

Resource Management Act 1991
Canterbury Regional Council

Hearing of applications for resource consents by the Ashburton Aquatic Park Charitable Trust ('the Trust'), references: CRC093111; CRC093113; CRC093102; CRC093103; CRC093104; CRC093109; CRC093110; to excavate and deposit 5.5 million cubic metres of material, to undertake works in the bed of waterways, to divert waterways, and to discharge contaminants to land/water and dust to air associated with the proposed expansion of Lake Hood Aquatic Park in the Ashburton District; together with applications CRC061380.1; CRC012224.1; CRC054402.1, to add and/or change conditions to consents related to the existing Lake Hood.

A consent period of 35 years was sought in relation to all of the above applications.

**Held at Environment Canterbury (ECan) offices, Christchurch, 13th – 15th
October, 2009.**

Report and decision of Hearing Commissioners

Robert Batty and Tom Heller

Representation and appearances:

Applicant:

- **Ms J. Crawford and Ms O. Burge**, counsel; **Mr D. West**, Trust Chairperson; **Mr W. Leferink**, landowner of the application site; **Mr G. Casey**, General Manager, Ashburton Contracting Ltd ('ACL'); **Mr G. Lovell**, a civil engineer; **Mr P. Christensen**, a senior water resources engineer; **Mr T. Reynolds**, a senior hydrologist; **Dr H. Hudson**, a hydrology scientist; **Dr T. Fisher**, a senior water engineer; **Mr G. Butcher**, an economist; **Ms E. Grace**, a resource management consultant.

Submitters:

- **Mr P. Wood** on behalf of the Clearwater Aquatic Club.

Section 42A reporting officers:

- **Dr G. Burrell**, consultant ecologist and freshwater scientist; **Mr B. Hughes**, a consultant hydrologist; **Ms A. Fowler**, ECan consents investigating officer; **Mr T. Boyle**, ECan principal hazards officer; **Mr W. Pascoe**, an environmental consultant.

Decision: To grant the consents sought subject to conditions and for duration periods of 21 years in each case (with a common expiry date of 5th July 2031).

1.0 Procedural matters.

- 1.1 By instructions from Canterbury Regional Council we were appointed as commissioners to hear and determine the above applications and submissions made upon them.
- 1.2 The hearings were conducted in Christchurch between the 13th and 15th October 2009. Following the hearing on Friday the 15th October, we conducted an inspection of the existing Lake Hood area (including existing intakes and discharge locations) together with the surrounding land that is the subject of these applications.
- 1.3 Prior to the hearing the Trust requested that three further applications relating to this proposal were to be withdrawn. These were referenced: CRC093101; CRC093108; and CRC093112. Those applications related to the disturbance of the riverbed and diversion of the Ashburton River; related discharges into the river; and the construction of a gravel haulage road across the Ashburton River. Those works are no longer intended by the Trust to be proceeded with.
- 1.4 Following the withdrawal of the above applications we were advised that submissions had also been withdrawn by: Mr. J. F. Rickard; the Regional Engineer - Environment Canterbury. We were also told that the following persons no longer wished to be heard in support of their submissions: Mr C. Hall; Save the Rivers Mid-Canterbury; Central south Island Fish and Game Council.

2.0 Background and introduction to these applications

- 2.1 These applications are to enable the expansion of Lake Hood which has an existing area of approximately 85 hectares (ha), to an eventual area of approximately 180 ha with a depth ranging from 2 to 3 metres, as is currently the case. The existing lake is surrounded by a recreational park of about 152 ha and residential development of 150 residential units, together with a small commercial area. The park is also to be extended to about 620 ha and the residential area expanded to cater for 500 residential units. Gravel extraction in connection with the formation of the expanded lake, together with a

gravel processing and storage area is also proposed within the extended Lake Hood zone. The relevant zoning provisions for these extended activities have been approved by the Ashburton District Council as a privately requested change to its operative District Plan, the hearing Commissioner in that instance also being Mr Batty.

2.2 The proposed activities nevertheless require resource consents from ECan for land use; earthworks; the placement of structures in a waterway; the disturbance of the bed of a waterway; the excavation of gravel; excavation over an aquifer; water permits to dam and divert groundwater and discharge permits to discharge contaminants to air, water and land. All of these applications (if assessed as a composite 'bundle' of associated activities) are to be considered overall as 'non-complying activities' in terms of relevant regional plans.

2.3 Applications for resource consent are also sought as variations to the conditions of three existing consents previously granted in relation to the existing Lake Hood. These are:

- CRC061380.1; requiring reference to the revised northern location of the damming of Carters Creek and Bayliss Stream for the purpose of maintaining Lake Hood for recreational purposes;
- CRC012224.1; requiring the deletion of the total nitrogen standard of less than one gram per cubic metre. The deletion of the condition requiring a dissolved reactive phosphorous standard of less than 0.3 grams per cubic metre is no longer being sought as the applicant considers it will continue to be able to meet that standard following the extension of the Lake.
- CRC054402.1; to change the rate for flushing sediment from Lake Hood from 2.5 cubic metres per second to 5.5 cubic metres per second.

2.4 The original 14 applications were lodged with ECan in December 2008 and were publicly notified in March 2009. A total of 32 submissions from 27 submitters were received on some or all of the applications. Fourteen submitters were in support and twelve were in opposition to some or all of the consents sought.

2.5 Prior to the hearing, reports pursuant to section 42A of the Act were prepared by Dr G. Burrell; Mr B. Hughes; Ms A. Fowler; Mr T. Boyle and Mr W. Pascoe. Those reports were circulated to all parties to the hearing. The overall conclusions of those reports were in general terms that the likely adverse effects on the environment of these proposals would be no more than minor and that the consents sought could be granted subject to conditions. For consistency with other existing resource consents relevant to the activities involved with Lake Hood it was further recommended that the duration of these consents should be co-terminus with those, effectively granting durations of 21 years, rather than the 35 years sought by the applicant.

3.0 The Hearing

The case for the applicant Trust

3.1 Ms Crawford presented legal submissions which were supported by the evidence of various technical expert witnesses who appeared on behalf of the applicant Trust. She noted that the consultative processes undertaken by the Trust with potentially affected parties had resulted in the evolution and modification of the project to a stage where the majority of submitters either do not wish to be heard further or have now formally withdrawn their submissions. The consents sought are therefore:

- Excavation for Lake and Park creation;
- Gravel processing;
- Ongoing Lake management;
- Discharge of storm-water associated with the further residential development proposed.

3.2 She also briefly discussed the activity status of these applications noting that the majority were discretionary activities and questioned whether 'bundling' was appropriate. In her closing submissions she acknowledged however that in this instance there was no suggestion that these proposals could not meet the threshold test of 104D(1)(b), and therefore they could effectively be assessed under the same statutory criteria as discretionary activities.

- 3.3 Ms Crawford raised the issue of whether the proposed Lake extension constituted a 'take' or consumptive use of groundwater, concluding that it did not. The applicant proposes management plans for both lake creation and lake operation to be secured by conditions of consent, and while she observed that while such conditions would need to be certain, given the long term nature of this project, a degree of flexibility should in her view be allowed for the applicant to adopt the best practicable option to secure such outcomes. A final issue raised was the potential duration of consents in this case. In Ms Crawford's opinion there was no substantive technical evidence advanced to justify a condition of less than the term of 35 years requested by the applicant.
- 3.4 The evidences presented by Mr West, Mr Leferink and Mr Casey briefly outlined the background to the establishment of the existing Lake hood and the development of its proposed extension in consultation with the Leferinks as adjoining landowners and Ashburton Contracting Limited. Mr Casey's evidence in particular indicated the specific advantages of Lake Hood aggregate to the construction industry in the Ashburton area in terms of both quality and location in relation to established transport routes.
- 3.5 Mr Lovell's evidence dealt with the methods proposed in the construction of the Lake Hood extension. Appended to that evidence were copies of draft Lake Creation and Lake Operation Management Plans ('LCMP' & 'LOMP' respectively). He referred to the overall 'Master Plan' developed jointly for this project by Isthmus Group and Tonkin & Taylor. That Plan identifies site constraints, engineering requirements, visual and landscape considerations together with ecological as well as urban design features. The main concepts of that Plan also form part of the statements for the Aquatic Park zone ('APZ') now incorporated in the operative Ashburton District Plan. The Lake creation process will be undertaken in 15 general stages involving the sequential excavation of areas of new Lake interspersed with the development of residential areas and recreational park facilities. The proposed excavations to form the extended Lake will penetrate the existing groundwater table, currently ranging from 0.5 to 3.5 m below existing ground levels. That groundwater will therefore provide an additional water source for the expanded Lake, supplemented by water from the Ashburton River.

- 3.6 Mr Lovell confirmed that an 'accidental discovery' protocol for archaeological or sites of cultural sensitivity will be in place as earthworks occur, and provision is made in the LCMP for both the New Zealand Historic Places Trust ('NZHPT') and a representative of the local Runanga to be contacted immediately should such discoveries occur. Excavated material is to be removed to the northern corner of the APZ where aggregate processing including crushing and screening operations and stockpiling are to occur within defined and bunded areas adjoining Boundary Road. Stockpiled aggregate is anticipated to be drawn down at a rate of about 200,000 m³ per year to serve the needs of local demand for gravel. Water for washing, screening or crushing will be sourced from existing bores on the Riversdale Farm and will be re-cycled and re-used. A sediment retention pond will be formed within the processing site area and regularly monitored and cleaned out when required. This pond will also cater for run-off within the processing plant area from rainfall events up to a 20% AEP.
- 3.7 Dust suppression would be a prime objective for lake and park construction areas as well as the aggregate processing and stockpiling areas. Methods employed will include water cart spraying, low vehicle speeds when conditions require, sprinkler systems for stockpiles, crushing and screening process areas. As the site and particularly the northern gravel processing area is adjacent to the Ashburton River and therefore prone to flooding, Mr Lovell confirmed a number of mitigation measures to address that issue. These include minimum building floor levels, bunds, 'no-build' areas and a 90 m gap between the gravel processing and gravel stockpiling areas.
- 3.8 Mr Christensen's evidence focussed specifically upon water supply and wastewater; storm-water; flood risk and mitigation and 'dam-break' hazard assessment. He indicated that as the current Lake Hood residential water supply source is at its design capacity a new source is to be gained from the deep aquifer beneath the proposed extension to the Aquatic Park. There are three such existing bores consented to and used by Riversdale Farm for irrigation purposes. A separate application was currently being processed for the conditions of those consents to be changed to allow that water to be used for the park development and associated activities and he confirmed

that sufficient water would be available for that purpose. A separate consent (CRC093100) has been granted to install, use and maintain sewerage pipes throughout the Aquatic Park extension area. These are to be connected to the Ashburton Wastewater treatment plant which is to be extended under that existing consent to cater for the current proposal including ablution facilities on the aggregate processing site.

3.9 Discussing storm-water treatment for the residential areas, Mr Christensen noted that first flush treatment to a depth of 25 mm is to be via infiltration basins accommodating a 10% AEP storm of 24 hours duration. Infiltration rate will be restricted to between 20 and 50 mm/hour by means of between 5% and 25% clay content being included in the construction of these basins. For the proposed rural-residential areas (comprising about 75 lots) road and other hard-surface / impervious area run-off is to be discharged to swales and thence to ground. Roof run-off will discharge to soakage pits via a sealed system. While the effect of extending Lake Hood will be to lower groundwater in the new development areas, resource consent is still required under the proposed Natural Resources Regional Plan (PNRRP) in some areas where the minimum separation distance to groundwater is less than 2.0 m. In his opinion and given the topography involved and a range of conditions the applicant proposes, the potential for contamination of groundwater from these storm-water discharge arrangements is low to non-existent.

3.10 Several submissions raised concerns about the potential effect of this additional development on flood hazard. Mr Christensen noted that no dwellings are proposed to be located in areas identified as 'High Risk' on the flood risk maps of the District Plan, although such development is proposed in identified 'Low Risk' areas adjoining the Ashburton River. Hydraulic modelling of the potential effects of 50, 100 and 200 year ARI flood event has been undertaken to assess this potential. Under the 50 and 100 year events there are no effects from these proposals on flood levels in the Ashburton River. A low floodwater diversion bund of just under 1 m in height and contoured into the existing ground is proposed to divert floodwaters away from the residential area to the eastern end of the Lake for a 200 year flood event. With that bund in place he considered that there would also be an

improvement in the flood hazard protection for the existing Lake Hood residential areas.

3.11 Lastly Mr Christensen assessed the potential effects of failure of the embankments containing the extended Lake Hood (the 'dam-burst' scenario) against the relevant Dam Safety Guidelines (the New Zealand Society on Large Dams - NZSOLD) and Regulations (the Building (Dam Safety) Regulations 2008). He concluded that the Potential Impact Category of the proposed lake extension when assessed in accordance with the above regulations was 'low', and that the incremental effect on dam break from the extension to the lake is less than minor.

3.12 Mr Reynolds' evidence assessed the effects on groundwater levels upstream and downstream of the proposed Lake extension, effects on flows in the Ashburton River, effects on the discharge of Carter's Creek, potential effects on existing consented groundwater users within a 2 km radius of the Lake, and evaporative losses from the extended Lake and his findings may be summarised as follows. Overall groundwater balance will be similar to the existing situation under low river flow conditions and the predicted change in groundwater level will have no effect on flows in Carter's Creek. Under low flow conditions, flows to groundwater from the extended lake will lessen and as a result, groundwater levels in the vicinity of the lake will decrease, i.e. inflow from groundwater will be greater than the corresponding outflow through the bed of the lake, including resultant flows to the Ashburton River. Slight reductions in groundwater levels up to 2 km distant from the lake extension are anticipated, but these will not be such as to restrict existing consented takes. Lake water levels due to evaporation effects are to be managed by the use of existing surface water resource consents together with the greater storage capacity of the increased lake area.

