

**BEFORE THE CANTERBURY REGIONAL COUNCIL**

**UNDER** The Resource Management Act 1991 (**Act**)

**AND**

**IN THE MATTER OF** Application CRC190445 by the Christchurch City Council  
for a comprehensive resource consent to discharge  
stormwater from within the Christchurch City area and  
Banks Peninsula settlements on or into land, into water  
and into coastal environments

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**DECISION OF HEARING COMMISSIONERS DAVID CALDWELL, EMMA  
CHRISTMAS, HUGH LEERSNYDER AND HOANI LANGSBURY**

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**Key to abbreviations**

AEE	Assessment of Environmental Effects
AEP	Annual Exceedance Probability
Applicant	Christchurch City Council
Application	Reticulated Stormwater Network to Land Application
CDP	Christchurch District Plan
CIA	Cultural Impact Assessment
CIAL	Christchurch International Airport Limited
CLM	Contaminant Load Model
CMA	Coastal Marine Area
CRC	Canterbury Regional Council
CRPS	Canterbury Regional Policy Statement 2013
CSNDC	Comprehensive Stormwater Network Discharge Consent
DOC	Department of Conservation
EMP	Environmental Monitoring Programme
ESCP	Erosion and Sediment Control Plans
GMP	Good Management Practice
HAIL	Hazardous Activities and Industries List
IMP	Iwi Management Plan
IP	Implementation Plan
ISA	Industrial Site Audit
IWS	Integrated Water Strategy
LDRP	Land Drainage Recovery Programme
LLUR	Listed Land Use Register
LPC	Lyttleton Port Company
LPRP	Lyttleton Port Recovery Plan
LWRP	Canterbury Land and Water Regional Plan
NES-CS	National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
NES-DW	National Environment Standards for Sources of Drinking Water

NPS-FM	National Policy Statement of Freshwater Management 2014
NZCPS	New Zealand Coastal Policy Statement
NZTA	New Zealand Transport Agency
RCEP	Regional Coastal Environment Plan
RMA	Resource Management Act 1991
SDMP	Sediment Discharge Management Plan
SMP	Stormwater Management Plan
STPRP	Stormwater Technical Peer Review Panel
SUDS	Sustainable Urban Drainage System
SWAT	Stormwater Action Team
TSS	Total Suspended Solids
WIM	Water Issues Management
WRRP	Waimakariri River Regional Plan
WWDG	Waterways, Wetlands and Drainage Guide 2003

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## **Representation and Appearances**

### Applicant

**Mr Brent Pizzey** - Counsel

**Mr David Adamson** – General Manager, City Services

**Ms Helen Beaumont** – Head of Strategic Policy

**Mr Graham Harrington** – Senior Surface Water Planner

**Mr Brian Norton** – Senior Stormwater Planning Engineer

**Dr Belinda Margetts** – Waterways Ecologist

**Mr Peter Callander** – Consultant Hydro Geologist

**Dr Julia Valigore** – Specialist Adviser at CCC

**Mr Mark Pinner** – City Streets Maintenance Manager

**Mr Dale McEntee** – Resource Consent Compliance Co-Ordinator

**Mr Mark Tipper** – Senior Environmental Adviser

**Mr Tom Parsons** – Consultant Surface Water Engineer

**Mr Eric van Nieuwkerk** – Senior Hydrologist, Golder Associates

**Mr Paul Kennedy** – Consultant Environmental Scientist

**Mr Simon Harris** – Consultant Economist

**Mr Clint Cantrell** – Civil Engineer and Sector Director at Tonkin & Taylor

**Ms Jane West** – Consultant Planner

**Mr Craig Pauling** – Planning Consultant

### Submitters

**Ms Annabel Hasselman and Ms Elizabeth Bertolett** – Heathcote Opawa River network

**Mr Kyle Sutherland** – Avon Ōtākaro Network

**Ms Tanya Didham** – Joint Avon; Greening Red Zone / Forest Park / Travis Wetland

**Mr Evan Smith** – Combined River Care Groups

**Mr Bill Simpson and Ms Isla Marsden** - Avon Heathcote Estuary Ihutai

**Ms Kay Rodrigues and Mr Robert Potts** – A & K Rodrigues

**Ms Susan Newell and Ms Linda Kirk** – Department of Conservation

**Mr Hugh James Macartney and Mr Ross McFarlane** – Halswell Drainage Committee

**Ms Adriana Hess** - Submitter

**Ms Kathryn Snook and Family Trust –**

**Mr Ray and Ms Pauline McGuigan –** Submitters

**Mr Peter Hay and Ms Anne Wilkes –** Ravensdown Limited

**Ms Jan Burney –** Submitter (singly and jointly with Mr Gary Sharlick)

**Mr Andrew Purves, Mr Gareth Taylor, Ms Kim Kelleher and Ms Jo Appleyard –**  
Lyttelton Port Company

**Mr Matthew Black, Mr Marcus Cameron and Ms Andrea Rickard –** NZ Steel

**Mr Barry Robertson –** Submitter

**Mr Rob Enright, Mr Trent Sunich and Mr Mark Laurensen –** Oil Companies

**Mr Ben Williams and Ms Felicity Blackmore –** Christchurch International Airport  
Limited

**Ms Penny Hargreaves –** Submitter

**Mr Robert Burch and Mr Robert Churcher -** The Little River Wairewa Community  
Trust

Canterbury Regional Council

**Ms Michele Mehlhopt –** Counsel

**Dr Aisling O'Sullivan and Prof. Tom Cochrane –** University Peer Reviewers

**Ms Michelle Stevenson –** Senior Scientist, Surface Water Science (Freshwater)

**Dr Leslie Bolton-Ritchie –** Senior Scientist, Surface Water Science (Coastal)

**Mr Michael Law –** Senior Water Resources Engineer (Beca)

**Mr Zeb Ethridge –** Senior Scientist, Groundwater Science



## Background and Procedural Matters

- 1 This is the decision of independent hearing commissioners Mr David Caldwell (Chair), Mr Hugh Leersnyder, Ms Emma Christmas and Mr Hoani Langsbury.
- 2 We were appointed by the Canterbury Regional Council (**CRC**) to hear and determine the application by the Christchurch City Council (**applicant**) to discharge water and contaminants from the applicant's reticulated stormwater network to land, to water and to the coastal environment (**Application**).
- 3 The Application has a somewhat complex history. An application for resource consent was originally lodged in June 2015. This was publicly notified in 2016. Following receipt of submissions, CRC sought further information from the applicant. Following receipt of that information a number of issues were raised by CRC. The applicant requested a timeframe extension to enable it to complete work on a revised approach.
- 4 Further information was provided by the applicant to CRC on 9 July 2018. That information included details of the approach now put forward. The applicant proposed to amend the application filed in June 2015 so that it would include all stormwater discharges to the reticulated network from 1 January 2025, or on the expiry of individual consents held by property owners. This differed from the original application which had sought to exclude "high risk" sites.
- 5 CRC officers concluded that the amendments were beyond the scope of the original application, particularly as the scale, intensity and character of the proposed activity had been changed, essentially from the inclusion of the discharges from the high risk sites.
- 6 A new application for this consent was formally received by CRC on 26 July 2018. This was publicly notified on 3 August 2018 in The Akaroa Mail, on 4 August 2018 in The Press and on 9 August 2018 in The Christchurch Star.
- 7 We understand that a number of interest groups, individuals and organisations were served with notice of the application and the submitters on the original resource consent application were notified by mail.
- 8 A total of 39 submissions were received within the submission period, with 30 requesting to be heard.
- 9 A summary of the submissions was provided in CRC's s.42A Report at paragraphs 40-43, and a complete submission summary was provided in Appendix 9 to that report. We consider that summary is accurate and adopt it for the purposes of this decision.

- 10 Following our appointment, and throughout the hearing process, we issued a number of Minutes addressing a number of issues, including evidence exchange, site visit, disclosure of interests and relationships, further information requests, issues of suspension of the application and extending the statutory timeframes. We do not repeat the details of the matters addressed in those Minutes and the responses. They are all matters of public record.
- 11 The hearing commenced at 9am on Monday 5 November 2018 and we sat for a total of nine days, with the hearing being adjourned on 15 November 2018.
- 12 On 1 March 2019, Mr Pizzey provided a draft supplementary Brief of Evidence of Mr Harrington and sought further suspension and timetabling to ensure that there was sufficient time to produce a new Joint Statement of Water Quantity Experts and to allow submitters to respond. Consequently, we issued a further Minute on 4 March 2019 suspending the hearing from Friday 1 March until Thursday 21 March 2019 and again made timetabling directions.
- 13 On 15 March 2019, the applicant lodged a further Joint Statement of Water Quantity Experts (including requested mapping) and a final Brief of Evidence of Mr Harrington, which cross referenced the Joint Statement.
- 14 Unfortunately, there was a brief delay in that information being made available to some submitters. We granted a brief extension for their responses to be provided. Several submitters availed themselves of that opportunity.
- 15 The joint experts' statements and associated responses were helpful but raised several questions for us. We considered the most efficient way of dealing with those questions was to reconvene the hearing for the limited purpose of questioning the water quantity experts and to receive Mr Pizzey's Reply. Unfortunately, Mr Pizzey was unavailable on the proposed date and we vacated our direction in that regard.
- 16 We did however reconvene the hearing for the purposes of questioning the stormwater experts – Mr Harrington, Mr Parsons, Mr Potts and Mr Law.
- 17 Following that reconvened hearing, we issued a further Minute requesting the applicant provide a map showing the flood depth across the Lower Styx catchment in a 1 in 10 year rainfall event at the calibrated weed scenario. We directed the map, and any further response from Mr Pizzey, be provided no later than Friday, 26 April 2019.
- 18 Mr Pizzey provided the information requested. We were then provided with a copy of a letter from submitter Ms Rodrigues, which raised issues with the

further maps provided and with Mr Pizzey's 26 April 2019 response. Mr Pizzey responded to that letter by memorandum of 3 May 2019.

- 19 We were comfortable that the maps did not provide new information, but rather were a visual reflection of the evidence we had already heard. Nevertheless, to ensure that submitters had an opportunity to comment if they wished to do so, we issued further directions that any submitter in the Styx catchment who wished to raise any issue in relation to the maps provided with Mr Pizzey's written response could do so by no later than 4pm on Thursday 9 May 2019, and any response from the applicant be provided by no later than 5pm on Friday 10 May 2019. We also extended the timeframes for the closing of the hearing and for the delivery of the decision pursuant to s37A.
- 20 The hearing and associated matters have taken some time and been procedurally very complex. This is reflective of the complexity and significance of the application, and the high level of engagement from the community. We have endeavoured to ensure that all submitters have had the opportunity to appropriately respond to matters arising. We record that several submitters took the opportunity to be actively involved in the hearing process as it progressed.

#### **Site Visits**

- 21 As outlined above, we raised the issue of the site visits and sought information as to locales for us to visit. The responses we received from both the applicant and submitters were helpful. We commenced our site visit on 8 November 2018. We carried out the site visit largely unaccompanied but were assisted in the identification of areas in the Halswell catchment by three CRC officers who were not witnesses in the hearing.
- 22 Very much by way of summary, we visited the Te Oranga Waikura (Linwood Lower Fields), the Bells Creek pump station, viewed Ngā Puna Wai, the Longhurst Subdivision, a ponding area known as the Creamery Ponds. We also viewed the areas identified by the Halswell Drainage Committee, although we did not go onto private land. This included sections of the drainage system. We viewed the springs at the headwaters of the Ōpāwaho Heathcote River, the Cashmere Stream, the Worsley retention basin, the estuary, the mouth of the Avon and Heathcote Rivers, the Avon River and from various viewpoints, including the Red Zone and Horseshoe Lake. We followed, as far as possible, the Ōpāwaho Heathcote River from its confluence with the Cashmere Stream to its mouth. Our visit to the Lower Styx area encapsulated largely the Lower Styx catchment from Marshland Road to the Brookland lagoon. We visited the

Prestons development, Lower Styx Road, Earlham Street, the Styx tidal gates and the Radcliffe Road water level recording site. We were able to view the Styx River from various locations.

- 23 We also inspected a rain garden in Richmond, which was identified by the Combined River submitters and again found that useful. The site visit provided a useful context for the evidence.

### The Proposal

- 24 A description of the proposal appears in section 2 of the initial Application CRC160056 at pages 8 to 13. The applicant requested that this form part of Application CRC190445.
- 25 The proposal is summarised in the s.42A Report at paragraphs 45-62. We consider that is an accurate summary of the proposal and adopt it for the purposes of this decision.
- 26 Although the proposal developed throughout the hearing process, (as can be expected with the iterative nature of the process) the key aspects are outlined in the following paragraphs. We note there were several changes to the conditions in the schedules throughout the hearing process. Our references to conditions and schedules adopt the numbering in the latest iteration.
- 27 The application is for a Comprehensive Stormwater Network Discharge Consent (**CSNDC**) to authorise all discharges from the network that have been accepted into the applicant's network, as well as direct discharges to waterways and land within the city's urban limits.
- 28 The applicant proposes the exclusion of a number of sites from the resource consent if granted. These include:
- (a) any site or development area on CRC's Listed Land Use Register (**LLUR**) that is considered by the applicant to pose an unacceptably high risk;
  - (b) any stage of development with a total area of disturbance exceeding 5ha on flat land or 1ha on hill land; and
  - (c) any site listed in Schedule 1 to the proposed conditions.
- 29 From 1 January 2025, the application proposes the above sites fall within the scope of this consent. That would include all discharges, both operational and construction phase, to the reticulated stormwater network.

