to Canterbury Regional Council.		Same reservations as outlined above for sub-catchment monitoring.	Again who approves the method?  Is the reference to table 3 correct?	The reference to Table 3 is incorrect and has been amended to Table 5.  A further check and balance has been inserted in the form of a certification process.	The Remedial Action Plan shall prescribe the methods and timeframes for altering and/or adapting farm practices on one or more of the farms within the affected lake arm or lake catchment to ensure that the exceedance in nutrient threshold limit/s under Table 5 at the affected lake monitoring site are returned to and maintained at a level that is below the threshold limit/s identified for the subsequent irrigation seasons. The Remedial Action Plan shall illustrate, via an approved method such as OVERSEER <a href="#">(or other method approved by the Canterbury Regional Council)</a> , that the recommended actions will deliver the required nutrient reductions from the farm or farms. The Remedial Action Plan shall be reviewed <a href="#">and certified</a> by an <a href="#">suitably</a> qualified <a href="#">and experienced</a> independent expert prior to being submitted to Canterbury Regional Council. <a href="#">The expert shall only certify the Remedial Action Plan if he/she is satisfied</a>

						<a href="#">that (i) it has been prepared using accepted and robust scientific principles, and (ii) the recommended actions are practicable and will deliver the required nutrient reductions.</a>
50.	Once the Remedial Action Plan prepared in accordance with condition 49 has been certified by the Canterbury Regional Council, the consent holder shall implement immediately any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 49 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance. The consent holder shall also be required to update their FEMP to include changes in farm management to be adopted in accordance with condition 49.  <i>Advice Note: Any remedial action required must be proportionate to the consent holder's contribution to the exceedance caused by the exercise of the consent</i>		Same reservations as outlined above for sub-catchment monitoring.	Same reservations as outlined above for sub-catchment monitoring.  Presumably the monitoring still continues at this point?  Natural perturbations and concerns around the absence of collective responsibility.  What if the continued monitoring shows the problem is still occurring?  There is no penalty or strong motivation to fix the problem.	Minor changes are recommended.  The Remedial Action Plan must be implemented immediately, having first been certified. There is nothing to suggest, therefore, that it will not be effective. Indeed involvement of two experts in its preparation provides a very robust response.	<a href="#">The consent holder shall implement immediately any necessary changes to on farm management practices required by the Remedial Action Plan. The consent holder shall ensure that the farm management practices recommended by the Remedial Action Plan in accordance with condition 49 are incorporated into their approved farm nutrient modelling when determining compliance with their Nutrient Discharge Allowance. The consent holder shall also update their FEMP (in accordance with the processes set out in conditions 22 and 23 of this consent) to include changes in farm management to be adopted in accordance with condition 49.</a>
				There is no longer any section 128 review condition linked to any of the lake monitoring as there was earlier.	The general review conditions at end of consent allow for review to occur. There is no need to duplicate the requirements here	
	<b>Site Specific Conditions – Killermont (WHL)</b>					
51.	The consent holder shall ensure that a no grazing riparian margin of at least 3 metres shall be maintained adjacent to the Tara Hills irrigation race on Killermont (WHL).		Needs to be re-written as a simple direct requirement e.g., "No grazing shall occur..."	Does this include ephemeral bodies?	No need to address ephemeral bodies in this condition as provided elsewhere in consent.  Agree condition needs simplifying.	<a href="#">No grazing shall occur within 3 metres of any riparian margin</a> adjacent to the Tara Hills irrigation race on Killermont (WHL).
52.	The consent holder shall ensure that a no grazing riparian margin of at least 5 metres shall be maintained adjacent to Manuka Creek that runs within Killermont (WHL).		Typo as indicated. Why is the term "for the duration of this consent" needed?		Agree condition needs simplifying.	<a href="#">No grazing shall occur within 5 metres of a riparian margin</a> adjacent to Manuka Creek that runs within Killermont (WHL).
53.	The consent holder shall ensure that stock is excluded from entering all surface water bodies on the property by fencing and or other effective means.		Suggest deletion of reference to nutrient stripping unless it is intended that this provision would be enforceable.		Support condition with some minor amendments	The consent holder shall ensure that stock <a href="#">are prevented</a> from entering all surface water bodies on the property by fencing and or other effective means.
54.	The consent holder shall ensure that all riparian margins identified in conditions 51 and 52 are planted with appropriate plant species to achieve nutrient stripping requirements. The		<i>Note: Not included in in Ohau Downs Conditions therefore no comment</i>	<i>Note: Not included in in Ohau Downs Conditions therefore no comment</i>	Support condition with some minor amendments	<a href="#">All riparian margins</a> identified in conditions 51 and 52 are <a href="#">to be</a> planted with appropriate plant species to achieve nutrient stripping