3.13 Dr Hudson had examined the effects on in-stream habitat in the 1.9 km section of the Ashburton River of the predicted change in surface flow in the upper Lake Hood reach. He observed that flow measurements in the River indicated a natural decrease downstream from SH1. Modelling indicates that the extension will deplete surface flow immediately upstream of the existing Lake, however immediately adjacent to Lake Hood and

downstream there will be a gain in surface flow, but this would be likely to be reduced as a result of the extension. He had evaluated habitat availability for the existing and extended Lake Hood and found that depleted residual flows continue to provide recommended habitat retention levels for food production, brown trout and native fish. Predicted changes in water temperature as a result of the depletion by Lake Hood would be very small (less than 0.2°C) and the effects on in-stream habitat and temperatures would be no more than minor.

3.14 Dr Fisher examined water quality and management issues in the proposed Lake extension together with inflows and discharges from the Lake. In his view the existing Lake is eutrophic to supereutrophic in terms of its current water condition but nevertheless it sustains a high recreational demand. That condition is likely to improve due to the cessation of effluent discharge into the River from the Ashburton Wastewater Treatment Plant which was just upstream from the Lake Hood intake. In future, groundwater will provide the highest potential source of nutrients in the extended Lake. Management measures intended for the enlarged Lake will maximise the use of existing consented intakes from the River. Overland flows will be fed through new 'wetland' areas near the Lake edge to reduce the concentration of nutrients, resulting in a predicted overall improvement in water quality.

3.15 Similarly the quality of water discharged from the extended Lake is predicted to be as good or better than the existing, although it is acknowledged that the total load of nutrients from this Lake will be higher, given that it will be 'concentrated' via the lake outlets rather than reaching the River via diffuse sources. An additional outlet structure and modifications to existing discharge consents are sought by these applications. Dr Fisher also discussed the availability of nitrogen and phosphorous as contributors to the nutrient enrichment of the Lake. He observed that the monitored levels and the ratio between these respective contributors had changed over the life of the existing Lake and now suggested that phosphorous is highly likely to be the limiting nutrient in Lake Hood rather than nitrogen sources. Overall, he concluded that the management measures proposed, in particular maximising the use of consented takes of river water, and on-going monitoring are appropriate to optimise the water quality of the Lake for

recreational purposes, and for subsequent discharge of lake water to the Ashburton River. Current measures to manage the effects of eutrophication such as the control of phosphorous sources, macrophyte harvesting and bio-manipulation with grass carp are to be continued. He considered that the overall environmental effects of the proposed extension would be no more than minor.

3.16 Mr Butcher's economic assessment and cost-benefit analysis of this proposal is based upon data provided by the applicant, District Council staff and information gathered from a survey of residents in July 2008 by Taylor Baines. Using the NZ Treasury recommended discount rate of 8% he assessed the likely Net Present Value ('NPV') of property development to be of the order of \$22 million, with traffic benefits (primarily shorter haulage distance) of \$13 million. Over the construction period the project would be likely to generate an additional \$25 million of business and household income and 280 job-years of work. Post construction on-going economic benefits include a rise in district income of \$1.5 - \$1.8 million per year and an additional 16 – 24 jobs created. Offsetting these benefits to some degree will be increased dust and noise effects on Huntingdon residents, particularly those adjacent to transport routes, from construction and gravel plant operations, although those matters are subject to compliance with performance standards in the Ashburton District Plan. Other 'non-financial' benefits are likely to include recreational and educational use of the enlarged Lake area and also the long-term security of gravel supply for construction and road projects. The latter is currently largely sourced from the Ashburton River near Ashburton Forks, but ECan has advised that for environmental reasons there is no long-term security of supply from that source.

3.17 In the light of the various expert evidences summarised above, Ms Grace considered that the applications for new resource consents were to be collectively assessed as non-complying activities, while the three applications for changes of conditions in existing consents were discretionary activities. Having regard to the "no more than minor" adverse effects on the environment identified, together with the range of conditions proposed to mitigate any such effects, she concluded that both 'gateway tests' of section 104D could be satisfied in this case. She further concluded that this

proposal was consistent with statements of objective and policy in the relevant statutory documents and Plans, including the Regional Policy Statement, the PNRRP and the Transitional Regional Plan. She also considered that the proposal achieved the purposes set out in Part 2 of the Act. With the exception of Mr Pascoe's section 42a recommendation to refuse consent for the change of condition application CRC012224.1 (to remove the limits of total nitrogen and dissolved reactive phosphorous) she otherwise was in general agreement with his assessment and recommendations.

4.0 Submitter

- 4.1 Mr Wood spoke to the submission in support of this proposal by the Clearwater Aquatic Club. He stated that the Club had a membership of some 100 persons and utilised the existing Lake for both Local and International water sports events. It has been involved with Lake Hood from its inception and has assisted with administrative and maintenance duties at the Tournament site. The Club supports the proposed extension as it considers that it will ease current congestion of facilities on the water at popular periods and thus enable improved safety for participants in all water borne activities.

5.0 Section 42a reports

- 5.1 The section 42A reports were taken as read. Dr Burrell remained concerned about the ability of the applicant to meet the stated discharge criteria, specifically in relation to the limitation of either phosphorous or nitrogen. In his view even though a more rapid 'turnover' of water in the Lake is proposed and different areas will exhibit different mixing characteristics, it will still remain eutrophic. Given that nitrate levels in the surrounding area are high, and groundwater was to be the primary additional water source for the expanded lake he remained doubtful that the stated discharge quality would be attained. He considered that consent conditions should therefore reflect the quality of water in the Ashburton River and recommended that 'baseline' monitoring of River water quality both upstream and downstream of the Lake should be established prior to any extension commencing.

- 5.2 Mr Pascoe's report noted that monitoring of total nitrogen concentration ('TN') in the existing Lake had exceeded the existing consent condition levels on a number of occasions in the past. Modelling of the proposed Lake predicted a 10 – 15% increase in those levels, even with the supplementary use of water from the Ashburton River. He therefore queried the value in the existing consent condition to maintain levels which clearly could not be complied with when the Lake extension draws upon even more nutrient rich groundwater as an additional source. However he concluded that given the significance of the eutrophication issue in this case, the current conditions limiting TN and dissolved reactive phosphorus (DRP) should remain or be replaced with revised limits to be suggested by the applicant and drawn from monitoring observations.
- 5.3 In a memorandum accompanying Ms Crawford's closing submissions Dr Fisher outlined his reasons for questioning the practicality and accuracy of Dr Burrell's suggested monitoring in the Ashburton River as the baseline from which performance standards should be set for the expanded Lake. In the alternative he therefore proposed a revised modification of consent dealing solely with the limitation of TN as in his opinion the existing standard for DRP in the existing consent can continue to be complied with.
- 5.4 Mr Pascoe's report also questioned the duration of consents sought in this case, noting that the current Lake consents had an expiry date of 5th July 2031 some 21 years hence, rather than the 35 year term sought for these current applications, which would then expire in 2045. He considered that if further consents were to be granted this would result in two separate 'sets' of conditions (those for the existing and those for the extended Lake areas). In his opinion these should share a common termination date, given that by 2031 the Lake will then be a single integrated entity. Its performance against conditions to protect the environment should therefore be capable of being assessed overall at the consent renewal process at that time, rather than in a limited/piecemeal way if these (later) consents were to remain operative.

5.5 With the exception of the above matters however, overall, and subject to a range of conditions to address various detailed matters raised, the section 42A reporters concluded that resource consents could be granted for the proposed extension.

6.0 Assessment

6.1 With the removal by the applicant Trust of its original proposal to place a road across the Ashburton River in connection with the gravel processing element of the Lake Hood extension, many of the submitter's concerns over this development have been removed. Principal remaining resource consent issues now focus upon the effects on the environment of the utilisation of groundwater as an additional source of water to create the extended lake. In addition, the land concerned closely adjoins the Ashburton River. The extended Aquatic Park area is potentially affected by future flooding from that river and the environmental quality of the river may also be affected by the discharge of water from the extended lake. The overall land use zoning framework enabling this development, including rules limiting the effects of dust and noise from proposed activities, is now contained in the operative Ashburton District Plan.

6.2 The following subsets of actual or potential effects on the environment of allowing the proposed activities are addressed as follows:

- Description of the affected environment
- Effects on flora, fauna and habitats within the lake footprint
- Effects of lake filling on groundwater levels and wetlands
- Effects of lake filling on flows in the Ashburton River
- Effects of lake creation upon local water balance, groundwater sustainability and surface water allocation
- Effects of lake creation upon groundwater users
- Effects of the lake infilling upon surface water and spring fed streams
- Effects of lake water circulation, water quality and ecology
- Effects of stormwater discharge
- Effects of discharge to the Ashburton River

- Adverse effect of flooding and flood conveyance
- Adverse effects upon air quality
- Adverse effects on Tangata Whenua values.

We will now move to apply these subsets of effects to the applications before us.

Description of the affected environment

- 6.3 The following description of the affected environment is based on information provided by the applicants consultants and in s42A recommending reports. We note that Ms Fowler considered the applicant provided a comprehensive description of the Lake Hood environment in Section 2 of the AEE.
- 6.4 The applications subject to this hearing are located at Stranges Road (Lake Hood), Ashburton and consist of an area of 95 ha to the north of the existing Lake Hood Aquatic Park. The area is predominantly owned by Riversdale Farm Limited (Legal Description Lot 1 DP 374140) with smaller holdings owned by the Ashburton District Council (RES 2502) and Ashburton Aquatic Park Charitable Trust (Sec 1 SO 400295; Lot 2 DP 374140; and Lot 2 DP 359318). The area is bounded by Lake Hood to the south, the Ashburton River to the east and farmland to the west and north. The Lake Hood Extension Project site is situated on alluvial river terraces of the Ashburton River floodplain and is predominantly flat except for a north-south oriented terrace scarp which is approximately 5 m in height.
- 6.5 Two ephemeral surface waterbodies run through the development footprint, namely Carters Creek and Bayliss Stream. Both creeks are groundwater fed with Carters Creek originating from the north of Tinwald Town and Bayliss Stream originating in the pastoral area immediately to the north of Lake Hood. In addition, an intake canal from the Ashburton River to Lake Hood was constructed for the existing lake, however this feature will not be disturbed by the development.
- 6.6 The development area is located within the Ashburton River Groundwater Allocation Zone (ARGAZ) which is described as a semi-confined or unconfined aquifer. The existing groundwater level over the proposed lake

extension varies in elevation from RL 61 m to RL 66 m and based on groundwater contours provided in the consent application, groundwater flows in a south east direction toward Lake Hood. The applicants hydrogeologist has reviewed borehole logs held by ECan and found that the underlying strata consists of relatively high hydraulic conductivity material separated by lower hydraulic conductivity materials, however no consistent layer of lower permeability material was identified. Based on this review the applicants hydrogeologist considered no aquitards are present in the vicinity of the Lake Hood area. Gauging of flows in the Ashburton River show that the river discharges to groundwater upstream of Lake Hood whilst groundwater discharges to the river in reaches downstream of Lake Hood.

- 6.7 ECan has identified the groundwater resource of the ARGAZ to be fully allocated. Riversdale Farm is currently supplied with water from three bores that utilise deep groundwater and one bore that utilises shallow groundwater. It is proposed to transfer the groundwater take consents for the four bores to the Lake Hood Extension Project.

Effects on flora, fauna and habitats within the lake footprint

- 6.8 The proposed lake extension will involve the inundation of 95 ha of farm land to the north of the existing Lake Hood and removal of all of Bayliss Stream and part of Carters Creek, upstream of the existing Lake Hood. The applicant has described the landuse of the site to be pastoral farming with some cropping. The vegetation is understood to be dominated by pasture grass with intermittent evergreen and deciduous tree rows along paddock boundaries and is a highly modified rural environment. Dr Burrell accepted the applicant's assessment of the terrestrial ecology and notes that the farmland is of low ecological value.
- 6.9 ECan requested further information regarding the freshwater ecological values of Bayliss Stream and Carters Creek. The applicant consulted the Department of Conservation (DoC) and found that an electric fishing survey of the streams recorded upland bullies and eels in both streams, including a single Canterbury mudfish recorded which is listed as a nationally endangered species. Dr Burrell consulted his colleague Dr Richard Allibone who discussed the Canterbury mudfish record with DoC and noted that the mudfish was identified in a 50-70 long drain that was not connected to Bayliss

Stream or Carters Creek. Further, DoC noted that any waters within the footprint of the proposed lake extension were hard to fish due to heavy silt and macrophyte growth and that the waterways would not be good habitat for mudfish. The reporting officer concludes that the proposed activities pose a low risk to Canterbury mudfish and notes that the applicants proposal to create some wetland habitats provides an opportunity to improve upon the existing degraded wetland values of the site.

- 6.10 To provide environmental management guidance during the construction and operation of the proposed lake extension, the applicants consultant has prepared the LCMP and LOMP. The LCMP identifies potential adverse effects associated with the construction phase of the project and documents procedures and mitigation measures to manage the identified risks. The LOMP has been prepared to provide environmental management guidance to ensure lake water quality is suitable for recreational activities, and surface water takes and lake discharges are managed in accordance with consent conditions.
- 6.11 The LOMP does not provide specifically for the protection of mudfish habitat. Dr Burrell has suggested that the LOMP could include a strategy for management of potential mudfish habitat by providing for mudfish population surveys and monitoring of water levels.
- 6.12 Overall, we find that there is likely to be a low risk of any adverse effects upon flora, fauna and habitats within the proposed lake footprint.

Effects of lake filling on groundwater levels and wetlands

- 6.13 The proposed lake extension will involve the extraction of gravel from within the existing groundwater table which will become an additional source of water for filling the new lake areas, thus, potentially causing 'drawdown' of the water table in areas adjoining the lake. The question was raised whether subsequent 'evaporation' of this water from the extended lake therefore effectively constitutes a 'take of water' requiring a separate and specific resource consent (not so far sought). Having carefully considered this issue, and particularly having regard to the occurrence of evaporation effects

from the groundwater source utilised by the equivalent irrigated pasture land (to be used for the lake extension), we do not consider that 'effect' to require further resource consents beyond those currently sought for this project. This is also in recognition of the proposed lake management to provide for increased lake levels (and an increased ratio of surface water to groundwater) when appropriate.