- 30 The exclusion, or potential exclusion, of sites post 1 January 2025, was subject to considerable debate throughout the hearing process and we will return to that in this decision.
- 31 The proposal specifies various receiving environment objectives and attribute targets in Schedules. These address effects of stormwater discharge on surface water quality and ecology, coastal water quality and ecology, groundwater quality in springs and cultural values. The environment objectives are largely qualitative. The attribute targets are quantitative. In addition, Schedule 10 specifies attribute target levels for water quantity.
- 32 Central to the proposal is the development of Stormwater Management Plans (**SMP**). The applicant proposes to develop and implement SMPs for the seven catchments of the district. Those which have already been developed were provided to us. They are to detail how stormwater management within each catchment will progressively improve discharges to work towards achieving the receiving environment attribute target levels; continue to contribute to groundwater and spring-fed stream by discharging stormwater to land infiltration systems where reasonably practicable; providing means to plan the works authorised by, and to implement the conditions of, the discharge consent as they apply to each catchment; identify the mechanisms to be used to achieve compliance with the conditions of consent; and the mitigation methods to be used to meet the targets. Each SMP is to include a Cultural Impact Assessment (**CIA**) prepared in collaboration with the Papatipu Rūnanga; and SMPs are to be reviewed at regular intervals.
- 33 Complementing the SMP, the applicant proposes to develop an Implementation Plan (**IP**) which documents measures to improve stormwater quality and quantity. The IP is to include matters such as a list of proposed stormwater mitigation methods and devices; a programme of stormwater works; a plan for regulatory, investigative, educational and preventative activities or programmes; details of budgets for capital works for resourcing, and; reporting on any testing or water quality monitoring undertaken.
- 34 A comprehensive Environmental Monitoring Programme (**EMP**) is proposed. This is to monitor the effects of the stormwater discharges and to determine progress towards achieving the receiving environment objectives and targets.
- 35 The applicant proposes a Contaminant Load Model (**CLM**) approach. This approach is used to set and track contaminant load standards for the Styx, Avon, Heathcote and Halswell SMP catchments. A number of conditions are proposed in conjunction with that approach. The conditions provide, inter alia,

for methods to adapt and manage the discharges over time and to manage non-compliances should they occur.

- 36 A range of responses to monitoring and modelling are proposed. If the target levels for TSS, copper, lead and zinc as set out in Schedules 7, 8 and 9 are not met, the proposed response is to investigate whether this is due to the effects of stormwater and to provide a summary of the investigation and results to CRC. If the results show the cause is as a result of stormwater discharges, an assessment of options and a timeline for correction or remediation are to be provided to CRC. CRC will assess those options to determine if they are adequate. If agreement cannot be reached, further consultation with WIM and the Papatipu Rūnanga is to be undertaken.
- 37 If the periodic modelling of contaminant loads show that the percentage reduction standards are not being met, the applicant will be in breach of the resource consent and will undertake a number of investigations and assessments. Monitoring and modelling results are to be collated and reported to CRC annually.
- 38 A number of mitigation measures are proposed. Included in these are retrospective mitigation measures where possible. In greenfield development, treatment devices in accordance with industry best practice are to be incorporated. As a minimum, first flush treatment and full or part attenuation of the post-development 2% Annual Exceedance Probability (**AEP**) flood event will be required.
- 39 In brownfield areas, criteria will be used for determining whether redevelopment is of a sufficient scale to warrant the installation of treatment devices. In the Christchurch hills area, the focus is on the development and management of runoff and erosion. Larger scale developments are required to provide full first flush treatment. In the Banks Peninsula settlement areas, it is anticipated that street scale rain gardens could be installed and proprietary filtration devices installed at the end of pipe.
- 40 As to industrial sites, a city-wide auditing process of potentially high-risk sites is proposed, with the applicant to then work with site owners to ensure that stormwater quality can be met by the required treatment. For contaminated sites, the resource consent is not to cover discharges and land within the site during construction or from sites that are identified as having a high risk of resulting in adverse effects on groundwater or surface water.

- 41 As to the management of flood risk, flood modelling will be required for larger developments. Flood models will be calibrated using data obtained from the EMP.
- 42 Investigations to identify the reasons and to determine whether additional mitigation or remedial measures are required will be undertaken when monitoring or modelling results indicate the conditions are not being met.
- 43 In addition to the installation of infrastructure, a range of non-structural means to improve the discharge quality and quantity are proposed. These include regular meetings between the applicant and CRC technical staff, investigations into alternative modelling approaches and mitigation measures, education campaigns and community engagement, liaison with industry groups, developing and implementing minimum water quality standards for discharges through the Water Supply, Stormwater and Wastewater By-Law 2014, and use of the District Plan.

#### **The Environment**

- 44 In terms of the receiving environment, the application provided a description in section 3 of the Assessment of Environmental Effects (**AEE**) at pages 15-75.
- 45 Again, the s.42A Report provides a helpful summary at paragraph 101. We are satisfied that is an accurate summary of the key aspects, with the addition of the Brooklands Lagoon.
- 46 In terms of the physical environment, this was a matter of considerable discussion in evidence and submissions. The evidence and submissions focussed on, particularly, the Lower Styx catchment and the particular difficulties experienced by the residents in that area following the Christchurch earthquake sequence. It appeared to be accepted by all that, in assessing effects, the existing physical environment and its sensitive nature due to earthquake damage and sea level rise was relevant. The more contentious issue was what that meant in terms of the scope.

#### **The Existing Environment**

- 47 On an application such as this, it is critical to determine the relevant environment against which the effects of the proposal are to be assessed. This was an issue which was subject of some dispute, and again is one of some complexity.

- 48 In the applicant's opening submissions<sup>1</sup> Mr Pizzey referred to the decision of Fogarty J in Shotover Park Ltd v Foodstuffs<sup>2</sup> and the High Court decision in Speargrass Holdings Limited<sup>3</sup>. He focussed on the "real world analysis" approach in assessing the environment.
- 49 Mr Pizzey then referred to Contact Energy Ltd<sup>4</sup>, before moving on to address New Zealand Energy Ltd v Manawatu-Wanganui Regional Council<sup>5</sup>, submitting that the High Court did not oppose the assertion that unusual circumstances may in some cases mean that the existing environment should include ongoing effects of activities for which consent is due to expire. He noted that the Court had referenced the following principle from the authors of Environmental & Resource Management Law:
- "The existing environment cannot include, in the context of a renewal application, the effects caused by the activities for which the renewal consents are sought, **unless it would be fanciful or unrealistic to assess the existing environment as if those structures authorised by the consent being renewed did not exist.**"* (Mr Pizzey's emphasis).
- 50 Mr Pizzey submitted that the applicant could not simply turn off the tap. Rain would continue to fall on an expanding urbanised environment, and stormwater would continue to be discharged to the receiving environment. That is, in his submission, in broad terms, the future environment. He submitted it would be both fanciful and unrealistic to assess the existing environment as excluding stormwater discharges as the discharges:
- are anticipated and promoted by the LWRP;
  - are via the applicant's reticulated networks, which are existing activities;
  - have already been affecting most receiving environments for many decades; and
  - are the result of an inevitable natural process and cannot feasibly be discontinued.<sup>6</sup>
- 51 Mr Pizzey concluded on this issue by submitting that excluding ongoing discharges from the existing environment would detach the consent decision from reality without doing anything to enable the gathering and use of new

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<sup>1</sup> Opening Legal Submissions for Christchurch City Council 5 November 2018 at paras 102-116

<sup>2</sup> Shotover Park Ltd v Foodstuffs (South Island) Ltd [2013] NZHC 1712 at para [115]

<sup>3</sup> Speargrass Holdings Ltd v Queenstown Lakes District Council [2018] NZHC 1009 at [64]

<sup>4</sup> Contact Energy Ltd v Waikato RC (2000) 6 ERLNZ 1

<sup>5</sup> New Zealand Energy Ltd v Manawatu-Whanganui Regional Council (Ngāti Rangī Trust v Manawatu-Whanganui Regional Council)

<sup>6</sup> *Supra* at para 114



information about effects on freshwater, which is the objective of the precautionary approach included in the CRPS.<sup>7</sup>

- 52 The s.42A Report also analysed this issue and attached a memorandum from Wynn Williams.<sup>8</sup> The memorandum was comprehensive. It addressed previous Environment Court authority and an analysis of the Ngāti Rangi Trust v Manawatu-Whanganui Regional Council High Court decision.
- 53 The memorandum concluded that the environment (for the purpose of assessing effects) includes the effects of past lawful discharges but excludes the effects of ongoing discharges under the existing consents intended to be replaced, unless it can be established that it would be fanciful or unrealistic to assess the existing environment without those discharges continuing.
- 54 The memorandum concluded that in the context of this application the environment should be considered as if the discharges under the existing consent to be replaced had been discontinued and the application is for a new activity. It went on to say however that is not to say the environment should be assessed as if the discharges never occurred. Rather, the environment will include the effects of past lawful discharges including, for example, the buildup of sediment and the effects of past discharges on the aquatic ecology. It noted that the receiving water bodies are, for the most part, heavily modified and have been for some years.
- 55 It noted that, if the effects of activities authorised by consents issued by regional authority always form part of the environment, it would be difficult to regulate activities in the future. This is because it would be hard to argue, particularly in the context of replacement consents, that the effects are more than minor compared to the status quo.
- 56 Assessing the application as if the existing consents to be replaced are not part of the environment, allows a more thorough assessment of effects and, in light of the lack of knowledge about the actual contribution of stormwater discharges to water quality, follows the precautionary approach recommended in the Canterbury Regional Policy Statement 2013 (**CRPS**).
- 57 As to whether it was feasible to assess the existing environment as including the continuance of discharges under the existing consent to be replaced, the memorandum noted the relevant matters as being likely to include:
- (a) the receiving water bodies are, for the most part, heavily modified and have been for some years;

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<sup>7</sup> Supra at para 116

<sup>8</sup> Memorandum Wynn Williams to N Reuther and Yvette Rodrigo 28 September 2018

- (b) stormwater discharge via the applicant's reticulated networks is a long existing activity;
- (c) the LWRP promotes stormwater by way of a reticulated system and water quality targets within the LWRP recognise the lower water quality experienced in urban water bodies.

- 58 The overall conclusion of the memorandum was that the environment should be considered as if discharges under the existing consents to be replaced have been discontinued and there is an application for a new activity, unless the applicant can establish that it is not feasible to do so. The environment is, however, not to be considered as if those discharges never occurred. Rather, the environment will include the legacy effects of past lawful discharges.
- 59 A number of submitters, including the Avon Ōtākaro Network, submitted that in the circumstances, particularly given the scale and significance of this proposal, the reference point for any test of adverse effects on the receiving environment must be its indigenous, not its current, state.

### **Evaluation**

- 60 The applicant currently holds a number of discharge consents. CRC000315 authorises the discharges from residential, commercial and industrial roofing and residential hardstand areas from individual properties within various parts of Christchurch City. This has an expiry date of 2034.
- 61 CRC090292 authorises discharges to surface water from roofs, hardstand areas and pervious areas from developed sites and during construction of some development sites within the Avon, Estuary, Halswell, Ōtukaikino and Styx catchments. This expired in June 2016 and continues to be exercised in accordance with s124 of the RMA.
- 62 CRC120223 authorises discharges into land and to water from roofs, roads and hardstand areas and from development areas during construction phase within the southwest area of Christchurch. This consent expires in 2047. It excludes high risk contaminated sites or commercial / industrial sites, together with large scale construction phase discharges.
- 63 CRC131249 provides for discharge into land or to surface water or groundwater from roofs, roads, hardstand areas and from development areas throughout the construction phase within the Pūharakekenui-Styx river catchment. Again this excludes some high risk contaminated sites or commercial / industrial sites and large scale construction phase discharges. This consent expires in 2048.

- 64 The existing environment is therefore a complex one. As to whether the effects should be assessed against the “indigenous state” environment we do not accept that. In our view, the existing environment must include the effects of the past lawful discharges. To do otherwise would be artificial and would place an almost unsurmountable burden on the applicant. The receiving water bodies, particularly the streams, rivers and the estuary, have been modified and impacted by over 150 years of various discharges and other activities.
- 65 As to whether the environment should be assessed on the basis of the discharges continuing, that is a difficult and complex one. This is not the usual situation of a replacement consent. While CRC090292 has expired, CRC120223 and CRC131249 are not near expiry and indeed have approximately 29 and 30 years remaining. If this application were to be declined the stormwater discharge authorised by those consents would continue. In our view, it would be fanciful or unrealistic to ignore those consents in assessing the existing environment. On a realistic world view, and recognising the consents held are fixed in duration, they are relevant.
- 66 The applicant has however sought a comprehensive stormwater discharge consent. Consistency of decision making is important. However we have received significant evidence and submissions, particularly on effects. Further, events post the granting of those consents have identified issues, particularly in the Styx catchment, that may not have been anticipated. We must make our decision on the basis of what is before us. It is not our role to rubber stamp the continuation of CRC120223 and CRC131249. That would be a dereliction of our duties.