	planting shall consist of, but not limited to: (a) Trees and shrubs along the outer zone of the riparian planted area; and (b) Sedges, flaxes, indigenous grasses along the stream margin.		<i>from MF</i>	<i>from MEL</i>		requirements. The planting shall consist of, but not <u>be</u> limited to: <u>(a)</u> Trees and shrubs along the outer zone of the riparian planted area; and <u>(b)</u> Sedges, flaxes, indigenous grasses along the stream margin. <u>Planting shall be implemented within the first planting season following the exercise of this consent.</u>
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55.	To achieve the obligations set out in condition 54, a planting plan shall be prepared by the consent holder, having taken advice from an appropriately qualified ecologist in order to assist in the preparation of the plan. This plan shall be submitted to the Canterbury Regional Council for certification prior to giving effect to this consent.		Certification against what?		Certification of the planting plan by CRC is considered appropriate in this instance as the plan will be prepared by an expert, in consultation with an ecologist. Condition 54 sets out the matters for which certification is to be given. Some minor amendments suggested to proposed conditions.	<p><a href="#">55A.</a> To achieve the obligations set out in condition 54, a planting plan shall be prepared by <a href="#">a suitably qualified and experienced expert</a>, having taken advice from an appropriately qualified ecologist in order to assist in the preparation of the plan.</p> <p><a href="#">55B.</a> <a href="#">The planting plan shall be reviewed and certified by a separate appropriately experienced expert. The expert shall only issue his/her certificate if satisfied that the planting plan accords with, and achieves, the intent of condition 54.</a></p> <p><a href="#">55C.</a> <a href="#">The planting plan and certificate shall be submitted to the Canterbury Regional Council prior to the exercise of this consent.</a></p>
56.	The consent holder shall implement a monitoring and maintenance programme to ensure that the planting undertaken in condition 55 is successful. The monitoring and maintenance programme shall consist of: (a) Three monthly monitoring for mortality of any plants during the first year post implementation of the farm system, and then six monthly for a period of two years. Any gaps in the vegetation cover shall be replaced. (b) Six monthly monitoring for visible woody weeds (eg gorse, broom, pines). Any woody weeds detected within the riparian margin shall be removed. (c) Monitoring specified in (a) and (b) shall continue until 90% vegetation cover has been achieved.				Condition supported as is	
57.	The consent holder shall ensure that soil Olsen P values on the property are maintained at or below 25.					
58.	The consent holder shall ensure that all applications of N fertiliser are less than 50 kg/ha per application.		Need to specify kg <u>N</u> /ha.		Agree	The consent holder shall ensure that all applications of N fertiliser are less than 50 kg <u>N</u> /ha per application.
59.	The consent holder shall ensure that silage is made and stored on suitable grade concrete and to ensure that liquor is captured and reapplied to land.		This requires silage to be made and lack of silage would be a breach of conditions. Is this the intention??  Is the liquor discharge covered in an existing application?		Amendments are suggested to the conditions to address the concerns expressed by MF.	<a href="#">Any</a> silage is <a href="#">to be</a> made and stored on suitable grade concrete and <a href="#">any</a> liquor is <a href="#">to be</a> captured and reapplied to land.

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60.	The consent holder shall maintain a fertiliser, effluent and spray layback from all watercourses on the property.		Layback definition? Needs to be properly worded. Most FEMPs specified a minimum buffer of 20 m.	'water courses' v 'surface water bodies' in condition 51?	Amendments to the condition are proposed and these address the concerns expressed by MF and MEL.	<u>A fertiliser, effluent and spray buffer zone of a minimum of 20.0m shall be maintained from all surface water bodies on the property.</u>
61.	The consent holder shall ensure that all farm operators/managers are required to attend an appropriate training course on Ngai Tahu values.		<i>Note: Not included in in Ohau Downs Conditions therefore no comment from MF</i>	<i>Note: Not included in in Ohau Downs Conditions therefore no comment from MEL</i>		
		Missing basic 'administrative' conditions, i.e., lapsing, duration, and review.			Consider appropriate to include usual administrative conditions.	<p><u>Subject to Section 125 of the Resource Management Act (1991), this consent shall lapse on [insert date – 10 years from issue of consent]</u></p> <p><u>The Canterbury Regional Council may once per year, on any of the last five working days of May or November, serve notice of its intention to review any conditions of this consent, pursuant to Section 128 of the RMA, for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which is appropriate to deal with at a later stage.</u></p>