Groundwater modelling

- 6.14 To assess the effects of the lake extension on groundwater levels and Ashburton River flows the applicants hydrogeologist, Mr Reynolds from Tonkin and Taylor, prepared a groundwater model to simulate the hydrogeological setting. A numerical groundwater flow model was developed using the USGS finite-difference code MODFLOW and the Waterloo Hydrogeologic pre-and postprocessor Visual MODFLOW 4.2.
- 6.15 The model domain is centred on Lake Hood and covers an area of approximately 9 km by 7 km with the axis aligned to the anticipated direction of groundwater flow. The model comprises a single 100 m thick aquifer layer divided into 50 m by 50 m cells. No flow boundaries were set to the east and west of the area with constant head boundaries set at the upstream and downstream extents of the model. Boundaries were also assigned to simulate the effects of rivers, streams, pumping wells and Lake Hood. The model was calibrated to observed groundwater levels as well as measured flow gains and losses over individual reaches of the Ashburton River.
- 6.16 Two scenarios for pre and post lake extension were modelled which represented the following:
- Average flow conditions - median river flow, rainfall recharge, no groundwater abstraction; and
 - Low flow conditions - January 2008 river flows, no rainfall recharge, groundwater abstraction at 70% of allocation.
- 6.17 The output from the scenarios was used to derive an estimate of the likely rate of groundwater inflow/outflow from the current and proposed lake configurations, as well as the potential drawdown in groundwater levels

surrounding the proposed lake extension and consequent impacts on flow gain/loss across four separate reaches of the Ashburton River.

6.18 Figure 8 of Mr Reynolds evidence presents a map of the calculated drawdown in groundwater levels resulting from the proposed lake extension. The figure shows a maximum drawdown of approximately 0.5 m in the vicinity of the lake extension and between 0.5 and 0.1 m extending across the model domain for a distance of approximately 2 km.

6.19 The reporting officer (Mr Hughes) states that the lake expansion will increase the rate of groundwater inflow into the lake resulting in the drawdown of the surrounding unconfined aquifer. The magnitude of the drawdown will reflect the steeper hydraulic gradient required to increase aquifer through-flow to balance the higher rate of groundwater discharge.

6.20 Mr Hughes considers that the estimate of potential groundwater level drawdown derived from the groundwater model provides a suitably conservative estimate of the likely magnitude of the potential drawdown in groundwater levels resulting from the lake extension. In reviewing the model Mr Hughes identified the inherent limitations of the groundwater model which include heterogeneity of the geological materials and that the model is a steady state simulation that is a predictive tool based on input/output parameters and does not consider temporal variability in response to seasonal variation in recharge and discharge. Notwithstanding this point, Mr Hughes considers the application of the model is a useful tool for predicting potential effects but considers the magnitude of the calculated impacts as indicative rather than absolute.

6.21 We note that the applicant has not assessed the effect of the groundwater drawdown on wetlands in the area. There has been no evidence presented to indicate there are any significant wetlands in the vicinity of the Lake Hood area. However, aquatic systems down-gradient of the lake have been identified to provide habitat for threatened Canterbury mudfish. During the hearing Dr Burrell indicated management measures that could be implemented to manage water levels and flows in waterbodies down-

gradient of the lake to ensure the maintenance of these waterways and therefore the Mudfish habitat.

6.22 The LOMP states the lake should be operated between a low normal water level of RL 60.0 m and higher normal water level of RL 60.4 m and provides a general operation strategy to achieve this objective. The LOMP requires the strategy to be monitored to determine if lake level management is meeting the objectives of the LOMP. Maintenance of lake levels as described in the LOMP will ensure the lake extension effect on groundwater levels are consistent with those described in the consent application.

Effects of lake filling on flows in the Ashburton River

6.23 Results of river flow gauging presented in the consent application indicate relatively significant flow gains and losses occur across individual reaches of the Ashburton River between Grove Farm Road and Wakanui School Road. The data indicates loss from the river upstream of Lake Hood and discharge back into the river over the downstream reach.

6.24 Mr Reynolds has modelled the likely response of the Ashburton River to the construction of the lake extension for median flow conditions and flows gauged in January 2008. The model divided the river into four reaches for the purposes of the assessment, two upstream of Lake Hood and two downstream of the lake. The modelling results for each reach of the river are provided in Tables 3 and 4 of Mr Reynolds evidence. The tables show flow losses from the river to groundwater upstream of Lake Hood and flow gains to Ashburton River from groundwater downstream of Lake Hood. Based on the gauged flow situation the model predicts the lake extension will cause the following:

- An **increase** in the existing flow from the Ashburton River to groundwater in reaches upstream of Lake Hood by 11 L/s (from the top of the model to south of Boundary Road) and 92 L/s (from south of Boundary Road to the top of the existing lake on River Road); and
- A **reduction** in existing flow from groundwater to the river of 92 L/s (between the top of the existing lake on River Road to above Carters Creek confluence) and 12 L/s (from above Carters Creek confluence to the model boundary).

- 6.25 Mr Hughes considers the potential increases in flow loss from the Ashburton River provided by the model are likely to represent a conservative estimate of the potential effect of lake construction on surface water flows.
- 6.26 The applicants consultant (Dr Hudson) undertook an assessment of the effect of lake extension on flows in the Ashburton River and subsequent effects on river habitat. Dr Hudson based his assessment on the outputs of Tonkin and Taylors groundwater model and focussed his assessment on the reaches of the Ashburton River upstream of Lake Hood where stream depletion effects increase as a result of the lake extension.
- 6.27 Based on the groundwater model Dr Hudson provides stream depletion calculations for sub-reach 2 for 7-day mean annual low flow (MALF) and median flow conditions. With the extension of Lake Hood the anticipated stream depletion rates are calculated to range between 23 – 185 L/s at low flow and 23 – 116 L/s at median flow. Dr Hudson predicts the lake extension will reduce flows in sub-reach 2 by 0.7 – 5.1% at low flow and 0.2 – 1.0% at median flow.
- 6.28 Dr Hudson assessed the effect of reduced flows in the Ashburton River on habitat availability and water quality using RHYHABSIM (River Hydraulics and Habitat Simulation). Dr Hudson considers a conservative approach was adopted in the calculation of habitat retention in the Wakanui Reach. This assertion is made as there is no allowance for natural downstream depletion or consideration of the effects for the existing Lake Hood.
- 6.29 Dr Hudson has calculated the available habitat (weighted useable area) at MALF and calculated the flow requirements at various habitat retention levels with the lake extension in place. All sub-reaches are predicted to have greater flows than required to achieve 90% habitat retention for the normal critical species. Dr Hudson assessed habitat retention levels for a range of additional criteria including the proposed National Environmental Standard (NES) for environmental flows, the MALF approach used for North Canterbury Rivers and median flow habitat retention. Dr Hudson considers that in all cases predicted depletion is expected to have little or no effect on habitat availability.

- 6.30 Dr Burrell checked the results of Dr Hudsons assessment using the same NIWA data and RHYHABSIM. Based on this review Mr Burrell confirmed that any effects on habitat availability will be very small.
- 6.31 Dr Hudson had also modelled the effect of flow depletion on river temperature. A conservative model was established and predicted that temperature changes would be considerably less than the permitted temperature increase of 3 degC specific in Schedule 3 of the RMA and Schedule WQL12.2 of the PNRRP.
- 6.32 Dr Burrell has not reviewed the inputs to the temperature model but he considers the model predictions are realistic given the estimated stream depletion.
- 6.33 Although we believe the effect of the lake extension on stream depletion is considered to be less than minor, the LOMP provides some security that lake levels will be maintained above 60.0 mRL and in doing so, reduces any risk of lower lake levels driving an increased depletion of the Ashburton River.

Effects of lake creation upon local water balance, groundwater sustainability and groundwater and surface water allocation

- 6.34 Mr Reynolds provided water budgets for the existing case and the lake extension in Figure 2 (median flow) and Figure 3 (January 2008) of his evidence. The modelled change in overall water budget for the January 2008 and median flow scenarios is for an overall increase of 22 L/s and 57 L/s respectively.
- 6.35 For the low flow case (January 2008) Mr Reynolds explains the increase in the total water balance as follows:

Groundwater flowing into the system

- a decrease in groundwater flowing into the lake of 12 L/s
- an increase in leakage through the lakebed into groundwater of 34 L/s.

Groundwater flowing out of the extended system

- a decrease in groundwater outflow of 133 L/s
- an increase in lakebed leakage into the lake of 144 L/s
- a decrease in groundwater flow to streams of 15 L/s based on the inclusion of Bayliss Stream into the lake
- an increase in evaporation of 25 L/s.

6.36 Mr Reynolds states that the overall water balance has increased by 22 L/s in comparison to evaporation of 25 L/s.

6.37 Mr Hughes states that whilst the lake extension alters the magnitude of various parts of the local water balance the only net loss is from evaporation of the extended lake area. Mr Hughes considers that under steady state conditions the additional evaporation represents a 'consumptive' loss of water from the local aquifer system.

6.38 Mr Reynolds considers the effect of the increased evaporation will be mitigated given the applicants intention to maintain a lake level of 60.4 m RL through consented surface water takes rather than the previously adopted 60.0 m RL. This level gives a buffer of 400 mm above the target lake level and the applicants consultant states that it would take 130 days of evaporative losses (or 65 days of evaporative and leakage losses) to reach 60.0 m RL should the applicant not be able to exercise the surface water take consent. The applicants consultant provides information that shows the longest recorded period when there was no flow (from the Ashburton River) permitted into Lake Hood was from the 31 December 2007 to 12 February 2008, a total of 43 days.

6.39 The LOMP provides a strategy for the management of lake levels to ensure the lake is full at the start of the summer period to allow for low flow periods and evaporation to be managed.

6.40 Mr Hughes informed the hearing that total allocation for the Ashburton River groundwater allocation zone is 68.15 million m³/year (98% of the available total) and there is a further 11.63 Mm³/year in process. Mr Hughes considers

any consumptive loss of groundwater from the aquifer has the potential to impact on the overall sustainability of the resource.

6.41 Mr Hughes report states that the applicants consultant provided a supplementary report that undertook an assessment of potential evaporative loss in terms of overall groundwater allocation from the Ashburton River Groundwater Allocation Zone. The supplementary report cites an ECan technical report number U94/97 which provides first order and second order allocation limits for the Ashburton River Groundwater Allocation Zone of 69.5 Mm³/year and 104.7 Mm³/year respectively. The report states the first order allocation limit should be retained until further work demonstrates that increased groundwater abstraction would not compromise efforts to manage the flow regime in the Ashburton River. Mr Hughes notes that the applicants consultant considers the second order limit is more appropriate to use in this case given the ecological effects on the surface flows in the Ashburton River have been found to be no more than minor and the surface water takes to control lake levels are controlled by consent conditions that protect flows in the Ashburton River.

6.42 Mr Hughes considers the mitigation proposed by the applicant is adequate to enable the project to operate in a manner whereby the overall impact on existing groundwater allocation can be considered as being less than minor.

6.43 We agree with the parties that given appropriate conditions of consent enabling mitigation to be performed in respect of the proposed activity, effects on the environment upon groundwater and surface water allocation may be regarded as minor.

Effects of lake creation upon groundwater users

6.44 Table 1 of Mr Reynolds evidence identifies a total of 16 consented boreholes within 2 km of the extended lake. The applicants consultant has assessed the potential well interference effect on these bores using the assessment methodology outlined in Schedule WQN10 of the PNRRP, as well as using a similar methodology developed by the applicants consultant. Mr Reynolds indicates that the results of both assessments confirm that the effect of the lake creation on groundwater users will be no more than minor.

- 6.45 Mr Hughes considered the methodology adopted by the applicant was appropriate and accepted that the lake extension is unlikely to impact upon existing groundwater users.

Effects of lake infilling upon surface water and spring fed streams

- 6.46 As discussed previously the lake infilling will result in the inundation of 95 ha of farmland to the north of the existing lake and the lowering of groundwater levels by approximately 0.5 metres in the vicinity of the lake extension. The following discussion considers the potential effects of the lake extension upon surface water and spring fed streams (other than the Ashburton River).
- 6.47 Inundation of farmland to the north will result in the loss of the section of Bayliss Stream north of the existing lake. Evidence from the applicants consultant stated that DoC has provided the opinion that the stream is highly modified and of low habitat for Mudfish due to the presence of eels. It also stated that an assessment by the applicant's consultant, Mr Reynolds, of potential ecological effects resulting from changes in groundwater levels, has found that this is likely to result in a low potential ecological impact.
- 6.48 Mr Reynolds has also undertaken an assessment of the effects of changes in groundwater flows on the flow in Carters Creek. He states that changes in groundwater levels are predicted to have a no more than minor effect on flows in Carters Creek given that the creek is largely influenced by groundwater discharge from the terrace to the west rather than drainage underlying the Ashburton River floodplain. Mr Reynolds also states that the applicant intends to maintain the lake level at 60.4 m RL and to use its surface water takes fully when permitted. Mr Reynolds considers maintenance of the lake level 0.4 m above the existing regime is likely to support flows in Carters Creek.
- 6.49 Mr Hughes notes that only a short section of Bayliss Stream comprising the outlet channel from the lake to the Ashburton River will remain under the planned Lake extension. Mr Hughes evidence concludes that the proposed lake extension will have no more than a minor impact on flow in Carters Creek.

- 6.50 On the basis of evidence presented, we consider that the proposal will have a no more than minor effect upon surface waters and spring fed streams adjacent to the Lake Hood extension area, or within the existing lake footprint area.