### **The Hearing / Summary of Evidence and Submissions**

- 67 We have briefly summarised the information provided to us at the hearing including the evidence, submissions and the s.42A Report. We have taken all of that information into account. We have also considered the tabled documents from LINZ, Transpower and the Ministry of Education. We will address the evidence and submissions further as we consider and address the issues. To avoid unnecessarily lengthening the body of our decision the summary is attached as **Appendix 1**.

### **Assessment**

- 68 In assessing this application, we have considered the application documentation and assessment of environmental effects, the s.42A Report, the further information provided by the applicant and all the matters raised in the

submissions lodged. We have also carefully considered all of the evidence provided to us, together with the legal submissions made and the proposed conditions of consent and associated documents provided.

- 69 While our assessment does not specifically address each and every point raised, we confirm that we have considered all matters raised, and have done so carefully, in reaching our decision.

## **Statutory Considerations**

### Activity Status

- 70 It was agreed that the application is for a non-complying activity.
- 71 Pursuant to the Land & Water Regional Plan, Rules 5.93 and 5.94 specifically address the discharge of stormwater from a reticulated stormwater system onto or into land or into surface water. Rule 5.93 provides for a restricted discretionary activity status provided three conditions of the rule are met. Standards 2 and 3 of Rule 5.93 require a SMP to have been prepared and lodged with the application, and the discharge will not cause an exceedance of the limits in Schedule 8.
- 72 As acknowledged by Ms West, the proposed discharges do not fully comply with Conditions 2 and 3. Not all of the required SMPs were lodged with the application. There is also an exceedance of the Schedule 8 quality limits for E. coli.
- 73 It therefore falls to be considered as a non-complying activity under Rule 5.94.
- 74 In terms of the Waimakariri River Regional Plan (**WRRP**), the standards are not met and non-complying activity consent pursuant to Rule 6.2 is required.
- 75 In relation to Canterbury Regional Coastal Environment Plan (**RCEP**), Rules 7.1(b) and 7.1(f) provide for the discharge of stormwater into water or into land in the coastal marine area as a permitted activity, subject to conditions. Full compliance with the standards set under those rules cannot be established. The applicant cannot establish compliance with the requirements of Rule 7.2 for discretionary activity and it therefore falls to require consent as a non-complying activity.
- 76 Rule 10.27 provides for the discharge of stormwater from the operational area of the port as a permitted activity, provided certain conditions are met. Compliance with those conditions cannot be established.
- 77 It was agreed by all planners that a bundling approach was appropriate.

S104, S104B and S104D of the RMA

- 78 S104(1) of the RMA sets out the matters we must have regard to in consideration of the application. The relevant matters are as follows:
- “(a) any actual and potential effects on the environment of allowing the activity and;*
  - (ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
  - (b) any relevant provisions of –*
    - (i) a national environmental standard;*
    - (ii) other regulations;*
    - (iii) a national policy statement;*
    - (iv) a New Zealand coastal policy statement;*
    - (i) a regional policy statement or proposed regional policy statement;*
    - (vi) a plan or proposed plan; and*
  - (c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.”*
- 79 S104(1) RMA provides the matters listed are subject to Part 2, which includes ss5 through to 8. We address Part 2 RMA matters and the approach taken to that analysis subsequently.
- 80 For non-complying activities, in addition to s104(1) matters listed above s104D contains a particular restriction known as the gateway tests.
- 81 In summary, we may grant a resource consent for a non-complying activity only if we are satisfied that either:
- “(a) adverse effects of the activity on the environment ... will be minor; or*
  - (b) the application is for an activity that will not be contrary to the objectives and policies of –*
    - (i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or*
    - (ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or*

(iii) *both the relevant plan and the relevant proposed plan, if there is a plan and a proposed plan in respect of the activity.*"

- 82 The issue of whether an effect will be, or will not be, minor is one which is to be made considering the adverse effects as a whole. "Minor" means less or comparatively small in overall size or importance.
- 83 In relation to the second aspect of the threshold test, the word "contrary" means opposed to in nature, different to or opposite.
- 84 Pursuant to s104B, if one limb of the gateway test is met, we may grant or refuse consent. S104B does not draw any distinction between an application for a discretionary activity and an application for a non-complying activity. The decision whether to exercise discretion and grant or refuse consent entails a judgment that is informed having regard to the matters under s104.
- 85 We must have regard to matters under s105. These relate to the nature of the discharge, the sensitivity of the receiving environment, the reasons for the proposed discharge and possible alternatives.
- 86 S107 must also be considered. Very much in summary, this provides that we may not grant a discharge permit if, after reasonable mixing, the contaminant or water discharged is likely to give rise to: the production of oil or grease films, scums or foams or floatable or suspended materials; any conspicuous change in the colour or visual clarity; any emission of objectionable odour; the rendering of fresh water unsuitable for consumption by farm animals; and any significant adverse effects on aquatic life.
- 87 S107(2) provides that we may allow any of the effects described if there are either exceptional circumstances justifying the granting of the permit, the discharge is of a temporary nature, or the discharge is associated with necessary maintenance work and it is consistent with the purpose of the RMA to do so.
- 88 Pursuant to s108, if we grant the application we may impose conditions. Pursuant to s108AA, a condition can be included only if agreed to by the applicant or directly connected to an adverse effect of the activity on the environment, or an applicable rule or standard.

## Part 2 of the RMA

- 89 The application of the words "*subject to Part 2*" in a s104 context has recently been addressed by the Court of Appeal in its decision of 25 August 2018.<sup>9</sup>

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<sup>9</sup> RJ Davidson Family Trust v Marlborough District Council CA97/2017

Guided by the Court of Appeal, in our view we are required to assess the objectives and policies in the planning documents against Part 2. If we consider the relevant plan documents have been prepared having regard to Part 2, and provide a coherent set of policies which are designed to achieve clear environmental outcomes, we do not need to expressly refer to Part 2 further, other than applying the policies and objectives of the plan. In undertaking that analysis, we will be referring to Part 2 as required by s104. Conversely, if planning documents do not appear to have been prepared in a manner that appropriately reflects the provisions of Part 2, then we must refer to it when determining the application.

- 90 Mr Pizzey's submission was that there was no need to refer expressly to Part 2 as the planning documents were complete. Ms Mehlhopt, in her submissions, submitted that it was appropriate to specifically address Part 2 matters in any event. Overall, and for completeness, we consider it is appropriate for us to address Part 2 matters.

#### Principal Issues in Contention

- 91 As noted earlier, agreement has been reached between the applicant and the CRC reporting officers in relation to the conditions of consent. Such agreement does not determine those issues: that is a matter for us.
- 92 In our view, the principal issues requiring determination were as follows:
- the stormwater management approach – adaptive management and certainty;
  - effects on the environment, largely encapsulated under the general headings of water quality and water quantity;
  - consistency or otherwise with the relevant objectives and policies;
  - s105 and s107 matters.

#### The Stormwater Management Approach – Adaptive Management

- 93 Adaptive management is central to the operation of the proposed consent. Mr Pizzey submitted that all of the elements required were met.<sup>10</sup>
- 94 As identified by Mr Pizzey, the Supreme Court has identified a number of factors which are appropriately assessed.<sup>11</sup>

<sup>10</sup> PK Pizzey Opening Legal Submissions for the CCC at para [97]

<sup>11</sup> Sustain Our Sounds Inc v New Zealand King Salmon Company Limited (2014) 17 ELRNZ 520 at para [133]

- 95 The Supreme Court addressed what an adaptive management regime must contain in any particular case before it is legitimate to use such an approach rather than prohibiting the development until further information becomes available:<sup>12</sup>
- (a) the extent of the environmental risk (including the gravity of the consequences if the risk is realised);
  - (b) the importance of the activity (which could in some circumstances be an activity that it is hoped will protect the environment);
  - (c) the degree of uncertainty;
  - (d) the extent to which an adaptive management approach will sufficiently diminish the risk; and
  - (e) uncertainty.
- 96 We consider that we need to be satisfied that:
- (a) there will good baseline information about the receiving environment;
  - (b) the conditions provide for effective monitoring of the adverse effects using appropriate indicators;
  - (c) thresholds are set to trigger remedial action before the effects become overly damaging; and
  - (d) effects that might arise can be remedied before the effects become overly damaging.
- 97 Mr Reuther addressed the stormwater management approach in his s.42A Report at paragraphs 122-182. Mr Reuther identified what he considered to be the basic principles of adaptive management in the context of resource consent as:
- “(a) the collection of information to understand the issues / problems;*
  - (b) the development of objectives and performance criteria (e.g. through modelling) that set clear outcomes to be achieved;*
  - (c) the design and development of mitigation actions;*
  - (d) the implementation of mitigation actions;*
  - (e) monitoring the implementation of actions;*
  - (f) an evaluation of the actions based on the monitoring data collected; and*
  - (g) the incorporation of the analysed data to inform further mitigation actions (feedback loop).”<sup>13</sup>*

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<sup>12</sup> Supra at [129]

<sup>13</sup> S42A Report at para 125



- 98 Mr Reuther considered that the principal issues with stormwater discharges were well understood, the applicant proposed a reduction of the contaminant load of stormwater discharges as specified in Table 2 and the progressive improvement of discharge quality to meet the Receiving Environment Targets specified in Schedules 4, 5, 6 and 7 of the initial proposed conditions to achieve the specified receiving environment objectives.
- 99 He considered the approach proposed required ongoing reporting, additional investigations where modelling or monitoring does not show the required or anticipated results, and a requirement for definite actions to respond to any non-compliances with the proposed conditions. Mr Reuther noted SMPs would be required for each of the seven stormwater catchments. What they must contain and what they must achieve was set out in proposed conditions. Overall he concluded, given the nature of the proposal, the adaptive management framework would enable the applicant to obtain a discharge permit that met Part 2 of the RMA without having a complete scientific understanding of the potential effects; and to manage stormwater in a dynamic and integrated way, enabling responses to change over time as more information became available, models updated and calibrated, and as technology evolves.<sup>14</sup>
- 100 Mr Reuther did however note that an adaptive management approach is required to be robust and to achieve the outcomes sought. Mr Reuther addressed the adequacy of the receiving environment objectives and accurate target levels and made some recommendations in that regard.
- 101 Mr Reuther addressed the adequacy of mitigation and the potential constraints on that and particularly those associated with funding and the statutory process under the Local Government Act (**LGA**).
- 102 Mr Reuther also addressed the adequacy and appropriateness of the use of SMPs, which he considered to be integral to the development and implementation of stormwater discharge mitigation measures, and therefore a fundamental part of the adaptive management approach. He identified these as being the key mechanism to deliver stormwater treatment and guide stormwater mitigation.<sup>15</sup>
- 103 Overall, Mr Reuther concluded, subject to recommendations, the use of SMPs is an appropriate means to contribute to effectively managing the effects of the stormwater discharges. He noted however that SMPs were only part of the wider “toolbox” for managing the effects of the discharges.

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<sup>14</sup> S42A Report at para 132

<sup>15</sup> S42A Report at para 183

- 104 Mr Reuther also addressed the EMP, the Annual Report proposed and the responses to monitoring.
- 105 Again Mr Reuther made a number of recommendations but concluded, subject to the recommendations, that an Adaptive Management Approach is appropriate as the proposal met the basic principles outlined above.
- 106 Following the adjournment of the hearing on 15 November 2018, the CRC reporting officers and the relevant experts for the applicant engaged, we understand, in ongoing discussions. By letter of 5 April 2019, which was provided with Mr Pizzey's written reply, Mr Reuther recorded that the proposed draft conditions as amended addressed the issues raised at the hearing, including those relating to the stormwater network, the use of the term "Best Practicable Options", the establishment of the Stormwater Technical Review Panel, the development of catchment specific contaminant load reduction targets through the SMP process, inclusion of the receiving environment objective for flooding and the addition of further responses to flood modelling. He was therefore able to recommend, as s.42A Reporting Officer, the granting of the consent for the duration of 25 years.
- 107 A number of submitters commented on the Adaptive Management Approach. Lyttleton Port Company (**LPC**) supported the approach in general terms, but identified particular issues. The Oil Companies, and others, identified issues with certainty around specific matters.