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## APPENDIX A

Table 1 – Proposed Total Farm Nutrient Loading

Proposed Total N & P Discharge allowance from this Farm (with irrigation) (kg/year) (b)
N = 21286 P = 459

Table 2 – Sub Catchment Monitoring

	Monitoring Type	Parameter to be measured	Sites to be monitored	Frequency of monitoring
Groundwater	Quality	Total nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorous, dissolved reactive phosphorous	All groundwater monitoring bores at mid aquifer depth.	Quarterly. If after 2 years there is consistency between the quarterly samples this can be reduced to twice a year.
Surface water	Quality	Total nitrogen, nitrate, ammonia, total Kjeldahl nitrogen, total phosphorous, dissolved reactive phosphorous, suspended solids, pH, and temperature.	All sub catchment nodes	Monthly
	Quantity	Flow assessed when water quality sampling occurs.	All sub catchment nodes	Monthly with water quality sampling.
	Establish that FRE3 is sufficient to remove nuisance algal growths	Periphyton biomass before and after a FRE3 flow event	All sub catchment nodes	One off
	Ecology	Benthic invertebrates, periphyton, macrophytes, and fish. Canada geese (if deemed	All major watercourses on farms.	Annually for macroinvertebrates, macrophytes and fish.  Monthly from November – April for

		required in consultation with Fish and Game) and mammalian predators (if deemed required in consultation with Department of Conservation)		periphyton.  Birds in consultation with Fish and Game.  Mammalian predators in consultation with Department of Conservation.
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**Table 3 –Sub Catchment Nutrient Threshold Limits for Killermont (WHL)**

Node	Nitrate N	Total P
Ahuriri River/Stream Periphyton	27000	5400

Table 4 – Upper Waitaki Lake Monitoring

Lake	Monitoring Type	Parameter to be measured	Sites to be monitored	Frequency of monitoring
Lake Benmore, Lake Ruataniwha, and Wairepo Arm	Water Quality	Vertical profile of temperature, dissolved oxygen, pH, total nitrogen, total phosphorus, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, dissolved reactive phosphorus, Secchi depth, Chlorophyll-a	Lake Benmore, Ahuriri Arm, Northern Arm, and near Benmore Dam, Lake Ruataniwha and Wairepo Arm of Lake Ruataniwha.	Monthly
	Lake sediment	Total nitrogen, total phosphorus		Every 3 years
	Headwater Delta Ecology	Benthic invertebrates, macrophytes, periphyton, phytoplankton and fish.	Lacustrine delta	Late summer and late winter

**Table 5 – Lake Triggers**

<b>Lake</b>	<b>TLI - N</b>	<b>TLI - P</b>
Ahuriri Arm Lake	154185	9391

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APPENDIX B

Method of Groundwater Variance Calculation

Process for evaluating monitoring data relating to discharge of groundwater from a catchment