Effects of lake water circulation, water quality and ecology

- 6.51 The applicant's consultant, Dr Fisher, provided evidence on water circulation, water quality and ecology. Dr Fisher stated that, as a starting point, the lake canal development was designed with wider canals than those in the existing development to aid in water circulation. He also advised that he recommended connections between the existing and proposed lake areas in four locations to enable circulation of water: at the end of the current rowing lanes in the north-east corner of the existing lake; in the vicinity of the current boat ramp to the east of the Lake House; in the vicinity of the village centre to the west of the Lake House; and between the canal residential developments.
- 6.52 Dr Fisher further informed that the main outlet from the lake will remain in the same location, but an additional outlet is proposed which is to be located at the end of the rowing lanes in the south western corner of the existing lake. This was considered necessary to manage higher flows through the lake and to enable greater circulation of lake water to the south west corner through existing canals.
- 6.53 Dr Fisher provided an overview of the BATHTUB model which was set up for the existing lake using data on actual inflows and calibrated to observed conditions. The consultant advised that this provided a calibrated baseline for subsequent modelling of the proposed extended lake and that the model was run for steady-state "typical summer conditions" corresponding to the period of data collection and period which typically represents the highest trophic status and "worst" eutrophication effects.
- 6.54 Dr Fisher stated that the modelling showed that for these summer conditions the hydraulic residence time in the existing lake is 165 days and found the existing lake for the summer modelling period to be eutrophic and predicted that algal scums would occur 43% of the time with nuisance conditions 10%

of the time. The model results provided a baseline from which the likely conditions of the proposed lake were assessed in terms of trophic state changes and chlorophyll-a exceedance thresholds.

6.55 Dr Fisher provided an overview of the model inputs for surface water quality, nutrient budget and nutrient concentrations associated with the groundwater flows. The consultant advised the modelling showed that:

- The groundwater represents the largest source of nutrient load to the extended lake providing, in total, approximately an additional 40% DRP, 300% TP, 300% IN and 250% TN to the extended lake in comparison to the total nutrient load for the existing lake.
- As a result of changes in volume and inflow the hydraulic residence time for summer conditions for the extended lake would increase from approximately 165 days to 172 days.
- The three Carlson Trophic Series Index (TSI) results indicate increased eutrophication for the proposed lake extension. However, this will be mitigated to a small degree by the predicted reduction in nutrient concentrations from the Ashburton River water (due to cessation in June 2008 of effluent discharge to the river from the Wastewater Treatment Plant).
- The frequency that chlorophyll-a exceeds threshold values is predicted to increase for the proposed lake, suggesting that the lake will become more eutrophic and that the frequency of nuisance algal blooms will increase unless mitigation measures are implemented.
- The lake water quality in the extended lake will become controlled to a significantly greater degree by groundwater inflows (with high nutrient loading) which the consultant stated is beyond the control of the Applicant.

6.56 Dr Fisher identified a number of options to improve water quality in an extended Lake Hood. This included options proposed to reduce the trophic status of the lake (dilution and flushing, wetlands for nutrient removal, riparian planting, and management of surface drainage (for site stormwater) and options proposed to manage the effects of eutrophication (macrophyte harvesting, fish to consume macrophytes)).

6.57 Dr Fisher advised that the BATHTUB model was used to model the proposed water quality management options of maximising surface water inflows from

the Ashburton River and using wetlands for nutrient removal from groundwater inflows. The evidence indicated that, if allowable inflows to Lake Hood from the Ashburton River are maximised, the hydraulic residence time in the extended lake will be approximately 90 days during summer flow conditions. This is approximately half the residence time calculated for the extended lake (172 days) if the intake flow were managed sub-optimally. Dr Fisher stated that the performance of wetlands to reduce nutrients can vary considerably. However, based on the feasible extent of wetlands approximately 65% of groundwater flow can be intercepted with a residence time of 3 days, and the phosphorous removal efficiency will be between 10% and 55% and the total nutrient load in the groundwater that could be removed as a result of this extent of wetlands and these treatment efficiencies ranges from 6-36%.

- 6.58 Dr Fisher's evidence outlined that three wetlands with a total surface area of 3.7 ha are proposed to cut-off and treat groundwater, the indicative shapes and sizes of which are shown on the Lake Hood Master Plan. The wetlands will have shallower areas for the growth of wetland plants and a maximum depth of approximately 2 m and will be established on a progressive basis, with performance monitoring undertaken to assist in determining the optimum wetland design for the location. Dr Fisher also stated that further wetlands will be used to treat the inflow from Carters Creek.
- 6.59 Dr Fisher's evidence concluded that the BATHTUB model shows that the two water quality management measures of maximising surface water inflow, and construction of wetlands would result in an improvement in water quality, compared to the extended lake without these measures. The evidence further concluded that the modelling results also indicate that maximising the flow from the Ashburton River combined with a conservative nutrient reduction (10% nutrient reduction) by wetlands, will result in the water quality in the extended lake still being better than the water quality in the existing lake and that water quality could potentially be further improved if the nutrient reduction rate achieved by the wetlands can approach 55%.
- 6.60 Key objectives of the LOMP are to provide guidance for lake level and lake water quality maintenance and ensure the water quality within the lake is

suitable for contact recreation. The LOMP requires the implementation of a suite of measures to mitigate eutrophication of the lake including the construction of wetlands, full use of consented surface water takes, lake flushing and mechanical and biological control of macrophytes. The LOMP provides for frequent water quality monitoring that will provide data to assist with management of lake and associated discharge water quality.

6.61 Evidence presented by Dr Burrell, stated that the applicant had considered the effects of the newly created lake on water quality and ecology in some detail and that the applicant had concluded that with the proposed mitigation options, the extended lake will serve as a sink for nutrients and other contaminants and that as a result, the quality of water discharged from the lake will be of a higher quality than that already present in the Ashburton River.

6.62 However Dr Burrell's evidence identified a number of concerns regarding the applicant's approach including the short timeframe and limited data used in modelling undertaken by the applicant; uncertainty regarding the effectiveness of wetlands in removing nutrients prior to groundwater entering Lake Hood; uncertainty over the effectiveness of grass carp at controlling macrophyte growth during cooler temperatures; failure of the applicant's modelling to take into account the convoluted shape of the lake extension which will increase water residence time and, combined with high nutrient concentrations could result in stagnant backwaters with degraded water quality.

6.63 Dr Burrell stated that the applicant's approach to assessing water quality and ecological effects is sound although the areas of uncertainty identified could impact negatively on recreational users of the lake, although Dr Burrell noted that the existing lake remains a popular location for recreation despite experiencing some water quality problems.

6.64 Dr Burrell stated that the applicant has demonstrated that there are options for managing lake water quality issues and that the potential effects could be managed with an appropriate lake water quality monitoring programme

tied into a lake management plan that includes consideration of how potential effects would be managed should they arise over time.

6.65 Dr Burrell also advised that, in Section 8.6.2.4 of the AEE the applicant proposes to cease monitoring phosphorus and nitrogen concentrations which are a requirement of the existing consent CRC012224. The reporting officer recommended that, given inherent uncertainties regarding effects of increasing the lake size on water quality, existing water quality monitoring requirements are to be maintained. The reporting officer expressed the opinion that monitoring conditions could be reviewed and potentially removed if the data supports the applicants prediction of minimal effects on water quality in the Ashburton River.

6.66 We were advised that surveys in the vicinity of the south east of the existing Lake Hood had identified a single specimen of the Canterbury mud-fish – an ecologically significant and endangered species. Concern was expressed about the potential effects of increases in the eutrophic state of the combined lake areas and the discharges from these back into the surrounding waterways and Ashburton River.

6.67 Having considered the proposed lake construction and management conditions, together with on-going monitoring provisions we have concluded that whilst there may be some uncertainties as to how lake water quality may change over time with the proposed expansion, any adverse variation in lake water quality may be mitigated with the proposed lake management outlined in the LOMP.

6.68 Additionally, any such changes in lake water quality (without mitigation) may not necessarily change the TLI status for the lake by any significant degree. However, we accept that robust ongoing monitoring of lake water (including discharge) quality should be undertaken.

Effects of stormwater discharge

6.69 The applicants proposal includes an application for resource consent to discharge stormwater from the extended Lake Hood development to ground following treatment via swales and infiltration basins and a small discharge (flow beyond the first flush) directly to the Lake.

- 6.70 Evidence from the applicant's consultant, Mr Christensen, presented details of a further assessment undertaken in response to several issues raised by the s42A reports relating to stormwater management and effects on lake and groundwater quality including the key design parameters of the stormwater network and infiltration basins; the performance of the infiltration basins; roof runoff to ground; calculation of impervious areas; and discharge to surface water.
- 6.71 The applicant's consultant found that the effects of roof runoff to ground will be less than minor; that the effect of diverting storms in excess of 25 mm will be less than minor; and that in terms of potential flooding effects, Lake Hood will act as a large attenuation pond and will mitigate any effects of increased runoff and that effect will therefore be less than minor.
- 6.72 The applicant's consultant also found that discharge from the rural residential areas will largely meet the majority of the permitted activity standards in Rule WQL5, and that potential effects on the lake water quality will therefore be no more than minor.
- 6.73 The applicant's consultant concluded that the proposed treatment of stormwater will be effective at removing contaminants so that discharge of stormwater into Lake Hood will not have a more than minor adverse effect on lake water quality and that the treatment proposed and the mixing that will take place in the lake will result in a less than minor effect on water quality. The applicant's consultant also considered potential cumulative effects and concludes that these will also be less than minor.
- 6.74 The applicant's consultant concluded that appropriate provision can be made for stormwater collection and treatment to meet ECan's requirements and a draft set of conditions prepared by the applicant's consultant to mitigate potential adverse effects of stormwater were tabled by the applicant's legal counsel.
- 6.75 In regards to stormwater effects during the construction phase of the project, the reporting officers evidence outlined that following lodgement of the AEE

the applicant had prepared a "Lake Creation and Management Plan" LCMP dated 5 June 2009 and the reporting officer concludes that the draft LCMP covers the key water quality and ecological effects that could arise during construction and proposed appropriate approaches to avoid and mitigate these effects. The reporting officer also concludes that the proposed monitoring, reporting and contingency plans presented in the draft LCMP appear appropriate.

6.76 In regards to the post-construction phase the reporting officer concluded that the proposed approach to stormwater management is appropriate for the site but stated that it remains unclear how the treatment system will meet the receiving water quality standards (WQL19 of the PNRRP) and the feasibility of achieving soakage in an area with such shallow groundwater levels. The reporting officer stated that the applicant is working on issues relating to infiltration rates and impervious area calculations with a view to providing greater certainty about predicted stormwater discharge and the ability to comply with the PNRRP water quality standards for artificial lakes.

6.77 It is noted that the applicant's consultant presented details of further assessments undertaken on these issues as part of his evidence and we accept that overall, given the proposals proffered and with adequate specifications contained in conditions of resource consent, any environmental impact of stormwater discharge will be minor.

Effects of lake discharge to the Ashburton River

6.78 The applicants consultant (Dr Fisher) has undertaken a review of the effect of the lake extension on discharge flow rates and water quality and subsequent discharge from Lake Hood to the Ashburton River. He states the existing consented discharge rate (CRC012224) to the Ashburton River of 400 L/s is considerably less than the consented takes of up to 2.5 m³/s, effectively limiting the water take from the Ashburton River. Dr Fisher states that to improve lake water circulation and water quality management by optimising through-flow of water, the maximum discharge needs to increase to 2.5 m³/s to allow for the maximum take to be exercised.

6.79 The existing outlet only has capacity for 2.2 m³/s and Dr Fisher indicates the outlet should also provide capacity to meet the demands of a 10 year ARI

event from Carters Creek, estimated to be 4 m³/s. To accommodate these flows Dr Fisher states that outlet capacity should be increased by up to 4.3 m³/s to allow for the 10 year ARI event whilst also providing for the maximum consented take from the Ashburton River.

6.80 Dr Fisher informs us that the existing outlet cannot be easily retrofitted and suggested a new outlet to accommodate a discharge of 4 m³/s be installed in the south-western corner of the lake which would allow for greater circulation of lake water to the south-west corner and through the existing canals.

6.81 Dr Fisher considers the existing consent (CRC054402.1) to discharge water to Ashburton River should be increased from 2.5 m³/s to 5.5 m³/s to allow for the maximum consented surface water take in addition to a 10 year ARI flood event.

6.82 Dr Fisher examined the discharge water quality with an assessment of the expected discharge loads of a number of parameters including suspended sediments, biological oxygen demand (BOD) , pH, E. coli, total nitrogen, dissolved reactive phosphorus and temperature. The following provides a summary of Dr Fishers conclusions for each parameter:

- Suspended Sediment – concentrations in the discharge will remain similar to those recorded in the existing lake and existing consent conditions will continue to be able to be met
- BOD – is not expected to increase as the water quality inflows from the Ashburton River will be improved due to the cessation of the Wastewater Treatment Plant discharge to the river upstream of the abstraction point
- pH - Dr Fisher predicts pH consents limits will continue to be met
- E.coli – Maximising flow from the Ashburton River increases the potential for E.coli contamination, however Dr Fisher considers the E.coli levels in the discharge are unlikely to increase given the relatively short decay rate of E.coli compared to the residence time in the lake.
- Total Nitrogen – The BATHTUB model predicts that TN will increase by approximately 10 -15% as a result of the increased groundwater inflow in the extended lake. Mitigation measures will be implemented to reduce TN concentrations and Dr Fisher indicates that if a 25% reduction in TN from

groundwater can be achieved through the use of constructed wetlands the concentration of TN in the discharge is likely to remain unchanged. Dr Fisher states that the lake will act as a sink for nutrients and the TN concentration in the Ashburton River downstream of the lake will be lower due to the presence of the lake.

- Dissolved Reactive Phosphorus - The BATHTUB model predicts the DRP discharge concentration will remain unchanged providing the take from the Ashburton River is maximised.
- Temperature – Dr Fisher considers the discharge water temperature will be similar to the existing lake as the lake depth does not change significantly and the lake residence time is reduced.

6.83 Dr Fisher considers existing consent conditions relating to suspended solids, BOD, E. Coli, DRP and temperature remain appropriate. However Dr Fisher suggests that because TN is controlled by factors outside the control of the applicant, that the TN limit should be removed or revised. Dr Fisher provided additional information to ECan regarding TN limits in a memo dated the 15th of October 2009. The memo suggested a consent condition that required TN concentrations in the lake discharge to be no more than 10% of the groundwater or surface water inflow concentration or 3 milligrams per litre, whichever is the greater.

6.84 Dr Burrell and Mr Pascoe agreed with Dr Fisher that the Lake Hood discharge presents a low risk to water quality in the Ashburton River with Dr Burrell considering this is mainly due to the low rate of discharge from the lake relative to the flow in the Ashburton River. Dr Burrell also notes that given the inherent uncertainties regarding the lake extension on water quality, monitoring requirements should be maintained.