#### Evaluation

- 108 We have considered the proposed Adaptive Management Approach carefully. We have been concerned throughout our deliberations as to whether there is sufficient certainty or whether the approach, in parts, creates a risk of an unlawful delegation of the decision-making process.
- 109 Subject to matters which we will address in our decision, we are largely satisfied: there is sufficient baseline information regarding the receiving environment; the conditions (subject to our comments and changes in that regard) provide for effective monitoring of the adverse effects and use appropriate indicators; the thresholds set to trigger remedial action are generally appropriate; and, on the evidence, effects can be remedied before they become irreversible, particularly in relation to stormwater quality.
- 110 We acknowledge that there is still some uncertainty in relation to the mitigation measures which may be available, particularly in relation to the availability of the Ōtākaro/Avon corridor residential red zone for stormwater treatment. We

are also conscious that there is a degree of uncertainty in relation to funding as that is subject to statutory processes. We have no control over such processes. This entails a level of uncertainty as to whether and/or when the mitigation measures will be put in place. However, the thresholds, through the objectives and the specified target attributes, are fixed, certain, and must be met.

## **Effects on the Environment**

- 111 The key effects are associated with the central issues of water quality and water quantity. The approach we have taken is to address water quality and water quantity in discreet sections in this decision. The sections will address what is proposed, the approach taken, the key issues, the proposed response and our decision in relation to the same.

## **Water Quality**

### Overview

- 112 The applicant's vision for Christchurch's surface waters is that these resources support the social, cultural economic and environmental wellbeing of residents and are managed wisely for future generations. The application cites the goals outlined in the Christchurch Surface Water Strategy, 2009-2039 which include aims to improve water quality and restore ecological, cultural and amenity values.
- 113 The management of the quality of stormwater discharges and the adverse effects of degraded water quality on the receiving environments are primary issues raised by the applicant, CRC and submitters. The submitters raising issues in relation to water quality included Jacob Wright, Fiona Fraser, Glen Menzies, Kyle Gregory Sutherland, Lindsay Walton, Dick Ongley, Ōpāwaho River Network, Avon/ Ōtākaro Network, Joint Rivercare Groups, Snook Family Trust, South Shore Residents Association, Cashmere Stream Care Group, Avon Rowing Club Inc., Mr & Mrs McGuigan, Ms Burney, the Oil Companies, Department of Conservation, Avon Heathcote Estuary / Ihutai Trust and Combined River Care Networks.
- 114 The process of urbanisation creates impervious surfaces which divert the natural path of rainfall onto land, reducing infiltration to groundwater and increasing the volume and rate of surface runoff. As the surface runoff is diverted over the impervious surfaces it can change in temperature and mobilise entrained and dissolved contaminants derived from the particular land use. Where the applicant's reticulated stormwater system exists the surface runoff is

diverted into the system and subsequently discharged to the natural receiving environment.

- 115 A combination of modelling of representative attributes (copper, zinc and TSS) and monitoring of physical, chemical, ecological and cultural indicators is proposed. The modelling is to predict the potential effects and what improvement might be achieved through various interventions. The monitoring is to quantify the actual effects. Conditions 19 requires the specified contaminant load reductions to be achieved and 20 sets the requirement to use best practicable options to achieve the contaminant load reductions specified in SMPS derived from the CLM or subsequent improved modelling methods and best available information.
- 116 A number of submissions identified a perceived a lack of commitment by the applicant to improve water quality and a lack of clear approach to managing industrial sites in particular.
- 117 For the applicant, Mr Adamson cited the applicant's current budgeted commitment to stormwater and land drainage management as \$1,081 million over the next 10 years. He added that the applicant sees the need to implement multi-facetted non-infrastructural measures including source control of contaminants, alongside the infrastructural measures to effectively make ongoing improvements to stormwater discharge quality.
- 118 The detail surrounding the particular concerns raised by submitters and more specific findings relating to them are discussed in the sections below. However, we find that the overall approach of addressing urban stormwater quality and its effects in an integrated and comprehensive manner is appropriate.

#### Integrated Management Approach

- 119 Ms Beaumont outlined the applicant's overall strategic approach to surface water management. This fits within a framework that seeks good outcomes across the four well beings – social, economic, environmental and cultural. She drew our attention to the applicant's draft Integrated Water Strategy (**IWS**) which draws together the responsibilities for water supply, wastewater, stormwater and flood plain management. The draft IWS calls for an integrated approach to asset management (across the three waters, transport and vertical infrastructure) to contribute to place making and ecosystem service benefits.
- 120 Ms Beaumont described how the applicant works in partnership with CRC to improve outcomes for freshwater across the district. The elected members of the two Councils meet twice per year in the Water Forum to discuss all aspects

of water resource management and the three water services which the Councils provide.

- 121 A Water Issues Management group (**WIM**) made up of senior staff from the two Councils operates to address stormwater and related issues. This group includes representation from Te Rūnanga o Ngāi Tahu. The WIM reviews priorities, oversees a joint work programme and responds to emerging issues. The WIM is supported by a collaborative task force, the Stormwater Action Team (**SWAT**). SWAT undertake actions to address the most significant sources of contaminants entering the city's waterways from commercial and industrial sites, construction sites and areas of major earthworks and pollution incidents.
- 122 Ms Beaumont concluded that the involvement of both elected members and staff (at all levels) from the applicant and CRC ensures alignment of work programmes and a consensus on priorities for action.
- 123 Mr Adamson and Mr Norton both referred to the Stormwater Management Protocol jointly developed by CRC and the applicant in 2006 and revised in 2008 and 2010. This document, signed by the respective CEOs, sets out how the Councils will work together at all levels to achieve integrated management of stormwater in Christchurch. An agreed set of principles and practices guide the management of urban stormwater. These include:
- (a) Ensuring land use planning and stormwater management is integrated;
  - (b) Improve the water quality, ecological health, landscape, recreation heritage and cultural values of surface water whilst managing flood risk;
  - (c) Working together at all levels in the most effective and efficient manner.
- 124 Mr Norton has responsibility for implementing the applicant's operative SMPs and providing technical stormwater advice into various Council processes.
- 125 Mr Norton described the significant contaminants in the stormwater and their sources. He considered copper, zinc and sediment to be major contaminants in Christchurch rivers, often at concentrations many times higher than ANZECC Guidelines<sup>16</sup>. He presented his view on Best Practice stormwater mitigation including a discussion of water quality stormwater treatment efficiency.
- 126 Mr Norton provided an overview of the applicant's SMP programme including a summary of SMP implementation progress to date and retrofit and source control measures. He also discussed the approval mechanism for sites to connect to the applicant's network, being authorised under a bylaw.

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<sup>16</sup> Australian and New Zealand Environment and Conservation Council

- 127 Dr Margetts described a number of best practice mitigation measures which she referred to collectively as the “mitigation toolbox”. She considered that each measure in isolation has benefit, but together they provide a robust approach to mitigate the effects of stormwater on aquatic ecosystems. Her evidence was that the suite of measures includes both structural and non-structural measures including stormwater treatment devices, statutory and non-statutory planning mechanisms, education and awareness and support for source control. The measures are founded on the best available research, monitoring and modelling.
- 128 In the s.42A report Mr Reuther expressed that the water quality objectives and target levels for waterways are well aligned to the LWRP outcomes and standards. He considered the overall approach proposed by the applicant likely to result in an improvement of the receiving environment’s water quality. He did however raise concerns about the CLM approach and the level of certainty around the implementation and efficacy of the mitigation measures.
- 129 We heard evidence from the applicant, Regional Council experts, and submitters on the broad suite of measures which can be applied to improve the quality of stormwater discharges. There was much discussion about implementing processes and practices which represent the “best practicable option”, as defined in s.2 RMA, to prevent or minimise the adverse effects of urban stormwater discharges. This includes consideration of the nature of the discharge, receiving environment sensitivity, financial implications, consideration of alternative options, the current state of technical knowledge and the likelihood that the option can be successfully applied.
- 130 Mr Clinton Cantrell presented evidence based on his extensive international experience on projects and programmes focussed on the assessment and mitigation of effects from stormwater and wastewater pollution. He highlighted the complex interactions between sources and effects in urbanised waterways. Mr Cantrell cited case studies where vast sums of money spent on compliance with overly prescriptive regulatory standards can result in little benefit in terms of measurable community driven outcomes.
- 131 Mr Cantrell drew on a specific case study in Melbourne, Australia focussed on the Merri Creek catchment. By taking an effects-based approach and managing adaptively, the responsible water authorities concluded that spending AUS \$12M to address identified hot spot stormwater pollution and source control would deliver more than 1,000 times the benefits that spending more than AUS \$25M on wastewater overflow compliance would have.

- 132 Mr Pinner's evidence for the applicant focussed on the use of road sweeping. The historic purpose of sweeping is to maintain drainage, safety, prevention of asset and private property damage, cleanliness and amenity.
- 133 In Mr Pinner's experience there is a growing appreciation, both nationally and worldwide, that sweeping the roads is linked to the quality of stormwater that is discharged to the receiving environment. Whilst sweeping was historically about cleaning up gross pollutants such as cans, glass plastics, and cigarette butts, it is now increasingly seen as an environmental necessity to manage water and sediment quality. It is a measure aimed at reducing the contaminants available to be entrained in stormwater.
- 134 Mr Pinner cited a study undertaken by NIWA for the Nelson City Council, "*Street sweeping; an effective non-structural Best Management Practice (BMP) for improving stormwater quality in Nelson*". (Depree, April 2011). The report provided recommendations on the methods, equipment and management of road sweeping which are equally applicable to Christchurch. The type of road sweeper, e.g. a vacuum sweeper, and the interval between sweeping relative to the interval between storm events are important criteria to optimise the stormwater quality benefits.
- 135 Ms Hess, a submitter, presented evidence on the use of permeable pavement and rain gardens as examples of a Sustainable Urban Drainage System (**SUDS**) measures. She advocated for the use of a broad suite of SUDS to be considered in the mix of measures and that these be assessed through the development of the SMPs.
- 136 The applicant's approach to managing stormwater quality is comprehensive and integrated. On the evidence before us, there appears to be a commitment at political and staff level to improve the quality of surface water. There appears to be strong and collaborative relationship between the applicant and CRC aimed at collectively improving water quality.
- 137 The adaptive management approach recognises the complexity of the issues. This approach recognises the need to adopt a broad suite of structural (stormwater treatment devices) and non-structural (education, regulation and source control) measures which can be applied in concert for the best outcome. The identification and prioritisation of these measures is to be undertaken with input from the community and affected parties through the development of SMPs.

### Management of Industrial Sites

- 138 The applicant acknowledges that the management of stormwater discharges from industrial sites is a key issue in relation to protecting the city's water quality. The applicant proposes that the water quality of stormwater discharges into the city's network from industrial sites will be required to be equivalent to the discharge from residential sites. To achieve this will almost always involve some form of on-site pre-treatment. Where the required standard cannot be met, the particular site will require a separate discharge consent from CRC.
- 139 The applicant's existing and proposed SMPs include a requirement to identify high risk sites from the Hazardous Activities and Industries List (**HAIL**) and to undertake industrial site audits (**ISA**).
- 140 Dr Valigore is a Specialist Advisor in the applicant's Technical Services team. Her primary role is to conduct stormwater audits at industrial sites in order to advise businesses on how they can mitigate their risks to the waterways and improve the quality of their stormwater discharges. Dr Valigore described the ISA process, resources and outcomes.
- 141 Dr Valigore described how the ISA team has engaged with over 60 businesses between June 2017 and October 2018. Risk mitigation and compliance has been achieved through the businesses implementing actions including staff education, adoption of good management practices (**GMPs**), capital works and/or establishment of Trade Waste areas for high risk activities.
- 142 During the hearing the panel raised questions of the applicant's witnesses over the level of resource being applied to the ISA programme and the suitability of the regulatory and enforcement tools available to the applicant's staff.
- 143 Dr Valigore considered the applicant's Technical Services Unit, which includes the ISA and Trade Waste teams is appropriately resourced to conduct field audits. She also pointed out that the ISA team collaborates with CRC's Pollution Prevention team.

### Evaluation

- 144 Condition 40, proposed by the applicant and agreed by CRC staff, requires a range of actions to be undertaken including undertaking a cost / benefit analysis of options to improve source control such as the allocation of staff resources to ISAs.
- 145 Condition 47 requires the maintenance of a desktop-based identification of industrial sites which is ranked according to the level of risk to water quality.



The Councils have agreed on at least 15 audits per year. This number may be varied following consideration of the cost / benefit analysis required under Schedule 4 and if agreed by CRC.

- 146 Targeting high risk industrial sites with a dedicated, skilled and experienced team of auditors seems in line with best practice. Further analysis of the costs and benefits of the approach on a catchment scale will confirm its value relative to other measures. Complementary, efficient and effective regulatory and enforcement tools are needed by the applicant's compliance officers. Appropriate measures exist under the RMA and LGA. These will need to be applied in an optimal way such that the efforts of the City and Regional Councils can maximise their efficiency.
- 147 Overall, we are satisfied with the applicant's approach to the management of industrial sites.