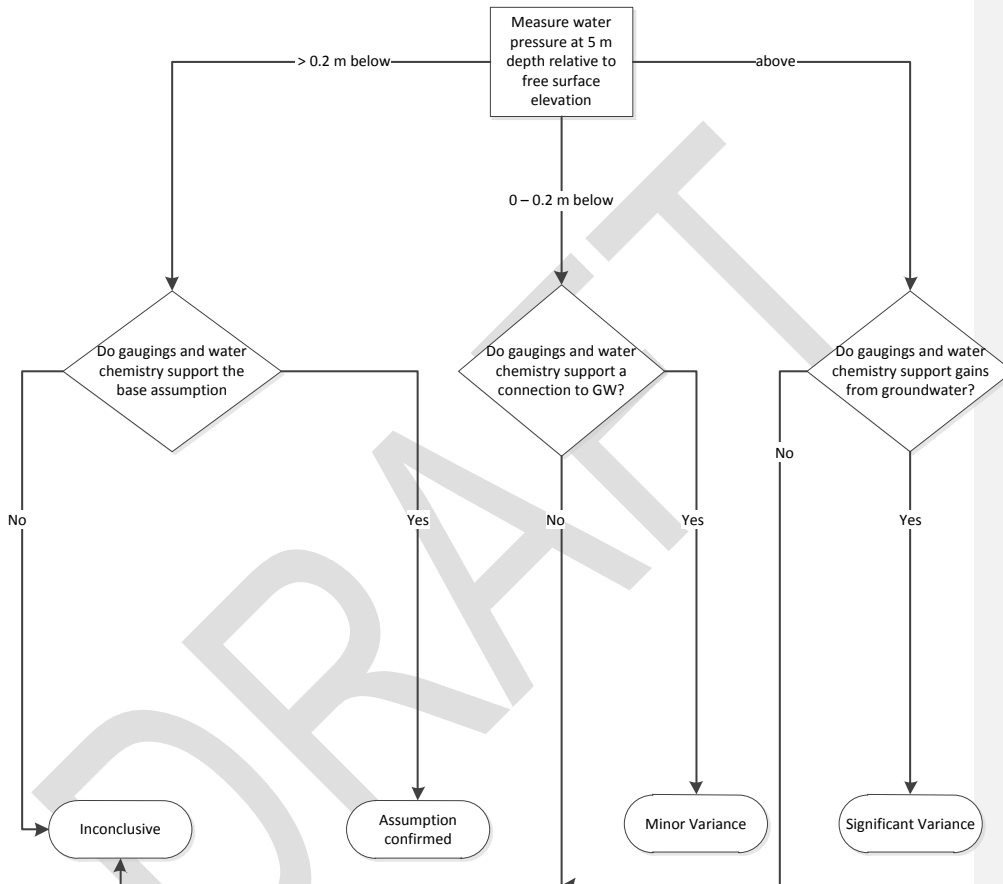


Figure 1 Process for evaluating Lower Ahuriri River monitoring data relating to the assumption that deep groundwater does not re-enter the river before discharging to Lake Benmore