6.85 We have reviewed the water quality data and the existing and proposed limits in relation to the discharge provided by the applicant. We are comfortable that the discharge limits set are either based upon ANZECC guidelines, water quality criteria as scheduled in the PNRRP, or as contained within existing consent conditions. The only deviation from this is the proposed TN limit. However, based upon the evidence provided to us, and given the proposed operation of Lake Hood, we are of the view that an

increase in the TN limit of up to 3 milligrams per litre will pose no risk to Ashburton River water quality. Particularly, as it is highly likely that the lake will provide reasonable buffering of input surface water and groundwater that would otherwise remain as or contribute to, flow in the river.

6.86 Notwithstanding the above, Dr Burrell reviewed the memo prepared by Dr Fisher regarding TN conditions for consent CRC012224 and states that he disagrees with the applicants proposed consent condition and confirms his position outlined to us during the hearing that monitoring of nutrients in the Ashburton River upstream and downstream of the Lake Hood discharge was appropriate and effects based. In his response, Dr Burrell suggests consent conditions to this effect.

6.87 Dr Burrell states that given the applicant accepts the discharge standards for parameters other than nutrients the simplest option is to maintain the existing discharge consent condition and ensure the condition for nutrients is reasonable and enforceable. In addition, Dr Burrell suggests the applicant should monitor the discharge water for nitrate-N and DRP as these are the bio-available nutrients that could cause algal growths in the river.

6.88 The Lake Hood Operation Management Plan provides for weekly and monthly discharge monitoring of suspended sediment, BOD, pH, E.coli, temperature, DRP and TN from the existing Lake Hood outlet and the proposed outlet. No provision for monitoring of nutrients in the Ashburton River in accordance with Dr Burrell's suggestion is made.

6.89 In that regard, and in consideration of the technical evidence presented, we are of the view that lake monitoring is important, more-so from the perspective of recreational water quality and discharge source quality trend over time.

6.90 The position we hold in respect of lake discharge management, is that we would not consent to an activity that would otherwise pose a risk to natural surface water receiving environments. The most effective method of ensuring this is to set reasonable limits on source discharge waters that are consistent

with the premise of low-risk to aquatic ecology in those downstream receiving environments.

6.91 Also, given the imposition of operational conditions for lake operation and discharge, if, and only if, these conditions are breeched at any time may there be any risk to water quality in the Ashburton River. Consideration must also be given to the fact that under those operational conditions, there is a significant disparity between Ashburton River and discharge flows.

6.92 The proposed water quality monitoring includes the Ashburton River at the upstream intake and the Lake Hood discharge point(s). Given that flow data is locally available for the Ashburton River and outlet flows are monitored, there is facility to audit the performance of the lake environment with respect to the discharge receiving environment. This is encapsulated within the proposed LOMP and is a requirement within conditions of consent in provision of satisfactory lake management outcomes.

6.93 As there are water quality limits to be set on the discharge, we see that duplication of limits within the Ashburton River (as a median reporting/compliance result) is not warranted given the source of the lake water in the first instance.

6.94 Overall, we are satisfied that the proposals do not constitute any more than a minor potential adverse effect upon the Ashburton River in respect of lake discharge, given the requested limits on discharge water quality and in consideration of proposed lake management.

Adverse effect of flooding and flood conveyance

6.95 Modelling of the potential flooding effects on the location and development of the proposed gravel processing and storage areas together with the newly proposed rural residential and residential areas indicated the desirability to provide for the setting aside of a floodway of minimum 90 m width extending from the Boundary Road area south-east towards the extended Lake area. This floodway is proposed to be partly contained with a proposed earth bund and partly by gravel bunds around the gravel processing and storage areas.

6.96 We note that it (the floodway) will pass beneath the overhead transmission line which crosses this land, but well clear and equidistant from the supporting pylons. We also note the applicants intention to provide for raised floor levels for new housing adjoining the potential areas that may be affected by future flood events.

6.97 The applicants consultant, Mr Christensen states that the residential development associated with the lake extension will be constructed in areas marked as low risk on the Ashburton District Plan: Planning Maps. The Ashburton District Council assessment criteria for subdivision in the Aquatic Park Zone requires a residential unit floor level of at least 150 mm above the 200 year annual return interval (ARI) flood event. To meet this requirement Mr Christensen undertook modelling work to evaluate the effects of a 200 year ARI flood event. Three scenarios were assessed including:

- Existing lake;
- Lake extension (without gravel stockpile and processing plant bund); and
- Lake extension (with gravel stockpile and processing plant bund).

6.98 The modelling results show that with the lake extension in place flooding will be similar to that of the existing situation with residences on the lower terrace being expected to be flooded. To mitigate this risk Mr Christensen proposes that a low bund should be constructed to divert floodwaters away from the residential area to the eastern end of the lake. In addition, low points in the recreational islands are proposed to provide for a flow path for floodwaters. The model shows that with the mitigation measures in place the lake extension reduces flood levels in the Ashburton River and will improve flood hazard protection for the existing development.

6.99 Modelling of the scenario with the gravel stockpile and processing bund in place shows that locating the processing plant close to the river would block the path of the river breakout and result in increasing flood levels in the Ashburton River by 100 mm at several locations downstream. The applicants consultant suggests that moving the processing plant approximately 100 m to the west of the original site would allow the breakout to pass through to Lake Hood resulting in a reduced effect on river levels. The model shows that with the mitigation measures in place the flood levels in the Ashburton River

downstream of the gravel processing plant will not increase by more than 5 mm which Mr Christenson considers to be a less than minor effect on flood levels.

6.100 The investigating officer (Ms Fowler) accepts that the 200 year ARI is appropriate to assess the flood risk to the Lake Hood Aquatic Park and neighbouring properties. Ms Fowler informed us that ECan's Mike 11/Mike 21 hydraulic model was made available to the applicants consultant (Tonkin and Taylor) to incorporate their development initiatives. Ms Fowler notes that ECan's Principal Hazards Officer reviewed the applicants assumptions and agreed with the applicants assertion that the increase in lake size will increase the attenuation volume and spread the same volume out over an additional 100 ha. Therefore, the lake extension will provide for lower flood waters than would occur at present and improve the current protection for existing dwellings. Ms Fowler concludes that the flood hazard levels for the proposed development will be similar to those for the existing Lake Hood.

6.101 Concern has been raised regarding the risk of a failure of the existing dam given the increase in water storage with the lake extension in place. To address this concern the applicant's consultant undertook a dam break hazard analysis to assess the risk and examine the impact of increased storage capacity on the impact of embankment failure and likely damage.

6.102 Mr Christensen indicates that the increase in lake volume would increase the peak breach outflow in the event of dam failure. The hazard assessment focussed on the effects of increasing the peak breach flow. Mr Christensen also reviewed the Potential Impact Category (PIC) of the embankment by utilising the New Zealand Dam Safety Guidelines and the Building (Dam Safety) Regulations 2008.

6.103 The results of the hazard assessment are listed below:

- Mr Christensen considers it is highly unlikely, lives would be lost given the flow would rapidly disperse over a comparatively wide area dissipating energy of the breach flow;
- A failure is expected to be slow to develop which would allow time for people to move to safe high ground;

- No dwellings are at risk from a dam failure in both the existing and extended lake;
- Financial risk will be confined to damage to pasture and potential stock loss, however a flow velocity of no more than 2 m/s should result;
- The environmental risk is low as flood levels during a fine day failure are similar to an annual event and the incremental effect of a wet weather failure is minor.

6.104 The results of the hazard analysis were analysed in accordance with Table III.1 of the NZSOLD Guidelines. The review shows the PIC of the Lake Hood embankment with the extended lake in place will be low given no fatalities are expected with only moderate socio-economic financial and environmental damage.

6.105 In addition the results of the hazard analysis were analysed in accordance with Table 1 (determination of damage level) and Table 2 (Matrix of the assessed damage level versus population at risk) of the Building (Dam Safety) Regulations. The review shows an assessed damage level of 'moderate' in both the existing and extended lake case and a detailed population risk assessment (PAR) of 2.2. For moderate damage and a PAR of less than 5 the dam may be considered as having a low PIC.

6.106 Mr Christensen concludes that the existing design and construction methodology as well as the ongoing monitoring and surveillance regime remain valid for the proposed lake extension and that the analysis shows that incremental effect of dam break from the lake extension is less than minor.

6.107 ECan commissioned Mr Paul Morgan of Riley Consultants Ltd to review the Tonkin and Taylor flood risk report, who then provided a letter to the applicant (via ECan) requesting additional information. Mr Morgan found that Tonkin and Taylor had responded to all points raised in his review and accepted their response. Ms Fowler considers adverse effects of dam failure due to the proposed activities are likely to be minor on the basis of Mr Morgans professional opinion and the applicants acceptance of proposed mitigation measures.

6.108 We are satisfied that an appropriate assessment of flood conveyance and potential dam-burst effects has been carried out in accordance with the recommendations in **NZSOLD** and that such effects on areas to the north and south east of the existing Lake boundary would be of a minor nature.

Adverse effects upon air quality

6.109 The applicants consultant Ms Grace states that the excavation of the extended lake and processing of gravel on the application site has the potential to generate dust and may adversely affect neighbouring properties. Ms Grace indicates the applicant proposes to manage the risk of dust discharge to the surrounding environment by adhering to the Lake Creation Management Plan (LCMP). The objective of the LCMP for dust control is to ensure there are no nuisance dust emissions from the project site. The LCMP identifies that the key sources of dust generation will be from stockpiles, materials processing, roads and transport of material and proposes a range of control measures designed to avoid the conditions that lead to dust generation. In addition to these avoidance measures the LCMP requires water carts to be used to dampen dust sources.

6.110 We believe that given the activities proposed, there is potentially some risk of adverse effects of dust migration. However, we agree that mitigation measures coupled with requirements contained within conditions of resource consent will serve to appropriately address any potential air quality effects. Ms Fowler considers that providing the applicant complies with the proposed mitigation measures, effects on air quality will be no more than minor. In order to ensure the applicant implements necessary mitigation measures Ms Fowler recommends the following two conditions of consent:

- Dust shall be controlled in accordance with the measures outlined in the LCMP and details which specifies measures are to be implemented; and
- The applicant is to maintain a dust complaints register, providing details of what should be recorded in the event of a complaint.

Adverse effects on Tangata Whenua values

6.111 The applicants consultant considered effects on cultural values and notes that there are no identified sites of significance to Maori within the application site. The applicant acknowledged that the Ashburton River/Hakatere is a Statutory Acknowledgement Area for Ngai Tahu but considers there to be no additional water take from the river above what is already consented. The effect of the lake extension on flows and habitat in the Ashburton River have been addressed with the applicants consultants considering that the effects are expected to be no more than minor.

6.112 Ms Fowler confirmed that there were no records of sites of cultural significance, or silent files in the lake extension area. Mr Pascoe states the application is within the rohe of Te Runaka O Arowhenua and confirms that the Ashburton River is a Statutory Acknowledgement under the Ngai Tahu Claims Settlement Act 1998. Mr Pascoe provides information from Chapter 2 of the PNRRP which describes the Ngai Tahu association with the river.

6.113 Ms Fowler notes that the surface water bodies affected by the lake extension (Carters Creek, Bayliss Stream and Lake Hood) are not within the Statutory Acknowledgement area although they are tributaries of the Ashburton River.

6.114 ECan informed Te Runaka O Arowhenua of the applications when they were receipted, and again when they were publicly notified. ECan also informed Te Runanga O Ngai Tahu when the applications were publically notified. Te Runaka O Arowhenua lodged a submission in opposition to all consent applications, however, there has been no information provided citing the rationale for the opposition. No submission was received from Te Runanga O Ngai Tahu. Given the lack of detail in the Te Runaka O Arowhenua submission, Ms Fowler states that she is unable to determine if adverse effects on Tangata Whenua values are acceptable.

6.115 Ms Fowler recommends that the applicant adopt the ECan standard Accidental Discovery Protocol condition to mitigate any potential effects from the activities.

6.116 No further elaboration was forthcoming on the concerns expressed in the submission by Te Runaka O Arowhenua Inc. Society. We note that the s42A reporters have had due regard to relevant Iwi management plans and we have also considered the potentially resultant effects on water quality in the Ashburton River from the proposed lake extension. Overall we conclude that the requested activities, together with proposed mitigation measures, will have a less than minor effect upon Tangata Whenua values.

Summary of Effects

6.117 As a preliminary procedural matter, the question was raised as to whether the utilisation of groundwater as a source for creation of the extended lake constitutes a 'take' requiring resource consent. In this context there was some debate between the experts concerned as to whether the rate of evaporation from the lake surface would also lead to a more rapid depletion of groundwater resources than would be the case for evaporation rates for irrigated farmland.

6.118 Having considered those matters and the legal cases cited by Ms Crawford in her closing submissions for the Trust, we accept her conclusion that what is proposed here does not constitute a 'take' and that evaporation from the Lake is by that stage from surface water, rather than groundwater. We note that a condition to partially mitigate increased evaporation rate effects on the overall 'groundwater budget' has subsequently been agreed between the Trust and the section 42A reporters. This involves the use of the existing consented surface water take to replenish such losses.

6.119 On the evidence presented we are also satisfied that while there will be some 'drawdown' effects on groundwater levels in the area surrounding the proposed Lake extension, those will not be of a magnitude sufficient to interfere with the exercise of consented groundwater takes in those areas.

6.120 As a final procedural matter we note that there was no disagreement between the applicant and reporting officers that this proposal can pass at least one of the 'gateways' of section 104D. We have therefore proceeded to assess these applications against Part 2 and the criteria set out in section 104 of the Act.

6.121 In terms of the actual or potential effects on the environment of these proposals, the primary issue to be considered here is the management of eutrophication in the extended Lake given additional nutrient loading from inflowing groundwater. We have carefully considered the contrasting opinions expressed by Dr Burrell and Dr Fisher in this regard. On the evidence presented we accept (at various times) that either nitrogen or phosphorus may be the limiting factor influencing eutrophication in the Lake (predominantly phosphorus), and we accept Dr Fisher's statement that the current DRP limit set out in CRC012224 can continue to be complied with. On balance, we accept Dr Fisher's reasoning and his recommended revised change to the condition in relation to Total Nitrogen concentration together with his recommended changes to the monitoring locations on the Ashburton River currently set out in existing consent CRC012224. We consider these changes to be appropriate and within the scope and intent of those as originally applied for by the applicant Trust in relation to that matter.