#### Effects of Operational Discharges from HAIL and Industrial Sites

- 148 The applicant recognises that there are additional risks of groundwater and surface water contamination associated with HAIL and industrial sites. Until 2025 operational stormwater discharges from these sites will be addressed through their existing consents.
- 149 Mr Freeman considered that the best approach for managing stormwater quality from high risk industrial sites includes:
- (a) Highlighting contaminants of concern and setting appropriate benchmarks;
  - (b) Developing a robust monitoring and inspection programme; and
  - (c) Having contingencies or responses in place in the event of the exceedance of benchmarks.
- 150 In the s.42A report Mr Reuther recommended that prior to 2025 a process/strategy is developed to provide certainty around the management of existing high-risk HAIL and industrial sites. This would include a risk assessment and ranking of sites, site inspections and working with CRC and site owners to develop and implement individual site management plans. Sites which did not meet the best practical option criterion for their site would be excluded from the consent and required to obtain a separate consent from CRC.
- 151 The Oil Companies raised a number of concerns in relation to clarity, lack of guidance and certainty. They also sought a clearer consenting route for service stations which compiled the relevant MFE guidelines. LPC also raised concerns

in relation to this issue, particularly the lack of clarity. Ravensdown likewise expressed concerns in relation to uncertainty and accountability.

- 152 Mr Pizzey addressed this issue in his reply of 8 April 2019<sup>17</sup>. He noted the agreement between the applicant's experts and the s.42A writers that appropriate management of high risk industrial sites is crucial to achieving the water quality outcomes. He addressed the auditing proposed. In relation to certainty, he recognised the industry submissions sought certainty in relation to both the high risk determination and how exclusion from the consent would be assessed. He reported the applicant's position as being that "high risk" cannot, and should not, be determined other than on a detailed site-specific case by case basis. He noted that absolute certainty was not achievable at this time, but the applicant had agreed to engage with industry in development of the risk matrix of industrial sites and development sites under Condition 3.

#### Evaluation

- 153 Conditions 47 and 48 require the consent holder to work collaboratively with CRC to manage the effects of stormwater discharges from industrial sites. This includes the identification and ranking of sites based on their risk, implementation of a site audit regime and working with site operators and CRC to mitigate the effects to an acceptable level.
- 154 Overall, we consider the approach to managing high risk industrial sites is appropriate.

#### Exclusion of discharges post-2025 – Policy 4.16A

- 155 Under condition 2(d) – (f), the applicant proposes to exclude discharges prior to 2025 from:
- any new activity or re-development that is on CRC's LLUR that is considered by the applicant to pose an unacceptably high risk of surface or groundwater contamination;
  - any part of a development with a total area of disturbance of 5 ha of flat land or 1 ha of hill land; and
  - any site listed in Schedule 1 to the consent.
- 156 Policy 4.16 of the LWRP requires that:
- "Operators of reticulated stormwater systems implement methods to manage the quantity and quality of all stormwater directed to and conveyed by the reticulated stormwater system, and from 1 January 2025 network operators*

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<sup>17</sup> BK Pizzey right of reply 8 April 2019 at paras 51-53

*account for and are responsible for the quality and quantity of all stormwater discharged from that reticulated stormwater system.”*

- 157 The applicant has the ability to manage the quality of new individual discharges into its network through two mechanisms: conditions on a land-use or subdivision consent, if one is required, and through its approval for the site operator to discharge into the network under its bylaw (an LGA process). It can enforce conditions on a land-use or subdivision consent under normal RMA processes. There is also ability to take enforcement action under the bylaw, but fines are limited to \$25,000. There is no ability to add conditions to existing discharges under the current bylaw: a change to the bylaw would be required.
- 158 Mr Reuther, in his s.42A Report, was of the view that it would be beneficial to provide a mechanism to exclude sites from the consent that pose a particularly high risk, in light of the limited enforcement powers currently available to the applicant to enforce its bylaws. Ms Mehlhopt, for CRC, noted that any conditions providing for exclusion from the consent should contain the specific criteria that must be met, in order for such conditions to have sufficient certainty and achieve the intention of Policy 4.16A. There should also be a requirement for CRC to certify those criteria as being met before a site is excluded.
- 159 An alternative to the exclusion of sites would be a transfer of powers under s.33 of the RMA, or a cross-delegation of powers. We were advised that this had been discussed between the Councils but no such mechanism is currently in place.
- 160 The ability for the applicant to exclude discharges raised significant concerns for several industrial submitters, given the uncertainty as to whether particular discharges would be excluded from the consent in the future. This was raised in submissions and evidence from Lyttelton Port Company, the Oil Companies and Ravensdown in particular.
- 161 As a consequence of evidence from the submitters and CRC at the hearing, the applicant revised its proposal in terms of which sites would be excluded after 2025. The discharges listed above will be included as part of the consent on 1 January 2025, or when the individual consents that authorise them expire, whichever is the later. However, these discharges may continue to be excluded, if they are considered to pose an unacceptably high risk following the mechanism described below.
- 162 Condition 3 (Transitional arrangements) requires that the applicant, in consultation with the Industry Liaison Group, develops a risk matrix to rate the risk associated with each discharge that is currently excluded. Within three

years, the applicant will develop a Transition Plan to ensure that discharges are subject to appropriate controls to achieve environmental outcomes, any site specific monitoring plans and the process to be used to determine whether a site remains excluded due to it posing an unacceptably high risk. This process will include collaboration with CRC and engagement with the affected site owners / operators. Excluded sites will remain on Schedule 1.

- 163 In addition, sites identified as posing an unacceptably high risk of contamination may be added to Schedule 1 following the ISA process, if there is agreement from CRC, under condition 48.
- 164 These changes to the proposed conditions were agreed to by CRC.
- 165 Lyttelton Port Company, in its response to the revised conditions, noted ongoing concerns about the structure and coherence of the conditions, but supported the creation of the Industry Liaison Group and its role in preparation of the risk matrix. It sought a number of drafting changes to conditions for clarity.
- 166 The Oil Companies, while maintaining that appropriately managed discharges from petroleum industry sites are not high risk and should be explicitly provided for within the consent, sought further assurances as to how the amended conditions would work in practice. They considered it unorthodox for a consent to authorise a discharge unless the consent holder decides otherwise. They preferred an approach where all discharges were included, but with the consent holder able to apply to exclude them, through a formal change of conditions process. The change of conditions could then be challenged by the discharger. In their view, this would be preferable to requiring a discharger to apply for a judicial review or declaration should it disagree with the exclusion of its discharge. With the proposed condition wording, it was unclear whether Schedule 1 would effectively be 'wiped clear' on 1 January 2025. To clarify this, the submitter recommended naming the pre-2025 and post-2025 schedules differently.
- 167 In response, Mr Pizzey submitted that the proposed condition 3 is certain and workable and includes the industry groups in the formulation of the risk matrix. Whether any sites continue to be excluded post-2025 will be determined by the applicant in accordance with the risk matrix. Exclusion of any sites resulting from the industrial audit process must be approved by CRC.
- 168 The Oil Companies also sought that any outstanding issues in formulating the risk matrix were put to a Technical Advisory Panel for recommendation or determination. This request was adopted by the applicant in its final draft set of

conditions, which requires that the draft risk matrix is reviewed by the Stormwater Technical Review Panel and a report on it is provided to CRC.

- 169 Ravensdown, which operates a fertiliser manufacturing site that is on CRC's LLUR, also sought clarification as to what the applicant would consider an 'unacceptably high risk' in terms of excluding sites after 2025. It also highlighted the practical overlaps between the applicant and CRC in terms of managing stormwater discharges and dealing with industrial dischargers. Ms Wilkes, Ravensdown's Environmental Policy Specialist, however, did not disagree that the applicant should have the right to exclude certain discharges from its system. Mr Pizzey advised us that Ravensdown had indicated that the revised conditions provided the clarity it sought in its submission.
- 170 Mr Pizzey argued in his comments during the November hearing that an additional certification process by CRC for any excluded sites was unnecessary. If certification was to be put in place, objective criteria would need to be included within the consent conditions. If those criteria were included, the applicant could simply work to those, without needing CRC input. They would also provide certainty for the site dischargers.

#### Evaluation

- 171 We find that the applicant should be able to exclude individual discharges from entering its system, but only in exceptional circumstances. The applicant is ultimately responsible for meeting the conditions of its consent, including water quality targets, and requiring it to accept all discharges, even those significantly contaminated, will potentially impact on its ability to do this.
- 172 In order to ensure the quality of discharges entering its system, it has the ability to put controls on new discharges into its system, through its bylaw. This should generally enable the quality of the discharge from its network to be managed. However, this does not apply to existing discharges.
- 173 We also accept that certainty is needed for site operators. The transitional arrangements outlined, which include development of a risk matrix to triage discharges, determination of the regulatory methods that will be used to manage discharges accepted under the consent, and identification of the process used to determine which discharges pose an unacceptably high risk and will continue to be excluded, should provide this.
- 174 However, the process proposed must be clear in terms of the criteria by which the discharges will be assessed, in order to provide certainty for site operators and to meet RMA requirements. We note Ms Mehlhopt's advice in this regard.

We understand that the criteria will be part of the risk matrix, which will be developed in consultation with the Industry Liaison Group. It appears from the proposed conditions that CCC ultimately 'signs off' on the risk matrix – there is no requirement to accept any recommendations made by the Technical Review Panel.

- 175 While the draft conditions are clear on the process to develop the risk matrix, we think it would be useful to specify that the risk matrix itself must include criteria to identify the risk of each discharge that are clear and objective. We have therefore amended condition 3 (b) to require this.
- 176 We do not agree with the Oil Companies that discharges should only be excluded through a change of conditions process. This would be far less efficient, and if clear and certain criteria are identified in the risk matrix, we consider there is no need.
- 177 We agree with some of the changes to the conditions suggested by both the Oil Companies and LPC to improve the coherence of the conditions and made amendments accordingly.
- 178 We have amended Condition 3(b) so that it now reads as follows:
- “Within 30 months of the commencement of this resource consent the consent holder shall draft a risk matrix to identify and rate the risk associated with each of the stormwater discharges where information has been provided under Condition 3(a), and those discharges described in conditions 2(d) and 2(e). The criteria used to identify and rate the risk of each discharge shall be clear and objective. The risk matrix shall be developed as follows:...”*

#### Effects on Freshwater Quality and Aquatic Ecology

- 179 As indicated above, water quality and associated effects on aquatic ecology were identified and addressed by a number of submitters.
- 180 We have had the benefit of expert evidence from Dr Margetts for the applicant and Ms Stevenson for CRC.
- 181 The applicant acknowledges that the development of land from rural to urban (residential and business) without appropriate mitigation can adversely affect aquatic ecosystems. The s.42A Report describes freshwater bodies in urban areas as particularly vulnerable to contamination from land uses that discharge contaminants into stormwater systems and subsequently into streams or rivers.
- 182 Dr Margetts provided detailed evidence. She addressed the receiving environment, noting that based on the Quantitative Macroinvertebrate

Community Index the majority of sites in Ōtautahi / Christchurch rivers are of *'poor quality; however a small number of sites are of good, or excellent quality'*. She identified that there were a number of biota present within the Ōtautahi / Christchurch waterways that fall within the 'Threatened' or 'At Risk' categories of the treat classification system.<sup>18</sup>

- 183 Dr Margetts addressed the prevalent contaminants in urban stormwater and their short term (acute) and long term (chronic) adverse effects on biota.
- 184 Dr Margetts identified that urbanisation and associated stormwater discharges can also affect the normal flow rates of a waterway, with urban streams tending to be 'flashier' than non-urban streams, meaning they have more frequent and larger flow events, with faster ascending and descending hydrograph limbs.<sup>19</sup>
- 185 Dr Margetts addressed the basis of the proposed approach. She described the proposed monitoring under the EMP as one of the most detailed programmes in New Zealand (to her knowledge). This monitoring would provide a comprehensive understanding of the receiving environments.<sup>20</sup>
- 186 Dr Margetts addressed the appropriateness of the attribute target level and addressed issues raised by various submitters.
- 187 Ms Stevenson for CRC described a range of physical, chemical and biological parameters which affect the quality of receiving waters and sediment. She also recommended the establishment of an independent technical advisory panel to input to the SMP process, providing a level of surety that the measures to improve stormwater quality represent the best practicable option.
- 188 A number of submitters identified concerns with water quality effects on aquatic ecology. These identified and summarised in Appendix 9 to the s.42A Report. Those who appeared are identified in Appendix 1. All of those submitters provided useful evidence and clearly articulated their desired outcomes. There was a common theme seeking real improvement of water quality outcomes to address, inter alia, aquatic biodiversity.
- 189 We were impressed with the work those submitters, particularly the river care groups, undertake. We have considered carefully the matters they have raised.
- 190 Through the hearing process there has continued to be dialogue between the applicant and CRC experts to reconcile their differences. We understand that there is now consensus. This includes agreement over the draft consent

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<sup>18</sup> Statement of Evidence of Dr Belinda Isobel Margetts for Christchurch City Council, 15 October 2018 at [18]

<sup>19</sup> Supra at para [25]

<sup>20</sup> Supra at para [34]

conditions, the detail of the EMP, the development of SMPs including input from a Technical Peer Review Panel and the use of the CLM (or other model/s as deemed best practice). The CLM is discussed in more detail below.

#### Evaluation

191 After careful consideration, we accept the position that the Councils have reached with respect to the management of stormwater quality and its effects on receiving freshwater quality and aquatic ecology. We consider the conditions of consent, particularly the setting of clear receiving environment objectives and attribute targets, together with a detailed EMP and a clear response process, the effects on aquatic ecology will be minor and, on the balance of probabilities, will decrease.