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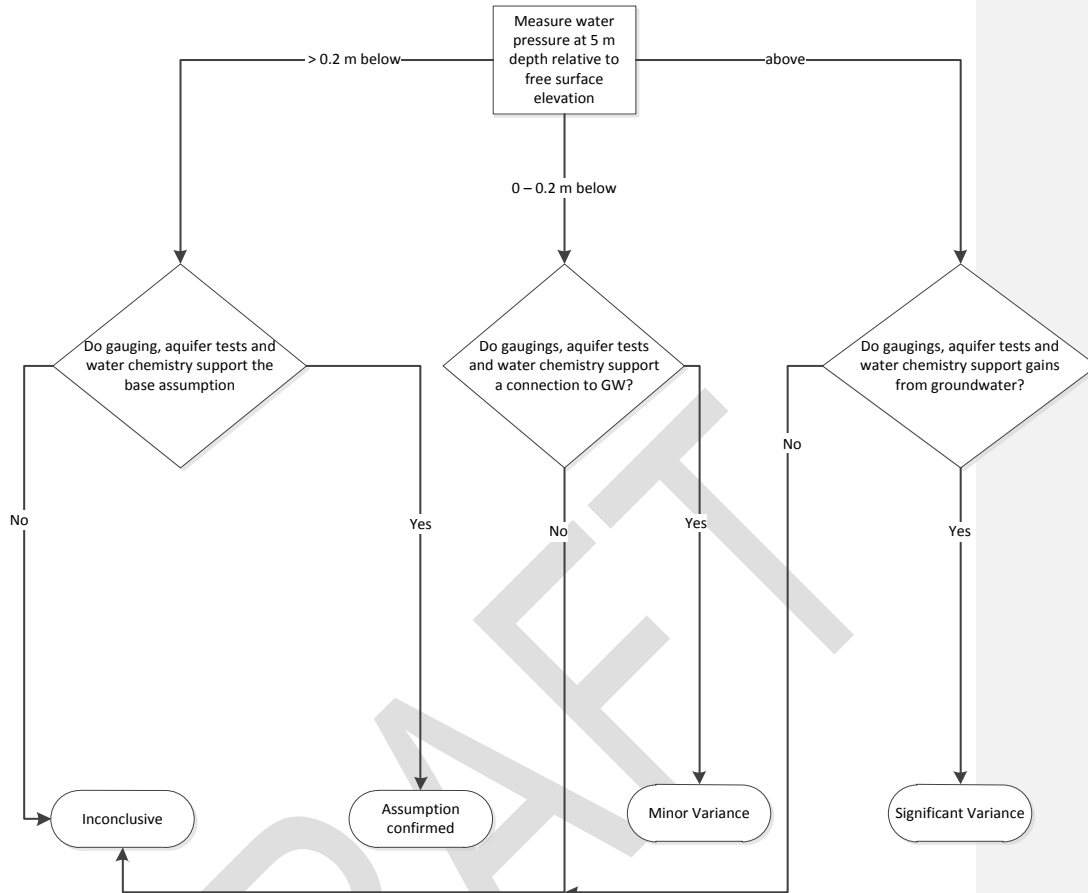
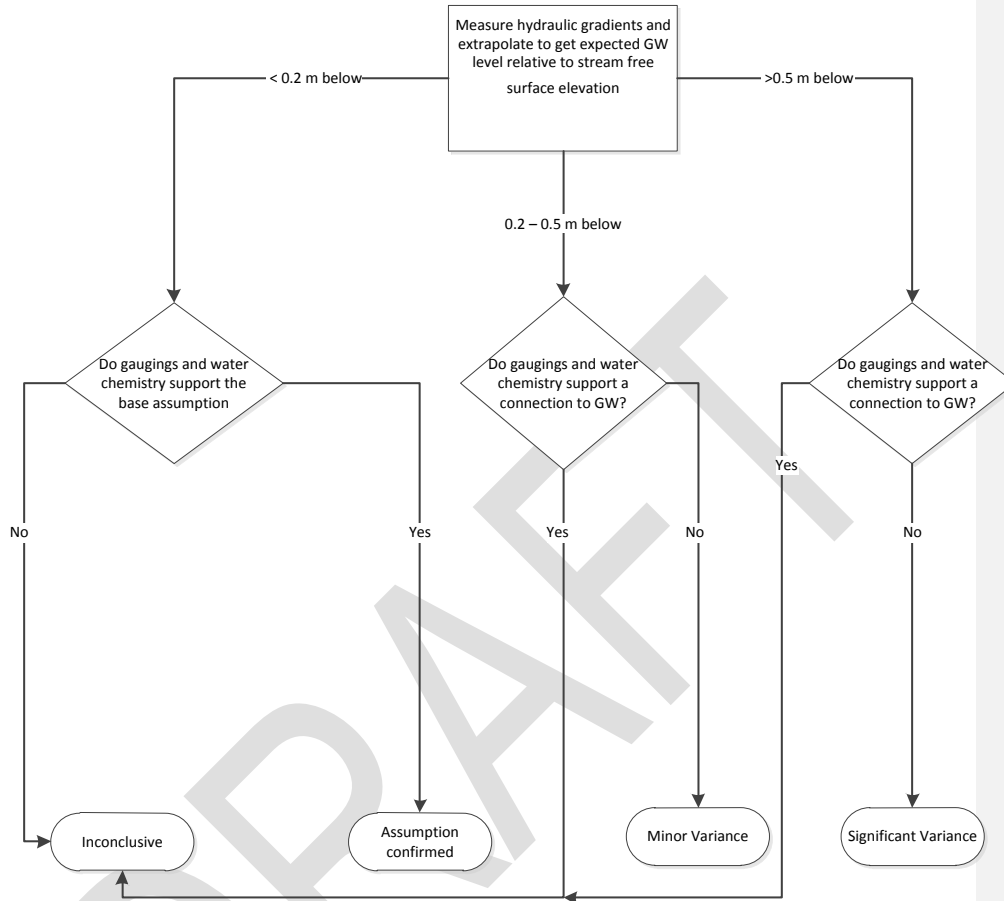


Figure 2 Process for evaluating monitoring data relating to the assumption that groundwater is discharged directly from the Omarama Stream, Quail Burn and Willow Burn sub-catchments without re-entering surface water.

**Process for evaluating monitoring data relating to whether a stream is perched or hydraulically connected to groundwater**