6.122 The potential for flooding in the north-east part of the APZ from the Ashburton River is proposed by the applicant to be mitigated by a combination of measures including specified building floor levels and the construction of a flood protection bund up to 1.0 m high. The location of that bund together with the noise mitigation bund adjoining the processing plant is indicated on Figure 1 of Appendix C attached to the 'LCMP – Lake Creation Management Plan' which accompanied Ms Crawford's Closing submissions for the applicant Trust.

6.123 The noise mitigation bund is located adjoining the northern and eastern boundaries of the proposed gravel processing plant (now to be located slightly further to the west). This will also act to partly 'deflect' flood flows. The longer flood protection bund stretches from north of Boundary Road to the northern edge of the extended Lake area. A 'floodway' gap is also to be provided to the south of Boundary Road and across the proposed Gravel Stockpile area. This 90.0 m wide floodway is located approximately mid-way between the high voltage transmission line pylons that pass in a line extending south-west to north-east across the APZ. Provision is made for primary and secondary (fusible) spillways to cater for the discharge of

floodwaters entering the Lake. We are satisfied that these combined measures are appropriate to ensure that potential flood effects on the proposed extensions to the APZ and on areas downstream of the Lake will be no more than minor.

6.124 During the course of the hearing there were continued references by many of the witnesses for the Trust to matters that were to be more fully addressed in either the LCMP or the LOMP. While 'draft' versions of those had been submitted with Mr Lovell's evidence, 'Final' copies were appended to Ms Crawford's closing submissions following further consultation and refinement with Council officers. We are satisfied that these two management plans now provide clear statements of how the particular requirements/standards set out in the conditions to the various consents are to be achieved and/or implemented.

6.125 We have carefully considered the issue of what should be an appropriate duration for the consents sought in this instance, and have noted Ms Crawford's earlier comments as to 'reasonableness' and the 'Newbury' tests, together with her submission as to the applicant's desire for flexibility and certainty of term to give full effect to the range of matters being consented. In that context we also noted that Mr Lovell's evidence (para.5.4) anticipated that full development of the Aquatic Park would be complete by 2020. In that light, and from the perspective of the Council's statutory function to achieve integrated management of the natural and physical resources involved here, we see greater merit in Mr Pascoe's recommendation that consents in this case should be co-terminus with those of the current Lake Hood consents. If the development of this land is still proceeding at that time but has to that date otherwise met the terms and conditions now set out, then we consider that the Council's requirements for further consent at that time should be minimal.

7.0 Statutory Considerations

- 7.1 Having regard to the above, we have then considered these proposals, subject to Part 2 of the Act, against relevant objective and policy statements in the Regional Policy Statement ('RPS'), Transitional Regional Plan ('TRP') and the Proposed Natural Resources Regional Plan ('PNRRP'). These were summarised in the evidences presented by Ms Grace for the Trust, together with Ms Fowler's and Mr Pascoe's section 42A reports. We are satisfied that these proposals are consistent with those statements.
- 7.2 Subject to the range of conditions set out below, together with compliance with the provisions of the LCMP and LOMP, we are satisfied that the potential adverse effects on the environment of the proposed Lake extension will be no more than minor.
- 7.3 As Ms Crawford pointed out, there was no evidence to suggest that these proposals would adversely effect tangata whenua values, nor will it be likely to adversely affect the values of the Ashburton River (noted as a Statutory Acknowledgement Area). We note that the applicant has volunteered an 'accidental discovery protocol' to address any unforeseen matters in this regard that may be revealed during the construction phase of this development.
- 7.4 For all of the foregoing reasons we are satisfied that the resource consents sought (and as modified during these hearings) may be granted subject to conditions.

8.0 Determination

- 8.1 Pursuant to sections 104, 104B, 104D, 105 and 107 of the Resource Management Act 1991, resource consents are granted for the following applications subject to the conditions set out in **Annexure 1** in relation to each.

9.0 General

- 9.1 Unless otherwise stated, each of the following resource consents identified in **Annexure 1** shall have an expiry date of **5th July 2031**.

DATED the 8th day of February 2010

R W Batty, Commissioner (Chair)

T B Heller, Commissioner

Handwritten signature of R W Batty in blue ink.Handwritten signature of T B Heller in blue ink.

Annexure 1 – Conditions of Resource Consent(s)

CRC093110 - To discharge stormwater to land and to water

(1) The discharge shall be only stormwater generated from:

- (a) Roofs;
- (b) Roads;
- (c) Hardstand areas; and
- (d) Construction activities

within the proposed residential subdivision located off Huntington Avenue, labelled as "Applicant's Site" on Plan CRC093110A, which forms part of this consent.

Stormwater System

(2) Stormwater shall be discharged into land, at or about map reference NZMS 260 L37:1120-9320 via the following stormwater systems:

- (a) Stormwater from roofs shall be discharged via a sealed system to ground that excludes all other stormwater;
- (b) Stormwater from hardstand areas and roading in the rural residential areas shall be discharged to soak holes via swales with a grassed section at least 20 metres in length with a minimum topsoil depth of 150 millimetres immediately before each soak hole;
- (c) Stormwater from hardstand areas and roading in the residential areas shall be directed to sumps via kerb and channel prior to discharging into land via soakage basins;

as shown on Plan CRC093110B, which forms part of this consent.

(3) When the capacity of the stormwater system is exceeded within the Lake edge and Island residential areas, stormwater shall be discharged directly to Lake Hood.

(4) When the capacity of the stormwater system is exceeded within the rural residential areas, all stormwater shall be discharged to land, except where this is not practicable, in which case, stormwater may be discharged to surface water where this drains to Lake Hood.

Design

(5) All sumps shall be fitted with submerged or trapped outlets capable of trapping hydrocarbons.

(6) The inlets shall be located as far as possible from the overflow structure from the soakage basins.

- (7) The inlets to the soakage basins and swales shall be designed with appropriate protection to prevent erosion and scour.
- (8) The roof soak holes shall be:
 - (a) Designed to collect and dispose of stormwater from all storm events up to and including all 1 in 10 year storm events of 24-hour duration; and
 - (b) Designed and sized in accordance with the New Zealand Building Code.
- (9) The soakage basins shall be designed to collect, treat and dispose of stormwater from the first 25 millimetres from any storm event.
- (10) A splitter box shall be installed to divert all stormwater generated in excess of the first 25 millimetres from any storm event from upstream of the soakage basins directly into Lake Hood.
- (11) The impervious area of the residential areas for the purposes of designing soakage basins shall be based on the following:
 - (a) All land areas drain to the collection system;
 - (b) The average house size is 250 square metres and roof runoff drains directly to soakage pits;
 - (c) Hardstand areas are 10 percent of standard residential lots and 50 percent of high density lots; and
 - (d) Road and footpath areas as per the final design layout drawings.
- (12) The soakage basins shall have an infiltration rate:
 - (a) Not exceeding 100 millimetres per hour and not less than 50 millimetres per hour as determined using a double ring infiltrometer test; or
 - (b) Not exceeding 50 millimetres per hour and not less than 20 millimetres per hour as determined using a flooded basin test;
- (13) The soakage basins shall:
 - (a) Be lined with a layer of sandy loam, or equivalent material, at least 200 millimetres thick;
 - (b) Be designed to prevent the entry of surface stormwater runoff from adjacent impervious and pervious areas of development;
 - (c) Be uniformly vegetated with grass and/or groundcover plants.
 - (d) Have side batters that do not exceed one vertical to three horizontal;
 - (e) For those basins within 150 metres of the lake, have a minimum invert level of 61.1 metres RL;
 - (f) Have a depth not exceeding one metre; and

- (g) Have a volume calculated by multiplying 25 millimetres by the impervious area, calculated in accordance with Condition 11.
- (14) The rural road and hardstand swales shall:
- (a) Have a minimum length of 20 metres with a minimum topsoil depth of 150 millimetres;
 - (b) Be designed to treat all runoff from the first 25 millimetres of each storm event;
 - (c) Be uniformly vegetated with grass and/or groundcover plants; and
 - (d) Discharge to soak holes designed to dispose of all 1 in 5 year storm events up to and including events of 24-hour duration.

Design Plans and Certification

- (15) At least one month prior to the construction of the stormwater system the consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, design plans of the stormwater system to be installed.
- (16) A certificate signed by the person responsible for designing the stormwater system or a suitably qualified person, shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, to certify that the system is constructed and installed in accordance with the conditions of this consent.
- (17) (a) Prior to any discharge occurring to a soakage basin, the consent holder shall test the infiltration rate of the top 200 millimetres of soil and demonstrate that it is in accordance with condition (12).
- (b) The results of testing carried out in accordance with (a) shall be provided to the Canterbury Regional Council, Attention RMA Compliance and Enforcement Manager, within 10 working days of the completion of testing.

Inspections and Maintenance

- (18) (a) The soakage basins and swales shall be inspected at least once every three months for the first twelve months following commencement of this consent, and at least once every six months thereafter.
- (b) Any visible hydrocarbons and debris or litter shall be removed as soon as is practicable, but not longer than 15 working days.
- (c) Any accumulated sediment in the soakage basins shall be removed as soon as is practicable, but not longer than 15 working days.
- (d) Any scour or erosion shall be repaired as soon as is practicable, but not longer than 15 working days.

- (19) The soakage basins and swales shall be:
- (a) Maintained so that vegetation or grass is in a healthy and uniform state;
 - (b) Replanted where erosion or die-off has resulted in bare or patchy soil cover;
 - (c) Maintained so that vegetation or grass is at a minimum length of 50 millimetres.

Monitoring

- (20) A representative soil sample shall be taken from two representative soakage basins:
- (a) At least once every ten years;
 - (b) From a depth of between zero and 50 millimetres below the ground surface at the point of lowest elevation;
 - (c) By a suitably experienced person.
- (21) Soil samples shall be analysed:
- (a) For the following contaminants:
 - Total Copper
 - Total Zinc
 - Benzo(a)Pyrene
 - Total petroleum hydrocarbons C7-C9
 - Total petroleum hydrocarbons C10-C14
 - (b) In milligrams per kilogram dry weight soil;
 - (c) By a laboratory accredited for that method of analysis by International Accreditation New Zealand (IANZ) or an equivalent authority.
- (22) Should any of the contaminants analysed in accordance with Condition (21) above exceed the trigger levels, in milligrams per kilogram dry weight soil, set out below:

Total Copper	[100]
Total Zinc	[300]
Benzo(a)Pyrene	[5.7]
Total petroleum hydrocarbons C7-C9	[500]
Total petroleum hydrocarbons C10-C14	[3200]

- (a) Further testing shall be undertaken to determine the extent of the contamination;
- (b) Contaminated soil shall be removed and replaced with uncontaminated soil and the affected area shall be revegetated.

Recording and Reporting

- (23) Records of the inspection, maintenance and monitoring of the stormwater system shall be kept. The records shall include, but not be limited to, information that demonstrates compliance with conditions of this resource consent. Copies of these records shall be provided to the Canterbury Regional Council on request.
- (24) The results of the analyses undertaken in accordance with Conditions (21) and (22) shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within ten working days of receipt of the results by the consent holder.
- (25) Any material removed in accordance with condition 22(b) shall be disposed of at a facility authorised to receive such material.

Management Plans

- (26) For construction discharges to a separate and bunded portion of the lake (such as during the lake creation period):
 - (a) The Consent Holder shall maintain and comply with the section in the Lake Creation Management Plan (LCMP) on Stormwater Management prepared in accordance with consent CRC093111, or any subsequent replacement consent, for the purposes of complying with consent conditions and to control the effects of construction discharges to a separate and bunded portion of the lake (such as during the lake creation period).
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (d) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
 - (e) The LCMP shall include, but not be limited to, the following measures:
 - (i) Undertaking excavation in stages to minimise the area exposed at any time;
 - (ii) Maintaining a buffer of intact land between each excavation stage and surface waterways;

- (iii) Retaining an area of in-situ ground to separate active excavation areas from surface waterways;
 - (iv) Locating stockpiles away from surface waters or areas of overland flow;
 - (v) Constructing a sediment retention pond to contain runoff from the processing plant area from a 1 in 5 year rainfall event.
- (27) For ongoing stormwater discharges, and construction discharges where the discharge may enter an open portion of the lake unprotected by a bund:
 - (a) The Consent Holder shall maintain and comply with the section in the Lake Operation Management Plan (LOMP) on Stormwater Management prepared in accordance with consent CRC0931111 or any subsequent replacement consent, for the purposes of complying with consent conditions and to control the effects of stormwater discharges during construction and for ongoing stormwater discharges.
 - (b) The LOMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) Any updates to the LOMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (d) Any activity authorised by this consent shall be operated in accordance with the current version of the LOMP.
 - (e) The Stormwater Management section in the LOMP shall include, but not be limited to, the following:
 - (i) Details of the locations of all sampling sites;
 - (ii) Measures to prevent exceedance of the trigger values;
 - (iii) Response measures to exceedance of the trigger values;
 - (iv) Reporting procedures; and
 - (v) Construction discharge management procedures which shall generally be in accordance with Canterbury Regional Council's Erosion and Sediment Control Guidelines.

Administration

- (28) The Canterbury Regional Council may, on any of the last five days of April or October each year, serve notice of its intention to review the conditions of this consent for the purposes of:
 - (a) Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or

- (b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
 - (c) Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent; or
 - (d) Complying with the requirements of a relevant rule in an operative regional plan; or
 - (e) Reviewing the trigger values established for parameters specified in conditions of this consent.
- (29) The lapsing date for the purposes of section 125 of the Resource Management Act (1991) shall be 31 March 2015.

CRC093111 – To excavate material including sand and gravel below groundwater level over an unconfined aquifer, which will result in the diversion and damming of groundwater.