#### Effects on Coastal Water Quality and Aquatic Ecology

192 This matter was addressed in some detail by the applicant and Mr Reuther in his s.42A Report. We also had the benefit of evidence from Dr Margetts and Dr Bolton-Ritchie on this issue. We also heard from representatives of the Avon Heathcote Estuary Ihtai Trust. They noted that there had been considerable water quality improvement following the removal of direct wastewater discharges to the Estuary and sought to ensure improvements would continue. They provided useful information in relation to their concerns regarding nutrients and sedimentation.

193 There was initially a degree of disagreement between Dr Bolton-Ritchie and Dr Margetts in relation to monitoring in particular. That disagreement has, to our understanding, been resolved and the experts agree that the appropriate attributes and objectives have been included.

194 The objectives and attribute target levels for coastal waters are contained in Schedule 8. The objectives and attribute targets address a number of issues.

195 They address adverse effects on water clarity and aquatic biota due to sediment inputs. The relevant attribute for sediment is the TSS concentrations in surface water, and the attribute target level is that there be no statistically significant increase in TSS concentrations.

196 Adverse effects on aquatic biota due to copper, lead and zinc inputs in surface water are not to occur. The attribute is copper, lead and zinc concentrations in surface water and maximum dissolved metal concentrations are specified, together with no statistically significant increase in the specified concentrations.



- 197 In terms of adverse effects on Mana Whenua values, the objective is that such do not occur due to stormwater inputs. The attribute is the Marine Cultural Health Index and state of Takiwā scores. The attribute target level is 2BC-B.

#### Evaluation

- 198 Overall, and while we acknowledge that the relationship between the ecological health of the coastal / estuarine waterways to the stormwater discharge is not a direct one, we are satisfied that overall the conditions in this consent, and the EMP will contribute to improvements in water quality in coastal and estuarine receiving environments.

#### Contaminant Load Model

- 199 The applicant proposes the use of contaminant load modelling to estimate the present and future contaminant loads in the Styx, Avon, Heathcote and Halswell catchments. The model is used to predict the long term contaminant load reduction that is anticipated through implementation of the proposed stormwater quality improvement measures.
- 200 The modelling approach is based on a model developed and applied in the Auckland region. The model uses the key urban stormwater contaminants of copper, zinc and suspended solids as representative. Due to a lack of local data some assumptions were made in drawing on Auckland derived data.
- 201 While acknowledging the value of end of pipe monitoring in targeted studies, Mr Cantrell notes that discharge monitoring data can be extremely variable for many reasons and does not provide confirmation of waterway effects or progress against targeted improvements that occur over lengthy periods of time. His view is that consent compliance and progress towards targeted improvements is best confirmed with a combination of modelling (such as the proposed CLM model) and waterway effects assessment studies including those set out in the EMP and required for high risk sites.
- 202 Mr Cantrell cited examples in Sydney and Auckland where models were used to demonstrate compliance with network discharge consents. He also noted the practice is common in the United Kingdom.
- 203 Ms Stevenson's section of the s42A Report raised a number of issues with respect to the use of the CLM. CRC contracted Associate Professor Cochrane and Dr O'Sullivan from the Department of Civil and Natural Resource Engineering at the University of Canterbury to review the model and its proposed application.

- 204 Associate Professor Cochrane and Dr O'Sullivan raised a number of concerns with respect to the model's application. These were:
- (a) Auckland derived contaminant load rates for different land uses have not been appropriately adjusted to account for Christchurch conditions;
  - (b) Treatment system contaminant removal rates used in the model are too high and will likely over-estimate the actual contaminant removal;
  - (c) There is a lack of detail regarding the rationale for some of the input data, for example the rate of future land use change and areas under construction; and
  - (d) There is no sensitivity analysis despite many of the inputs having uncertainties associated with them.
- 205 Mr Van Nieuwkerk presented evidence for the applicant on the use of the CLM. The primary purpose of the CLM is to provide a basis for estimating stormwater contaminant loads discharged from a stormwater network serving large catchments. The model only produces an annual contaminant load (in kg or tonnes per year). It does not assess the water quality effects of these contaminants.
- 206 Mr Kennedy reviewed the CLM on behalf of the applicant. In his opinion the model is fit for its high level use of looking at the implications of infrastructure efforts to reduce contaminant loads to waterways.
- 207 Expert caucusing between Associate Professor Cochrane and Dr O'Sullivan for CRC and Messrs Van Nieuwkerk and Kennedy for the applicant resulted in the production of a joint expert witness statement (2 November 2018). It was agreed by the parties that the overall purpose of the model is to predict relative contaminant load reductions for catchment scenarios. It was also agreed that there are limitations with the current model, particularly with respect to the model's inputs.
- 208 The parties did not agree on the accuracy of input data which may lead to outputs which do not reflect the local Christchurch conditions. However, the experts made a series of recommendations and identified additional investigations which will assist in addressing the concerns raised.
- 209 Associate Professor Cochrane and Dr O'Sullivan responded to questions from the hearing panel on the applicability of the CLM. Their view was that the Medusa Model, with which they had local experience with, was better suited to predicting contaminant loads. The Medusa Model was described as a "process based" model which derived contaminant inputs from inputs such as soil type,

land use and climate. This differs from the CLM which uses input data based on empirical data, in this case extrapolated from Auckland based studies.

- 210 Proposed Condition 19 requires the consent holder to install stormwater mitigation facilities and devices that achieve the contaminant load reduction standard specified in Table 2. The stormwater contaminant load reductions for the representative contaminants (TSS, zinc and copper) are at 5, 10 and 25 year intervals from 2018. The reduction standards set out in Table 2 are expressed as a percentage reduction relative to a modelled scenario with no infrastructural treatment measures.
- 211 Proposed Condition 20 addresses catchment contaminant load reduction targets which are yet to be specified in SMPs. The consent holder is to use the best practicable options to achieve the specified contaminant load reduction targets.
- 212 The expert witness statement records a recommendation that the Table 2 values remain as an overall goal for the City and that SMPs should include more specific contaminant load reduction targets appropriate for the Avon, Heathcote, Styx and Halswell catchments. We consider that is appropriate, and indeed consider that express commitment critical.
- 213 The joint witness statement also proposes further investigations to further improve the CLM, using the monitoring of local stormwater contaminant loads and potential reductions as part of the Adaptive Management Approach.
- 214 Proposed Conditions 37-39 require the consent holder to investigate and implement methods to improve the management of stormwater quality and reduce the adverse effects on the receiving environment. Schedule 3 sets out the stormwater quality investigation programme and includes investigating the use of various models to characterise the processes and relationships between contaminant loads and concentrations and the effects these have on the receiving environment. Such tools may include the Medusa and Music models.
- 215 Proposed Condition 56 sets out a process to respond to a situation where the contaminant load reduction standards set in Table 2 or the catchment specific targets in SMPs are not met. This response requires an investigation to determine whether or not the best practicable option has been applied. If not, then a process, including a time frame, is to be applied to mitigate the adverse effects.

### Evaluation

- 216 We accept that the use of the CLM provides a tool, which will be refined over time, will assist in setting and achieving improvements in stormwater quality with consequential benefits for the receiving environment. While recognising its current limitations, coupled with a rigorous water and sediment quality monitoring programme and the feedback through the adaptive management approach we agree that the use of the CLM is beneficial.

### Effects During Construction and Development

- 217 The application identifies that sediment discharges to waterways during relatively short duration construction period can have long term impacts. Accelerated erosion and sediment discharges can lead to adverse effects on ecological values where sediment causes smothering and abrasion of flora and fauna, potentially modifying or destroying in-stream values, changing food sources and interrupting life cycles.
- 218 The applicant proposes objectives of no adverse ecological impacts from construction activities, and to protect and otherwise enhance ecological values. To achieve this the applicant proposes:
- (a) Sediment and erosion control plans are in place during subdivision construction;
  - (b) A maximum area of 5 ha is disturbed at any one time during construction;
  - (c) All Erosion and Sediment Control Plans (**ESCP**) comply with CRC's Sediment and Erosion Control Guidelines (Environment Canterbury 2007);
  - (d) Ensure sediment and erosion control measures are monitored and maintained to operate at the required standard.
- 219 Construction phase stormwater discharges and sedimentation were raised by a number of submitters. Mr Norton discusses the effects of construction phase discharges, being discharges of stormwater from sites under development. He touches on the use of erosion and sediment control measures to manage the effects of this sediment laden stormwater. The Opāwaho and the Heathcote River Network and Cashmere Stream Group were concerned about sedimentation in that catchment. A number of submitters in the Styx catchment were also concerned about increased sedimentation from development in that catchment and the impacts that had, particularly on flooding issues

(subsequently addressed). LPC had concerns around clarity and particularly what constituted site development.

- 220 Mr Norton considered the risk of sediment laden discharges varies with soil type, slope, weather and area of exposed soils. He points to proposed Condition 2(b) (revised to 2(e)) which excludes discharges from development sites with an area of disturbance exceeding 5 hectares on flat land or 1 hectare on hill land. Further restrictions exclude discharges from HAIL sites.
- 221 A range of views were expressed on whether or not a limit should be set for the concentration of Total Suspended Solids (**TSS**) on the discharges of stormwater from development sites. Mr Reuther cited concerns from CRC compliance officers that without a specific TSS concentration limit it may be difficult to achieve the objectives and targets in Schedule 7. Furthermore, they raised a concern that some contractors and developers may not implement adequate erosion and sediment control measures while claiming that they had made reasonable endeavours to minimise the discharge of sediment laden stormwater. In the s.42A Report, Mr Reuther recommended the inclusion of a TSS limit for construction phase discharges from individual development sites.
- 222 In response Mr Norton did not consider a single TSS limit applying to all development sites through a condition of consent is an appropriate method of managing construction phase discharges. He cites a number of circumstances where he considers a higher or lower TSS limit may be acceptable. His view is that TSS limits, if set, should apply on a site specific basis and should be determined through a risk assessment process at the time of development of ESCPs. Development and implementation of these plans would be required as a prerequisite for discharging to the applicant's network.
- 223 Mr Tipper, for the applicant, pointed out in his evidence in chief that activities undertaken under the Permitted Activity rules in both the District and Regional Plans did not require notification of the works, preparation of an ESCP nor any monitoring of sites. He considered it appropriate to set an absolute limit for the concentration of TSS in stormwater entering the applicant's network from development sites.
- 224 In his rebuttal evidence, Mr Tipper referred to a number of measuring devices which can be used to determine compliance with TSS limits in "real time". He also acknowledged that the approach proposed by Mr Norton of setting a TSS limit on a case by case basis has potential benefits. However, he raised concern about a significant number of uncertainties that would need to be clarified before the cost/ benefit of this approach could be determined.

- 225 Messrs Sunich and Laurenson for the Oil Companies favoured an approach based on best practice, citing a number of practical challenges in monitoring and meeting an absolute concentration limit. Mr Laurenson considered that despite best practice, exceedances of a 100mg/l TSS limit are likely on some sites during storm events.
- 226 The applicant's proposed draft Conditions 39 and 40 relate to the issue of erosion and sediment control. Draft Condition 41-46 requires an ESCP to be prepared for any development site which would discharge to the applicant's network. Draft Condition 43 requires the applicant to develop a Sediment Discharge Management Plan (**SDMP**). The plan, to be certified by CRC, is to include a risk assessment to determine TSS limits to be discharged to the applicant's network. The SDMP will include processes for the authorisation by the applicant of these development sites' discharges. Also included will be processes for monitoring of both the development sites' erosion and sediment control practices and the TSS concentration of discharges from the development sites.
- 227 The issue of setting a TSS concentration limit to manage the quality of discharge into the applicant's network is challenging. It raises questions which highlight the complexity alluded to in Mr Cantrell's evidence about the relationship between sources of contaminants and their effects on the receiving environment. In the case of sediment discharges to the applicant's network we accept that factors such as slope, rainfall intensity, soil type, the degree of dilution and sensitivity of the natural receiving environment after reasonable mixing need to be considered in setting a standard or trigger level.
- 228 In his rebuttal evidence Mr Tipper opines that "effective management of erosion and sediment control is more of an art than a science. No two sites are the same, there are a great many influencing factors that need to be considered holistically and in concert, and there is a wide (and ever increasing) range of products and techniques available." We accept this view and that implementation of effective erosion and sediment control relies to a great extent on the professional judgement of trained and experienced practitioners.
- 229 The TSS concentrations of site discharges are likely to vary within and between storm events. The duration of flow at a particular concentration will generate a load of sediment discharged to the receiving environment. This poses challenges with respect to monitoring for compliance against any standard or limit. It is conceivable that a site which has adopted best practice in terms of erosion and sediment control may discharge a TSS concentration in excess of a set standard, but the timing of the sample taken through the storm hydrograph

is such that the exceedance of the limit may or may not be captured. This limitation in the monitoring may be overcome with automated sampling through the storm event or continuous monitoring of turbidity as a surrogate for TSS. However, such monitoring is complex, costly and unlikely to meet the criteria of the “Best Practicable Option” for management of the sediment laden discharge.