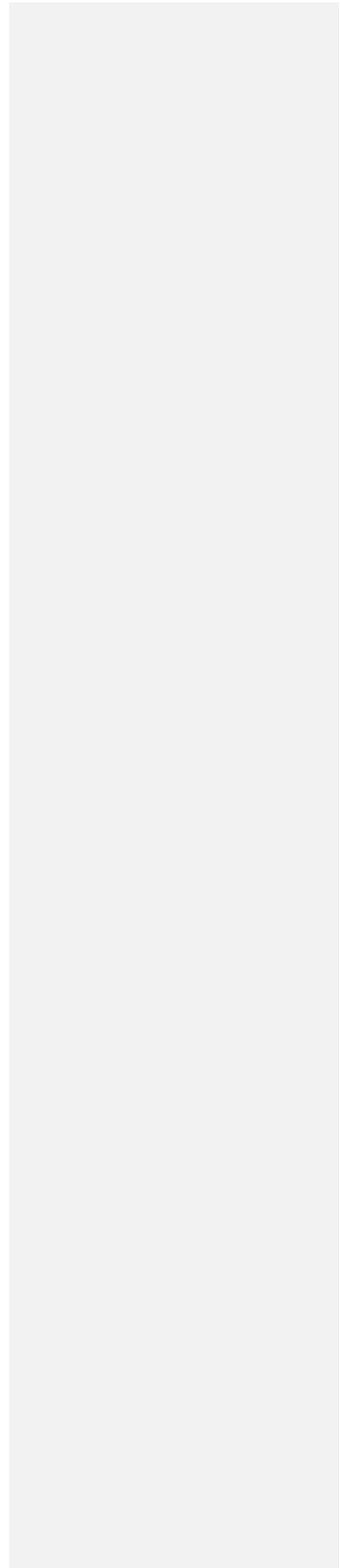
*Figure 3 Process for evaluating monitoring data relating to connection of streams to groundwater in the Omarama Stream and Willow Burn sub-catchments.*

**Process for evaluating monitoring data relating to location of catchment boundaries.**

Where it is necessary to confirm the location of a catchment boundary, monitoring bores / piezometers will be installed as described in the Proposed Monitoring Programme report, and the well-head elevations accurately determined by surveying. Water level measurements from these bores / piezometers will be used to estimate groundwater flow directions, and therefore the location of the catchment boundary.

If the catchment boundary location determined from monitoring moves less than 0.5 km in either direction from the assumed location the baseline assumption is confirmed. If the boundary moves 0.5 – 1.5 km the variance will be considered minor. A change of more than 1.5 km in either direction will be considered a significant variance.

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**APPENDIX C**

1. Monitoring of compliance with the Proposed Total Farm Nutrient Loading identified in Table 1, Appendix A shall be undertaken by the consent holder by:
  - (a) To benchmark OVERSEER modelled losses from current practices as set out in condition 4(f)(i): An approved method (such as OVERSEER) which shall be used to model the annual average nutrient leaching on the farm for current practices by preparing a nutrient budget for the farm based on typical practices over the previous 3 years minimum. This modelling shall be supported by farm management records on practices including cultivation, nutrient inputs, stock movements and yields and associated data where available. Typical annual average climatic data should be constructed from data from the nearest weather station.
  - (b) To assess compliance with the Proposed Total Farm Nutrient Loading in Table 1, Appendix A: An approved method (such as OVERSEER) which shall be used to model the nutrient leaching on the farm and to prepare a nutrient budget for the farm for that prior 12 month period. This modelling shall be supported by maintaining farm management records throughout the year on practices including cultivation, nutrient inputs, stock movements and yields and associated data. Weather records can be collected on farm or can be constructed from data from the nearest weather station.
  - (b) A nutrient budget to estimate nutrient losses for Killermont (WHL) shall be:
    - (i) Prepared by 31 August each year by a suitably qualified person; or
    - (ii) Certified as an accurate record by a suitably qualified independent person; and
    - (iii) Constructed using accurate farm records for the previous 12 months and typical annual average climatic data constructed from data from the nearest weather station; and
    - (iv) Maintained for the property for the duration of the consent; and
    - (v) Provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 September each year, or upon request.
2. The consent holder shall prepare a suitable monitoring plan for the purpose of providing sufficient information to calibrate and improve the OVERSEER (or other approved method) modelling predictions for nutrient loss for Killermont (WHL). This plan shall be submitted to Environment Canterbury for certification.
3. The consent holder shall apply the method established by the plan required by Condition 2 above to ensure that the OVERSEER (or other approved method) modelling is accurately representing MacKenzie Basin conditions. This process shall be repeated at 3 yearly intervals commencing from the third anniversary of the date upon which this consent is implemented, and shall continue for the duration of this consent, or until the Canterbury Regional Council advises that it is satisfied that OVERSEER (or other approved method) modelling is accurately representing the Mackenzie Basin conditions, at which time the use of the method by the Consent Holder can cease.

**APPENDIX D**  
**KILLERMONT (WHL) FEMP**

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