1. The works shall be limited to the excavation of approximately 5.5 million cubic metres of earth materials including sand and gravel for the construction and formation of an artificial lake with a surface area of approximately 95 hectares, and earthworks for associated facilities.
2. Location of the excavation shall be centred at or about map reference NZMS 260 L37:1136-9346, as shown on plan CRC093111, which forms part of this consent.
3. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of works.
4. Prior to commencing works, a copy of this resource consent, the Lake Creation Management Plan, and the Lake Operation Management Plan shall be given to all persons undertaking activities authorised by this consent.
5.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
 - (f) The LCMP shall include, but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.

- (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 6.
 - (a) The Consent Holder shall maintain and comply with a Lake Operation Management Plan (LOMP) for the purposes of complying with consent conditions and to control the effects of operating the lake and associated activities.
 - (b) The LOMP is to be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LOMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LOMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LOMP.
 - (f) The LOMP shall include but not be limited to:
 - (i) Providing guidance on environmental management for lake level and lake water quality maintenance.
 - (ii) Ensuring that the water quality within the lake is managed so that it is suitable for contact recreation.
 - (iii) Ensuring the abstraction of water from Ashburton River is in accordance with consent conditions.
 - (iv) Ensuring the discharges of water to the Ashburton River, Carters Creek and Bayliss Stream are in accordance with conditions of resource consent.
 - (v) Identifying and providing for opportunities to manage and improve water quality in the lake.
 - (vi) Setting out the requirements for monitoring, inspections and reporting.

- (vii) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 7. The Consent Holder shall ensure that:
 - (a) All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles and machinery.
 - (b) There shall be no storage of fuel or refuelling of vehicles and machinery within 50 metres of the bed of a waterbody.
 - (c) Fuel shall be stored securely or removed from site overnight.
- 8. Any discharge of water and sediment that is not permitted shall be in accordance with consent CRC093102, or any subsequent replacement consent.
- 9. Any discharge of dust to air that is not permitted shall be in accordance with consent CRC093103, or any subsequent replacement consent.
- 10. No cut vegetation, debris, or other excavated material surplus to site development works, shall be placed in any surface water body, or in a position such that it, or any leachate derived from it, may enter any surface water body.
- 11. All disturbed areas above water level shall be stabilised and re-vegetated as soon as is practicable following completion of the works.
- 12. All practicable steps shall be undertaken to minimise adverse effects on property, wildlife, biodiversity values, aquatic ecosystems, vegetation, cultural and amenity values.
- 13. To prevent the spread of Didymo or any other aquatic pest, the consent holder shall ensure that activities authorised by this consent are undertaken in accordance with the Biosecurity New Zealand's hygiene procedures.

Advice Note: You can access the most current version of these procedures from the Biosecurity New Zealand website <http://www.biosecurity.govt.nz> or Environment Canterbury Customer Services.

- 14. All practicable steps shall be undertaken to ensure that machinery is free of plants and plant seeds prior to disturbing the bed and banks of any surface water body.
- 15. (a) In the event of any disturbance of Kōiwi Tangata (human bones) or taonga (treasured artefacts), the consent holder shall immediately:
 - (i) Advise the Canterbury Regional Council of the disturbance;
 - (ii) Advise the Upoko Runanga of Arowhenua, or their representative, and the New Zealand Historic Places Trust, of the disturbance;
 - (iii) Mark off the affected area; and
 - (iv) Cease earthworks in the affected area.

- (b) Earthworks within the affected area may recommence after a period of five working days following notification in accordance with (a), or after agreement has been reached with Upoko Runanga and the archaeologist regarding recommencement of earthworks, whichever occurs sooner.

Advice Note: This condition is in addition to any agreements that are in place between the consent holder and the Upoko Runanga (Cultural Site Accidental Discovery Protocol) or the New Zealand Historic Places Trust. If any activity associated with this proposal may modify, damage or destroy any archaeological site(s), an authority from the NZ Historic Places Trust must be obtained for the work to proceed lawfully.

- 16.
 - (a) Works shall only occur between the hours of 7.00am and 6.00pm inclusive, Monday to Friday.
 - (b) Works shall only occur between the hours of 7.00am and 1.00pm inclusive, on Saturdays, and shall not occur within 200 metres of any occupied dwelling during that time period.
 - (c) Works shall not be carried out on Sundays or public holidays.
- 17. 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 the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.
- 18. The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093113 – To construct and maintain structures in watercourses and associated disturbance including channel works, in the beds of waterbodies.

1. The works shall be limited to:
 - (a) The installation of a new outlet in the embankment on the south-western corner of Lake Hood with a maximum capacity to discharge four cubic metres per second, at or about map reference NZMS 260 L37:1068-9205;
 - (b) The installation of a pipe, approximately 60 metres in length, from the new outlet to a new open drain between approximate map references NZMS 260 L37:1065-9203 and NZMS 260 L37:1068-9197;
 - (c) The construction of approximately 100 metres of open drain between approximate map references NZMS 260 L37:1068-9197 and NZMS 260 L37:1075-9192;
 - (d) The installation of a flow splitting structure at the confluence of the open drain with Carters Creek, which will be designed to discharge up to one cubic metre per second to Carters Creek and three cubic metres per second to the groundwater cutoff drain at or about map reference NZMS 260 L37:1075-9192;
 - (e) The widening of the groundwater cutoff drain between approximate map references NZMS 260 L37:1075-9192 and NZMS 260 L37:1154-9200;
 - (f) The installation of a flow splitting structure at approximate map reference L37:1156-9201 in the groundwater cutoff drain prior to Bayliss Stream, which will be designed to discharge up to one cubic metre per second to Bayliss Stream and three cubic metres per second to the Ashburton River via the existing Lake Outlet Drain between approximate map references NZMS 260 L37:1075-9192 and NZMS 260 L37:1154-9200; and
 - (g) The maintenance of the works outlined in (a) to (f) as shown on the attached plan CRC093113, which forms part of this consent.
2. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of works.
3. Prior to commencing works, a copy of this resource consent and the Lake Creation Management Plan shall be given to all persons undertaking activities authorised by this consent.
4.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.

- (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.
- (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
- (f) The LCMP shall include but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.
 - (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 5. The design of the structures, including associated erosion protection measures, shall be certified by a chartered professional engineer, and a copy of the certificate shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, not less than 20 working days prior to the start of construction.
- 6. A certificate signed by a chartered professional engineer confirming that the structures, including associated erosion protection measures, were constructed according to the approved design and specifications, shall be submitted to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within ten working days of installing the structures.
- 7. Erosion protection measures shall be installed at the outlets of the structures that are the subject of this consent, and maintained to ensure that erosion does not occur to the banks and bed of any waterway.
- 8. The structures shall not deflect floodwaters into the berm or neighbouring property.
- 9. The consent holder shall ensure that any damage to the structures and associated works, and any erosion or reduction in flood carrying capacity caused by the damage is remedied as soon as practicable.

10.
 - (a) During the works, all practicable measures shall be undertaken to prevent the discharge of sediment to the waterbodies.
 - (b) On completion of works, the disturbed area of the banks of the waterbodies shall be restored to their original condition as far as practicable, including regrassing/replanting and reshaping as appropriate.
11. No cut vegetation, debris, or other excavated material, excluding material used in restoration works, shall be placed in any waterbody, or in a position such that it, or any leachate derived from it, may enter any waterbody.
12. All spoil and other waste material from the works shall be removed from the works sites on completion of works.
13. All practicable steps shall be undertaken to minimise adverse effects on property, wildlife, biodiversity values, aquatic ecosystems, vegetation, cultural and amenity values.
14. All practicable measures shall be undertaken to minimise vehicles and machinery entering waterbodies.
15.
 - (a) All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles and machinery.
 - (b) There shall be no storage of fuel or refuelling of vehicles and machinery within 50 metres of the bed of a waterbody.
 - (c) Fuel shall be stored securely or removed from site overnight.
16. All practicable steps shall be undertaken to ensure that machinery is free of plants and plant seeds prior to disturbing the bed and banks of waterbodies.
17.
 - (a) The consent holder shall take all practicable steps to avoid cement material entering the waterbodies, including waste wash water from tools and machinery.
 - (b) Cement shall be stored securely or removed from site overnight.
18. Works shall not cause the stranding of fish in pools or channels.
19.
 - (a) Works shall only occur between the hours of 7.00am and 6.00pm inclusive, Monday to Friday.
 - (b) Works shall only occur between the hours of 7.00am and 1.00pm inclusive, on Saturdays, and shall not occur within 200 metres of any occupied dwelling during that time period.
 - (c) Works shall not be carried out on Sundays or public holidays.
20. To prevent the spread of Didymo or any other aquatic pest, the consent holder shall ensure that activities authorised by this consent are undertaken in accordance with the Biosecurity New Zealand's hygiene procedures.

Advice Note: Access the most current version of these procedures from the Biosecurity New Zealand website <http://www.biosecurity.govt.nz> or Environment Canterbury Customer Services.

21. 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 the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.
- 22 The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093102 – To discharge water and sediment to land, into an artificial lake and into groundwater, associated with the excavation and formation of an artificial lake.

1. The discharge may only occur at or about map reference NZMS 260 L37:1136-9346 as shown on attached plan CRC093102 which forms part of this consent, from the excavation and formation of an artificial lake and earthworks for associated facilities authorised under CRC093111, or any subsequent replacement consent.
2. The discharge shall only be water and sediment associated with works authorised under land use consent CRC093111, or any subsequent replacement consent.
3. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of the discharge.
4. Prior to commencing works, a copy of this resource consent, consent CRC093111, or any subsequent replacement consent, and the Lake Creation Management Plan, shall be given to all persons undertaking activities authorised by this consent.
5.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
 - (f) The LCMP shall include but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.

- (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 6. Sediment discharges shall be controlled in accordance with the measures outlined in the attached Lake Creation Management Plan which forms part of this consent and in particular, the consent holder shall:
 - (a) for the lake extension works, retain an area of in-situ ground as a buffer for as long as is practicable to separate any area of active excavation from any other waterbody;
 - (b) cease excavation activity for at least 48 hours prior to the removal of the in-situ buffer and joining of the new stage to the lake area; and
 - (c) contour the area adjacent to the excavated area to ensure that the excess water runoff is directed back into the adjacent excavated area.
- 7.
 - (a) A spill kit shall be kept on site at all times. The spill kit shall be capable of absorbing or otherwise containing the quantity of oil and petroleum products and chemicals on site at any one time.
 - (b) A written spill response plan shall be developed and communicated to all persons undertaking activities authorised by this consent and a copy kept on site at all times.
- 8. 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 the conditions of this consent for the purposes of:
 - (a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
 - (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.
- 9. The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093103 – To discharge dust to air, associated with the excavation and formation of an artificial lake.

1. The discharges may only be dust to air associated with the excavation and formation of an artificial lake and earthworks for associated facilities, permitted under consent CRC093111, or any subsequent replacement consent.
2. The discharges to air shall be only from property described as Lot 1 DP 374140, Sec 1 SO 400295, Lot 2 DP 374140 and Lot 2 DP 359318, at or about grid reference NZMS 260 L37:1136-9346, at the Lake Hood Aquatic Park, Ashburton District, as shown on Plan CRC093103, which forms part of this consent.
3. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of the discharge.
4. Prior to commencing works, a copy of this resource consent, consent CRC093111, or any subsequent replacement consent, and the Lake Creation Management Plan, shall be given to all persons undertaking activities authorised by this consent.
5. Water cart(s) shall be provided onsite for the purposes of dust management, and used as necessary in order to comply with condition 9 below.
6. The height of stockpiles shall be no greater than six metres.
7. The surfaces of stockpiles retained for longer than three months shall be compacted to the extent practicable.
8. Areas stripped of topsoil, excluding areas where the water table has been intercepted:
 - (a) For lake creation, shall not exceed 25 hectares at any one time; and
 - (b) For other activities, excluding the stockpiles, shall not exceed 25 hectares at any one time.
9.
 - (a) All practicable steps shall be undertaken to minimise dust nuisance beyond the boundary of the site, including implementing the appropriate measures outlined in the attached Lake Creation Management Plan which forms part of this consent.
 - (b) There shall be no offensive or objectionable dust beyond the Lake Hood Aquatic Park boundary.
10.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.

- (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.
- (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.
- (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
- (f) The LCMP shall include but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.
 - (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.

11. The consent holder shall maintain a dust complaints register that shall include:

- (a) The location, where the dust was detected by the complainant;
- (b) The date and time when the dust was detected;
- (c) A description of the wind speed and wind direction, when the dust was detected by the complainant;
- (d) The most likely cause of the dust detected; and
- (e) Any corrective action undertaken by the consent holder to avoid, remedy or mitigate the dust detected by the complainant.

This record shall be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, before 1 February each year, and otherwise upon request.

12. 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 the conditions of this consent for the purposes of:

- (a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
- (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

13. The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093104 – To deposit excavated material and to discharge dust to air, associated with stockpiling and gravel processing.

1. The works shall be limited to the stockpiling and processing of material that has been excavated under land use consent CRC093111.
2. The discharges to air may only be dust associated with stockpiling and materials processing.
3. The works and associated discharges of dust to air may only occur on property described as Lot 1 DP 374140, at or about grid reference NZMS 260 L37: 1102-9468, at the Lake Hood Aquatic Park, Ashburton District, as shown on Plan CRC093104, which forms part of this consent.
4. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of the works.
5. Prior to commencing works, a copy of this resource consent and the Lake Creation Management Plan, shall be given to all persons undertaking activities authorised by this consent.
6. All practicable steps shall be undertaken to minimise dust nuisance beyond the boundary of the site, including implementing the appropriate measures outlined in the attached Lake Creation Management Plan which forms part of this consent. There shall be no offensive or objectionable dust beyond the boundary of the property authorised for stockpiling and gravel processing.
7. Water cart(s) shall be provided onsite for the purposes of dust management, and used as necessary in order to comply with condition 6.
8. The height of stockpiles shall be no greater than six metres.
9. The surfaces of stockpiles retained for longer than three months shall be compacted to the extent practicable.
10.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.

- (f) The LCMP shall include but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.
 - (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.