230 The management of the quality of stormwater discharges into the applicant’s network relies on the applicant’s ability to regulate and otherwise influence the processes and practices of upstream third party properties. The applicant has a stormwater Bylaw and can restrict the ability of properties to connect to its network. We heard evidence from several witnesses who suggested the bylaw, while useful, is a relatively “blunt tool” compared to the enforcement provisions available to CRC. CRC has the powers, functions and duties to manage the effects of discharges. It may also transfer these to the applicant.

231 The use of an absolute TSS concentration as a compliance limit has a benefit of certainty. However, the binary nature of using a TSS concentration as a limit does not recognise the complexity of the cause/ effect relationship, the monitoring challenges and the role of the consent holder to comply with conditions of consent and its ability to impose restrictions on third party developers which discharge to its network.

232 The principle articulated in draft Condition 41 requires the preparation and implementation of an ESCP for development sites discharging to the applicant’s network. We have revised this condition to address concerns around a reliance on third parties to achieve the outcome of the consent. We have therefore added a requirement for the ESCP to be prepared by a suitably qualified and experienced professional to a BPO standard. The revised Condition 41 is:

*“The consent holder shall use reasonably practicable measures to ensure that a site specific ESCP be prepared and implemented for development sites that discharge to the Council’s network. The ESCP is to be prepared by a suitably qualified and experienced professional prior to commencement of stripping of vegetation or earthworks. The ESCP is to be prepared in accordance with the Erosion & Sediment Control Toolbox for Canterbury (or successor document) and is to adopt a Best Practicable Option approach.”*

233 Draft Condition 43 requires the applicant to prepare a SDMP for certification by CRC. Condition 44 outlines the purpose of the SDMP. The applicant’s proposed condition is that the purpose of the SDMP is to manage discharges of stormwater from development sites to mitigate effects on water clarity and aquatic biota as far as reasonably practicable. The preparation of this SDMP is entirely within the control of the applicant and does not rely on a third party.

Therefore, to be consistent with the adoption of the BPO approach applied throughout this application, we have determined that it is appropriate to require minimisation of the adverse effects of discharges from the consent holder's network on the receiving environment's water clarity and aquatic biota. The revised Condition 44 is:

*'The purpose of the SDMP is to set out the processes and practices to be implemented to manage the discharges of stormwater from development sites into the consent holder's network such that the adverse effects of discharges from the consent holder's network on the receiving environment's water clarity and aquatic biota are minimised. The processes and practices will represent the best practicable option for achieving the fine sediment and TSS Attribute Target Levels for waterways and coastal areas within Schedules 7 and 8.'*

- 234 Condition 45 sets out what is to be included in the SDMP. We have revised this condition to reflect our view that a TSS concentration trigger will be used to initiate a feedback process to ensure a BPO approach is being implemented. It is likely that low intensity rainfall events will not generate sediment discharges to the extent that they will have an adverse effect on the environment. We therefore propose that the SDMP identify a rainfall event intensity and duration which will trigger the needs for samples to be collected. The revised Condition 45 is:

*'The required content of the SDMP shall include, but not be limited to the following means to achieve the purpose:*

- (a) *A risk assessment to determine TSS concentration trigger levels for the discharge of stormwater into the stormwater network from development sites. The risk assessment will include factors of slope, soil type, whether the discharge will be treated downstream by a Council treatment facility prior to reaching the receiving environment, and the sensitivity of the receiving environment.*
- (b) *In the event of a trigger level exceedance, a feedback process to identify any changes to the erosion and sediment control practices in place on the development site. These may include reducing the area exposed to erosion by stabilisation or improving the efficiency of sediment laden water treatment.*
- (c) *A description of the process for how TSS concentration levels will be included in authorisations by the Christchurch City Council for discharges into the network from individual sites.*
- (d) *A process for the monitoring of erosion and sediment control management and sediment discharges from development sites.*



- (e) *Determination of a rainfall intensity which will trigger monitoring of sediment discharges from development sites into the Council's network.*
- (f) *Details of how records will be kept (such as site TSS concentration trigger level exceedance, compliance monitoring and enforcement actions) with records made available to the Canterbury Regional Council on request. '*

### Evaluation

- 235 Through implementing the processes set out in the revised conditions we are satisfied that the best practicable approach to managing development site sediment discharges into the applicant's network will be achieved.

### Effects on Soil Quality

- 236 The applicant identifies that the quality of soil may be affected where contaminated stormwater is diverted to infiltration basins. These basins have a combined effect of attenuating both stormwater runoff and contaminants. The stormwater is filtered through the soil, ultimately discharging to the groundwater. Contaminants such as trace metals (zinc and copper) that do not degrade are likely to remain bound to the soil. The applicant proposes a two pronged approach where by best management practices are adopted to improve the quality of the basin's incoming water and the quality of the soil in the basins monitored to assess the level of build-up of contaminants.
- 237 The proposed soil quality monitoring is described in the EMP. The purpose of the monitoring is to ensure that the infiltration treatment facilities do not accumulate contaminants to a point where they may negatively impact on ground or surface water quality or pose a human health risk. Six stormwater infiltration or soakage system and dry detention ponds were selected for monitoring. These are listed in Table 2 of the EMP and receive stormwater from a range of land uses including residential, commercial and industrial. A suite of four parameters (Cu, Zn, Pb, PAH) to be tested is consistent for all land uses with the addition a further four parameters (As, Cd, Cr, SVOC) for the infiltration basin receiving stormwater from the industrial land use.
- 238 Mr Freeman for CRC raised initial concerns over the suite of parameters, suggesting that all eight parameters be tested for all land uses. He also expressed a concern about the frequency and spatial distribution of soil samples collected from the infiltration basins.

- 239 In response, Mr Norton's view is that the commercial and residential catchments are not significant sources of the additional contaminants to be monitored from the infiltration device with the industrial catchment. Further, he considered the frequency and spatial distribution of samples are matters that will be addressed on a site specific basis.
- 240 Conditions 4 to 10 detail the requirement to develop SMPs based on the principle of improving stormwater quality by applying the best practicable option approach. Conditions 14 to 18 require the establishment of a Stormwater Technical Peer Review Panel (**STPRP**). A task of this panel is to review the detail of draft SMPs to ensure they are fit for purpose and meet the criterion of best practicable option.

#### Evaluation

- 241 We are satisfied that the applicant's measures to mitigate the effects of contaminated stormwater on the soil quality of infiltration basins are appropriate. Any revision to the suite of parameters to be measured or the frequency and spatial distribution of soil samples for analysis can be made through the SMP process and be assessed through the STPRP.

#### Effects on Groundwater Quality and Users

- 242 The discharge of contaminated stormwater onto and into land has the potential to adversely affect groundwater quality. This can affect stream water quality where the groundwater feeds surface springs. Where groundwater affected by contaminated stormwater is abstracted for drinking it poses a risk to human health. The applicant considers the contaminants of concern to be primarily metals and pathogens.
- 243 The applicant proposes Receiving Environment Objectives and Attribute Target Levels for groundwater and springs. These are contained in Schedule 9 and include the protection of drinking water quality and the avoidance of widespread adverse effects on shallow water quality.
- 244 For CRC, Mr Etheridge generally agreed with the proposed Receiving Environment Objectives and Attribute Targets for metals which he considered to be appropriately conservative. However, he suggested the addition of cadmium to the suite of parameters to be monitored. This recommendation was based on the findings of an Australian study which found concentrations in stormwater to be approximately 20 times greater than the drinking water standard of 0.004mg/L.

- 245 In response, Mr Callander for the applicant reviewed the cited study and considers that the levels of Cadmium from the study are higher than would be expected in Christchurch stormwater. He cited local Council data which showed levels generally below detection and below the drinking water standard. Mr Callander also noted that the major proportion of cadmium found in the Australian study was in a particulate rather than dissolved form and would therefore not migrate far into the groundwater infiltration system. Mr Callander concluded that there is insufficient evidence to include cadmium in a regular monitoring regime.
- 246 In Mr Etheridge's technical report appended to the s.42A Report he raised a concern with respect to the separation between a stormwater infiltration facility and domestic water supply wells. Mr Etheridge opined that the separation distance be increased from the applicant's proposed distance of 2000m to 2500 and that this distance be applicable for both domestic and community water supply wells. This distance could be reduced based on a site-specific assessment and certification by CRC. Mr Etheridge cites a study on the transmission of viruses through groundwater which shows that a separation distance of greater than 1000m is required.
- 247 In response Mr Callander considers there is huge variability in virus infectious limits and the physical processes to transmit viruses. He concludes that the 2000m separation distance is sufficiently conservative.

#### Evaluation

- 248 Messrs Etheridge and Callander have subsequently met and discussed their respective positions. They have reached agreement on the separation distance as required in Condition 32(b) which is 2000m when an infiltration facility is upstream of a domestic and community drinking water well and 500m when the infiltration facility is downstream of a domestic and community drinking water well.
- 249 In his summary evidence at the hearing Mr Etheridge concludes that the proposed consent conditions and associated management regime are appropriate to mitigate the effects of stormwater on groundwater quality.
- 250 We accept the position the experts have reached.

#### Surface Water Quantity

- 251 The primary issue in relation to surface water quantity is changes to stream flow, particularly increases in stream flows during periods of rain, potentially

causing flooding. A second issue is erosion caused by increases in stream flow, both at the point of discharge and as a result of higher flows in the streams for longer periods. A third issue is reduced base flows and spring flows through lack of infiltration of rain into the ground. This is discussed in the part of our decision on groundwater quantity.

252 Policy 4.17 of the Canterbury Land and Water Regional Plan (**LWRP**) states that:

*‘Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety.’*

253 We received considerable evidence on flooding in the Pūharakekenui/Styx and Huritini/Halswell catchments. We received relatively little evidence on surface water quantity issues within the Ōtākaro/Avon, Ōpāwaho/Heathcote, Ōtukaikino and Banks Peninsula catchments, or on issues related to increased erosion. Our discussion therefore focusses on the approach taken to manage downstream flooding generally, and in particular the Pūharakekenui/Styx and Huritini/Halswell catchments. In relation to the potential for bed and bank erosion, proposed Condition 26 requires that the applicant follows the design standards in the applicant’s Waterways, Wetlands and Drainage Guide 2003 (**WWDG**). Both Mr Law and Mr Reuther agreed that this was appropriate. We agree and are satisfied that the risk of erosion will be appropriately managed. Consequently, we do not discuss erosion further.

254 Condition 23c of the draft conditions, requires that:

*‘The consent holder shall use best practicable options to mitigate the effects of the discharge of stormwater on ... water quantity. The mitigation of effects shall be measured against achievement of the Receiving Environment Objectives and Attribute Target Levels described in Schedule 10.’*

255 For modelled catchments (the Ōtākaro/Avon, Ōpāwaho/Heathcote, Pūharakekenui/Styx and Huritini/Halswell), attribute target levels are set in Schedule 10 as a specified maximum increase in water level at a single location within each catchment. The Schedule requires that water levels for the 2% AEP event, equivalent to a 1 in 50 year return period event) for the assessment year critical duration event must not increase more than the specified amount when compared to the modelled 2% AEP for a given baseline year, determined using applicant’s flood models.