11. The consent holder shall maintain a dust complaints register that shall include:

- (a) The location, where the dust was detected by the complainant;
- (b) The date and time when the dust was detected;
- (c) A description of the wind speed and wind direction, when the dust was detected by the complainant;
- (d) The most likely cause of the dust detected; and
- (e) Any corrective action undertaken by the consent holder to avoid, remedy or mitigate the dust detected by the complainant.

This record shall be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, before 1 February each year, and otherwise upon request.

- 12.
- (a) Prior to stockpiling the consent holder shall erect a bund between the extended lake and the transmission line corridor, to protect residential areas from flooding in a 200 year Average Exceedance Probability event.
 - (b) The design of the bund shall be certified by a chartered professional engineer, and a copy of the certificate shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, one month prior to the start of construction.
 - (c) A certificate signed by a Chartered Professional Engineer confirming that the bund was constructed according to the approved design and specifications, shall be submitted to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within seven days of installing the bund.

13. The stockpile shall include a gap at least 90 metres wide, to allow any water that ponds behind the stockpile to pass through.
14.
 - (a) Active stockpiling and gravel processing shall only occur between the hours of 7.00am and 6.00pm inclusive, Monday to Friday.
 - (b) Active stockpiling and gravel processing shall only occur between the hours of 7.00am and 1.00pm inclusive, on Saturdays, and shall not occur within 200 metres of any occupied dwelling during that time period.
 - (c) Active stockpiling and gravel processing shall not be carried out on Sundays or public holidays.
15. 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 the conditions of this consent for the purposes of:
 - (a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
 - (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.
16. The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093105 – To discharge sediment and water to land in circumstances where it may enter groundwater, associated with stockpiling and gravel processing.

1. The location of the discharge shall be at or about at or about map reference NZMS 260 L37:1143-9496, as shown on the attached plan CRC093105, which forms part of this consent.
2. The discharge shall only be water and sediment to land associated with the stockpiling and processing of material that has been excavated under land use consent CRC093111, or any subsequent replacement consent.
3. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified at least one week prior to the commencement of the discharge.
4. Prior to commencing works, a copy of this resource consent and the Lake Creation Management Plan, shall be given to all persons undertaking activities authorised by this consent.
5. All practicable measures shall be undertaken to direct water from processing activities to a settling pond prior to discharge to groundwater.
6. The settling pond required by condition 5 shall have capacity to contain the maximum likely runoff from the gravel processing plant area in a 1 in 5 year average recurrence interval rainfall event.
7. The settling pond system shall not direct runoff towards, or cause localised flooding of, Boundary Road, neighbouring properties, or the riparian margins of the Ashburton River.
8. The design of the settling pond system shall be certified by a chartered professional engineer and a copy of the certificate shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, one month prior to the start of construction.
9. A certificate signed by a chartered professional engineer confirming that the settling pond system was constructed according to the approved design and specifications, shall be submitted to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within one month of completion of the system
10.
 - (a) The Consent Holder shall maintain and comply with a Lake Creation Management Plan (LCMP) for the purposes of complying with consent conditions and to control the effects of lake creation and associated activities.
 - (b) The LCMP is to be provided to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LCMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LCMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided

to the Canterbury Regional Council, attention RMA Compliance and Enforcement Manager, within 10 working days of the update.

- (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LCMP.
- (f) The LCMP shall include but not be limited to:
 - (i) Setting out the way in which the LCMP is to be implemented, monitored and reviewed including responsibilities, opportunities for feedback from site neighbours, interested parties and consent authorities.
 - (ii) Identifying potential adverse environmental effects, and opportunities to avoid or mitigate effects, as well as contingency plans, to ensure that the conditions of resource consent are met.
 - (iii) Setting out procedures to be followed for construction and development of the lake and park, and gravel management, to meet environmental objectives and resource consent conditions.
 - (iv) Setting out the requirements for monitoring, inspections and reporting.
 - (v) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 11. Any sediment removed from the settling pond shall not be placed in a position such that it may enter any surface water body, or result in sediment runoff onto Boundary Road, neighbouring properties, or the riparian margins of the Ashburton River.
- 12.
 - (a) All practicable measures shall be undertaken to prevent oil and fuel leaks from vehicles and machinery.
 - (b) There shall be no storage of fuel or refuelling of vehicles and machinery within 50 metres of the bed of a waterbody.
 - (c) Fuel shall be stored securely or removed from site overnight.
- 13.
 - (a) A spill kit shall be kept on site at all times. The spill kit shall be capable of absorbing or otherwise containing the quantity of oil and petroleum products and chemicals on site at any one time.
 - (b) A written spill response plan shall be developed and communicated to all persons undertaking activities authorised by this consent and a copy kept on site at all times.
- 14. 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 the conditions of this consent for the purposes of:

- (a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
- (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

15. The lapsing date for the purpose of section 125 shall be 31 March 2015.

CRC093109: Discharge of water and contaminants from the artificial lake to the Ashburton River for the purposes of emergency discharge, discharge during floods, and for sediment flushing

1. The maximum combined rate of discharge from Lake Hood to the Ashburton River via the Lake Hood Outlet Drain and Bayliss Stream, at or about map references NZMS 260 L37:1172-9192 and L37:1162-9161 respectively, shall be 6.5 cubic metres per second.
2. The discharge shall be only water and contaminants from Lake Hood via the existing outlet structure and the new outlet structure authorised by CRC093113, or any subsequent replacement consent, as shown on attached plan CRC093109 which forms part of this consent.
3. The discharge shall only be from the lake during emergencies, or during high inflows to Lake Hood, or for the purposes of sediment flushing.
4. Discharges for the purposes of sediment flushing shall only occur when flow in the Ashburton River at State Highway One Bridge, as estimated by the Canterbury Regional Council, is at or above 15 cubic metres per second.
5. Discharges for the purposes of sediment flushing shall not exceed a suspended sediment concentration of 2,000 milligrams per litre, as measured at the point where the discharge enters the Ashburton River via the Lake Hood Outlet Drain or Bayliss Stream, at or about map references NZMS 260 L37:1172-9192 and L37:1162-9161 respectively.
6.
 - (a) The Consent Holder shall maintain and comply with a Lake Operation Management Plan (LOMP) for the purposes of complying with consent conditions and to control the effects of operating the lake and associated activities.
 - (b) The LOMP is to be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (c) The LOMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (d) Any updates to the LOMP shall be made in consultation with the Canterbury Regional Council and the updated plan shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, within 10 working days of the update.
 - (e) Any activity authorised by this consent shall be operated in accordance with the current version of the LOMP.
 - (f) The LOMP shall include but not be limited to:
 - (i) Providing guidance on environmental management for lake level and lake water quality maintenance.

- (ii) Ensuring that the water quality within the lake is managed so that it is suitable for contact recreation.
 - (iii) Ensuring the abstraction of water from Ashburton River is in accordance with consent conditions.
 - (iv) Ensuring the discharges of water to the Ashburton River, Carters Creek and Bayliss Stream are in accordance with the resource consent conditions.
 - (v) Identifying and providing for opportunities to manage and improve water quality in the lake.
 - (vi) Setting out the requirements for monitoring, inspections and reporting.
 - (vii) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 7. Any damage to flood protection works or structures or erosion that can be shown to have been demonstrably caused as a result of the exercise of this consent shall be repaired within 20 working days.
- 8. The Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, shall be notified:
 - (a) 12 hours prior to this consent being exercised for the purposes of sediment flushing;
 - (b) Immediately upon the exercise of this consent either for the purposes of an emergency or as a result of a high flow event.
- 9. 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 the conditions of this consent for the purposes of:
 - (a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
 - (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.
- 10. The lapsing date for the purpose of section 125 shall be the same as the expiry date of the consent.

CRC054402.1 – Change to conditions of CRC054402 – To increase the rate of discharge to 6.5 cubic metres per second for the purposes of water quality management;

and

CRC012224.1 Change to conditions of CRC012224 – To amend the total nitrogen standard.

- 1 The rate at which water is discharged from Lake Hood to the Ashburton River via the Lake Hood Outlet Drain and Bayliss Stream, at or about map references NZMS 260 L37:1162-9213 and L37:1162-9161 respectively, as shown on attached plan CRC054402.1 which forms part of this consent, shall not exceed a combined rate of 6.5 cubic metres per second for the purposes of maintaining water levels and water quality management.
- 2 The discharge shall be only water and contaminants from Lake Hood via the existing outlet structure and the new outlet structure authorised by CRC093113, as shown on attached plan CRC054402.1 which forms part of this consent.
- 3
 - a) A representative sample of water shall be collected during the last five working days of each month and tested for total phosphorus and nitrate-nitrogen (in milligrams per litre), in addition to the water quality parameters specified in condition 4 below, from the commencement date of this consent, from the following locations:
 - (i) The outlet of the existing outlet structure at map reference NZMS 260 L37:1162-9213, being representative of any surface discharge of water from the Lake;
 - (ii) Carters Creek immediately upstream of the culvert at Huntingdon Avenue at map reference NZMS 260 L37:1063-9288;
 - (iii) Ashburton River intake canal immediately downstream of the Ashburton River intake structure at map reference NZMS 260 L37:1261-9421; and
 - (iv) Groundwater upgradient of Lake Hood at borehole L37/1652 at map reference NZMS 260 L37:1107-9484 (sample quarterly only for total phosphorus, total nitrogen, nitrate-nitrogen and dissolved-reactive phosphorus, all in milligrams per litre).
 - b) All samples collected in accordance with clause a) shall be collected within the same 24 hour period.
 - c) A copy of the sample results collected in accordance with (a) shall be provided to the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, by the end of each calendar year, and upon request.
- 4 The discharge from Lake Hood shall meet the following water quality standards at the monitoring location specified in condition (3)(a)(i):
 - a) Suspended solids: less than 50 milligrams per litre
 - b) Biochemical oxygen demand: less than five milligrams per litre

- c) pH: between 6.5 and 8.5
 - d) Escherichia coli (E.coli): rolling four monthly median less than 126 per 100 millilitres
 - e) Total nitrogen: concentration in the lake discharge should be no more than 10 percent greater than the groundwater or surface water inflow concentration or 3 milligrams per litre, whichever is the greater based on the average monitoring result over the preceding 12-month time period
 - f) Dissolved reactive phosphorus: less than 0.3 milligrams per litre
 - g) Temperature: not greater than three degrees Celsius above or below the temperature of the receiving water at the time of discharge.
- 5 In the case of any exceedance(s) of the standards in condition (4) the consent holder shall:
- (i) notify the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager, of the exceedance(s); and
 - (ii) undertake best endeavors to investigate and explain the exceedance(s); and
 - (iii) advise what measures will be taken to bring the water quality of Lake Hood back to within the limits set in condition (4), and the timeframe for carrying these measures out, within ten working days of providing the results to Canterbury Regional Council; and
 - (iv) advise the Canterbury Regional Council, attention: RMA Compliance and Enforcement Manager when any measures undertaken in accordance with clause (iii) have been carried out, within 10 working days
- 6 In the case of any and every exceedance(s) of the E.coli standard in condition (4)(d) the consent holder shall notify Community and Public Health, or the equivalent organization responsible for protecting the public from breaches of microbiological contact recreation standards.
- 7
- a) All sampling required under this consent shall be undertaken by a competent person using the most appropriate scientifically recognized and current method(s).
 - b) All samples taken shall be analysed using the most appropriate scientifically recognised and current method by a laboratory that is accredited for the method of analysis, or, where there is no laboratory in New Zealand with accreditation for such a method, by a laboratory that has accreditation for similar analyses.
 - c) For the purposes of clause (b) of this condition, accreditation must be by International Accreditation New Zealand (IANZ), or an equivalent accreditation organization that has a Mutual Recognition Arrangement with IANZ.

- 8 The discharge shall not cause erosion of the bed or banks of Bayliss Stream, Lake Hood Outlet Drain, or the Ashburton River.
- 9
- (a) The Consent Holder shall maintain and comply with a Lake Operation Management Plan (LOMP) for the purposes of complying with consent conditions and to control the effects of operating the lake and associated activities.
 - (g) The LOMP is to be provided to Canterbury Regional Council, Attn RMA Compliance and Enforcement Manager, at least four weeks prior to the commencement of works.
 - (h) The LOMP shall be reviewed by the Consent Holder no less frequently than every two years.
 - (i) Any updates to the LOMP shall be made in consultation with Canterbury Regional Council and the updated plan shall be provided to Canterbury Regional Council within 10 working days of the update.
 - (j) Any activity authorised by this consent shall be operated in accordance with the current version of the LOMP.
 - (k) The LOMP shall include but not be limited to:
 - (i) Providing guidance on environmental management for lake level and lake water quality maintenance.
 - (ii) Ensuring that the water quality within the lake is managed so that it is suitable for contact recreation.
 - (iii) Ensuring the abstraction of water from Ashburton River is in accordance with consent conditions.
 - (iv) Ensuring the discharges of water to the Ashburton River, Carters Creek and Bayliss Stream are in accordance with the resource consent conditions.
 - (v) Identifying and providing for opportunities to manage and improve water quality in the lake.
 - (vi) Setting out the requirements for monitoring, inspections and reporting.
 - (vii) Identifying contingencies to be put in place in the event of specific circumstances arising.
- 10 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 the conditions of this consent for the purposes of:

- a) dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
- b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

11 The lapsing date for the purposes of section 125 shall be 31 March 2015.

CRC061380.1 – Change the conditions of CRC061380 - To add a new condition that includes reference to where water will be dammed.

1. Water may only be dammed at or about map reference NZMS 260 L37:1122-9214 as shown on Plan CRC061380.1, which forms part of this consent.
2. All practicable measures shall be undertaken to minimise adverse effects arising from the damming of water on property, amenity values, wildlife, vegetation and ecological values.
3. The lake level shall, to the extent authorised by consents held by the consent holder to take water from the Ashburton River, being CRC054397 and CRC012223, or any subsequent replacement consents, be brought to RL 60.4 metres by 1 November each year, and shall be maintained at that level as far as is practicable after that date, and until 30 April each following year, in order to minimise the effects of potential evaporation losses resulting from the creation and operation of the lake.
4. 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 the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.
5. The lapsing date for the purposes of section 125 shall be 31 March 2015.