- 256 The allowable increases range from 0mm in the Halswell River to 100mm in the Pūharakekenui/Styx River. We note the applicant had originally proposed 100mm plus / minus 20%, but has now changed this to 100mm.
- 257 The 'critical duration' is the time taken for peak water levels to be reached in the receiving waters during a storm event.
- 258 For non-modelled catchments (the Ōtukaikino River and the Banks Peninsula streams), the targets are described in terms of the mitigation strategy that will be used for new development. Water level monitoring has recently begun in the Ōtukaikino catchment and it is proposed that ultimately a maximum water level increase will be set for this catchment through the SMP. In the meantime, the attribute target is that discharges from all new greenfield development are mitigated using the 'Partial Detention' strategy outlined in the Pūharakekenui/Styx SMP. This requires that water storage is provided within first flush basins, plus additional storage through flooding of wetland areas to an average depth of 500mm. Water is discharged over a minimum of 96 hours for the critical 2% AEP design storm event. Mr Harrington explained to us, in relation to the Pūharakekenui/Styx catchment, that this means that smaller floods are fully attenuated, but that larger floods are not and will cause an increase in water levels in the downstream flood basin.
- 259 In the Banks Peninsula catchment, the attribute target level is that all discharges from new greenfield development within Banks Peninsula settlements will be mitigated using the 'Extra-Over Detention' strategy. This means attenuating sufficient stormwater to control peak flow rates from a developed site back to pre-developed flow rates, for storms up to and including the critical 2% AEP design storm event.
- 260 Schedule 2 outlines the contents of SMPs. Clause (s) of Schedule 2 is as follows:
- 's. *Identification of key locations in addition to those identified in Schedule 10 where modelled assessments of water levels and/or volumes shall be made for the critical 2% AEP event and any other relevant return interval. For each additional key location, appropriate water levels reductions or tolerances for increases shall be set according to the SMP objectives and shall be reported with the model update results required under Condition 55.'*
- 261 Condition 55 requires that:
- 'The water quantity / flood model(s) for the Pūharakekenui/Styx, Ōtakāro /Avon, Ōpāwaho/Heathcote and Huritini/Halswell rivers shall be updated as necessary*

*to reflect changes in development patterns or modelling parameters at least every 5 years following the commencement of this resource consent. The results of model updates and a description of how they demonstrate compliance with Schedule 10 shall be included in the annual report required under Condition 61 on a five-yearly basis following commencement of this resource consent.'*

- 262 This is reflected in Section 4.3 of the EMP. This allows for changes in catchment land use and development to be incorporated into the models and the models re-run for the relevant design event(s). The updated model results will be compared to the baseline model results for the catchment to assess performance against Schedule 10. The models are therefore updated and re-run every five years to assess whether changes in urbanisation over the preceding five years are appropriately mitigated by stormwater detention facilities and the like, such that the target attribute levels in Schedule 10 are being met.
- 263 The general City conditions for areas not covered by an SMP require the assessment of water quantity effects for any new development.
- 264 Mr Parsons described the City's stormwater network as being typically able to convey flows up to the 1 in 5 year rainfall event. In more significant rainfall events, there will be 'surface water storage' on streets and property, with overland flow paths ('the secondary network') developing. The secondary network is an integral and necessary part of the stormwater network, as it is not cost effective to design a primary network with capacity for extreme rainfall events. The Building Code requires that new subdivisions are designed such that overland flow paths do not cause flooding above floor level in a 1 in 50 year event. In large parts of the city, the District Plan requires floor levels to be above the 1 in 200 year event flood level.
- 265 He explained that sea level rise will increase the flood risk from rivers where there are tidal influences (high water levels) at the point of discharge, for example the Styx catchment. The SMPs prepared for each catchment will need to take account of this risk; however, over the period of this consent (25 years), sea level rise is predicted to be modest.
- 266 Mr Parsons noted that there are many areas at risk of flooding in extreme events that will not be addressed through this consent. This is because the consent is for discharges from the stormwater system, not drainage management itself. However, the applicant is actively investing in flood risk reduction across the city through programmes that are not managed by this consent, such as the Land Drainage Recovery Programme (**LDRP**). This was set up to respond to

damage to waterways and increased flood risk resulting from the earthquakes, with the aim of restoring flood risk to pre-earthquake levels. Projects are prioritised by a range of factors, but primarily the number of habitable dwellings at risk of flooding.

- 267 Mr Parsons explained that work under the LDRP overlaps with stormwater infrastructure development. It is likely to take decades to complete, and the LDRP work will affect the stormwater network in ways that cannot yet be predicted, which means it is difficult to describe infrastructure requirements in the SMPs now that will meet both stormwater management and LDRP objectives (which sit outside this consent). The SMPs therefore need to be 'living documents', and be reviewed throughout the period of the consent.
- 268 Mr Norton explained that stormwater detention is used in new developments with the aim of maintaining the hydrology of the pre-developed land by capturing the higher volume of stormwater and releasing it slowly over several days into the downstream network. This reduces peak flows, which can cause erosion, and peak water levels, which can cause flooding. In general, catchment-scale stormwater detention systems implemented by the applicant are designed to meet the 1 in 50 year storm event and the corresponding critical duration of the receiving environment, in accordance with the WWDG.
- 269 Mr Harrington's evidence outlined the extent of the water level monitoring network and the monitoring undertaken. Water level sensors identify potential flood situations and flood modelling is used to determine water levels across the network over time. The models are calibrated against real events and used to predict water levels in given flood design events. The models are also used to determine appropriate sizing of stormwater treatment and detention facilities, and to determine compliance with the target water levels in Schedule 10.
- 270 Mr Parsons described how the models used at the time the application was made (2015) were of sufficient quality to support the application; however, they were of mixed levels of detail. Subsequently, the applicant has improved the model for the Sumner catchment and will soon produce an improved model for the Avon catchment. Models for the Heathcote, Styx and Halswell are at an earlier stage of development. He noted that it is not clear whether there will be sufficient budget available to complete the improved models for the Halswell and Styx catchments. The improved models (if completed) would provide greater confidence in predicted flood levels and allow the re-evaluation of target water levels in Schedule 10. They could be used to test a wider range of return periods and flood durations, and test future land use and mitigation options. He considered that in the interim, the existing models can be used to determine

compliance with existing consent conditions but will provide lower confidence in absolute flood level predictions. Mr Parsons clarified at the reconvened hearing that in relation to the lower Styx catchment, the current model is sufficient to meet the needs of the consent. The floodplain is very wide and the level of detail in the model is appropriate to reflect this.

- 271 Allowance of climate change has been incorporated into the models by assuming a 16% increase in design rainfall intensities and an allowance for sea level rise.
- 272 Mr Parsons provided additional explanation at the reconvened hearing of the process for updating the model, and the Styx model, in particular. This model had been updated in 2012 to include post-earthquake cross-sections and LIDAR land surface information. The information in the model, such as the cross-sections, represented a snapshot in time. The models are updated as needed, for example if an event occurred (such as an earthquake, large flood or dredging activity) that was likely to change the parameters within it. They are also calibrated against flood events.
- 273 Data for bed and bank roughness are included in the model. These account for matters such as weed and vegetation in the channel, but are also used to account for un-modelled (possibly unknown) factors in the channel that affect flow, such as un-modelled structures in the river or natural occurrences such as a localised bank slump. The roughness is adjusted when the model is calibrated so that the model output reflects the observed water levels.
- 274 The water quantity experts agreed that it was good practice to update the models, if required, prior to using them to test consent compliance. This would be likely to involve an assessment of whether any events had occurred to justify changing the parameters, for example updating the cross-sections or incorporating new structures within the river into the model. A number of cross-sections might be checked to see if there were any changes before a decision was made on whether all needed to be re-measured.
- 275 Mr Parsons explained that ensuring this process occurred is the intent of the statement in Schedule 10 that reads: "All non-variant scenario parameters shall be as at the assessment year scenario." The assessment year is the year the model is run to test compliance with Schedule 10. 'Non-variant scenario parameters' include matters such as roughness, cross-sections and floodplain shape (eg. LIDAR data).



276 We agree that this is an appropriate approach, however consider that the requirement could be clearer. We have therefore added an additional explanation:

*“Non variant scenario parameters include, but are not limited to, channel cross-sections, roughness and floodplain shape. Prior to undertaking the assessment, the appropriateness of the non-variant scenario parameters shall be assessed and updated if necessary”.*

#### Issues raised

277 The approach outlined for stormwater management was generally considered to be appropriate by Mr Law, a water resource and hydrological specialist called by CRC. However, he raised the following issues:

- (a) the need for additional performance reporting locations (the applicant proposes only one location in each modelled catchment);
- (b) measurement of performance against the 20% AEP (1 in 5 year flood event) as well as the 2% AEP (1 in 50 year event);
- (c) provision of additional information as to how the allowable increases in water level are set for each catchment and whether the baseline conditions are appropriate;
- (d) the need to amend consent conditions if stormwater models are developed for other catchments, to incorporate performance reporting locations and targets for those catchments; and
- (e) the need to set a volume limit, as well as a flood depth limit, in catchments sensitive to flood volumes, including the Halswell, Styx and Ōtukaikino.

278 Mr Reuther, while generally also agreeing that the proposed approach was acceptable, recommended the inclusion of a receiving environment objective in Schedule 10, noting that the other relevant Schedules each contain receiving environment objectives, but Schedule 10 does not.

279 A number of further issues were raised by submitters. These can be grouped as follows:

- (a) high flows and flooding in the Styx catchment, exacerbated by earthquake damage and a lack of channel maintenance;
- (b) the effects of stormwater discharge in the Halswell catchment, including outside the applicant's boundary; and
- (c) flooding in Little River township.

280 We consider these various issues in turn.

The need for additional performance reporting locations

281 Mr Law's primary concern with measuring performance at only one location is that it will not reflect variations across the catchment. Where the location is not at the downstream end of the catchment there will be no control on increases in flood level downstream of the measuring point. An example was the Avon catchment, where the single proposed reporting location is the Gloucester Street Bridge. Development downstream of this site will not be monitored.

282 Reporting locations in the upper catchment could also distinguish between effects in different tributaries feeding into the mainstem. An example was the Heathcote catchment, where there is a single reporting location at Ferniehurst Street. Flooding effects in the Cashmere Stream could occur but be offset by lower flows in the upper Heathcote, with the water level target being met at Ferniehurst Street. Mr Law recommended a network of performance reporting locations in each catchment to safeguard all parts of the catchment. These could be identified now, as applicant experts had sufficient knowledge of each catchment to identify additional locations that are relevant.

283 Mr Harrington and Mr Parsons both disagreed with this approach. Mr Harrington argued that the flooding risk in urbanised areas of Christchurch has been thoroughly examined through the LDRP and other flood mitigation works. Future work under these programmes and this consent is likely to change the hydraulics of the rivers and mean that many of the fixed monitoring points suggested by Mr Law may become obsolete and an unnecessary expense. They believed that monitoring points should be established through the SMP process, as that would allow critical issues and strategic points that require monitoring to be identified.

284 This matter was also discussed in the first joint statement. There, all experts agreed that it was appropriate to assess the need for, and appropriate limit of a volume target through the SMP process<sup>21</sup>. This is addressed in Schedule 2(s) as follows:

*"Identification of key locations in addition to those identified in Schedule 10 where modelled assessments of water levels and/or volumes shall be made for the critical 2% AEP event and any other relevant return interval. For each additional key location, appropriate water level reductions or tolerances for*

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<sup>21</sup> First Joint Statement at para 19)c)

*increases shall be set according to the SMP objective and shall be reported with the model update results required under Condition 55."*

- 285 We agree with Mr Law that there are likely to be benefits in having additional reporting locations, and that the locations suggested by him are reasonable. However, our major concern at adding additional reporting locations into Schedule 10 at this stage is that for each location, a target must be set. While Mr Law suggested that a 0mm increase would be an appropriate starting point, this is unlikely to be appropriate in every location, and we do not have the information required to identify those targets now.
- 286 We therefore accept, as a general proposition, that a better process would be to identify both the appropriate locations, and the target for each location, through the SMP process as proposed in the joint witness statement.
- 287 We note all of the stormwater experts agreed to this approach. The issue of whether the setting of water level reductions or tolerances at additional locations could potentially lead to increased effects was discussed at the reconvened hearing. We understand that the risk of that would be avoided provided the levels in Schedule 10 are retained.

Measurement of performance against the 20% AEP (1 in 5 year event) as well as the 2% AEP (1 in 50 year event)

- 288 Mr Law considered that measuring performance against only one design event means that increases to flooding depth, extent and hazard in other magnitude events may occur but with no ability of CRC to trigger remedial action under the consent. This could particularly be an issue in more frequent flood events, such as up to the 1 in 5 year event. The evidence we received from submitters in the Styx catchment made it clear that this was a particular issue, with significant flooding occurring in the 2013 flood, which was reported to be a 1 in 8 year event. Mr Law acknowledged that reporting performance against multiple flood return interval events would be onerous, but considered that two design events were appropriate: the proposed 2% AEP (1 in 50 year event), and the 20% AEP (1 in 5 year event).
- 289 Mr Potts, an environmental engineer appearing on behalf of the Rodrigues in relation to the Styx River, supported this view. The issue was also raised by the Halswell River Rating District Liaison Committee submission, in relation to flooding at 2 to 5 year return period events.
- 290 Mr Parsons' view was that applicant has statutory duties under the Christchurch District Drainage Act and Land Drainage Act to manage nuisances that arise

through management of its stormwater network, and considered that many of the issues arising from smaller flood events could be dealt with outside the consent. More frequent events not classified as a nuisance could be identified and addressed as part of the SMP review process. Mr Harrington also noted the 'public surveillance system' whereby the applicant is informed very quickly if water levels are rising.

- 291 This matter was subsequently addressed by the joint witness statement. The experts did not agree on the need to report on performance in these smaller, more frequent events, and if reporting was to occur, what size event would be reported. However, Mr Harrington and Mr Parsons both acknowledged that additional reporting may be required.
- 292 Mr Harrington's view was that 1 in 5 year target levels should be set if there are critical issues within the catchment which need to be managed during these events. However, in some cases, a 1 in 10 year event target (or some other return interval) might be more relevant than a 1 in 5 year event target. It would be necessary to review the issues that arise and identify appropriate targets at specific locations, and this would be best done through the SMP process. In residential areas, stormwater infrastructure is designed to manage events up to a 1 in 5 year event, so flooding would not generally occur unless there was a blockage. Mr Law and Mr Potts noted that not all parts of the city are served with stormwater networks, or ones capable of containing 1 in 5 year event flows. This can result in nuisance flooding in events less than the 1 in 10 year event (for example the 2013 flooding at Brooklands).
- 293 Ultimately, all experts agreed to the proposed Condition 2(s), matters to be included in the SMPs, which states that: 'modelled assessments of water levels ... shall be made for the critical 2% AEP event and any other relevant return interval.' This is now incorporated as Schedule 2(s).
- 294 In our view, if there is no monitoring target in Schedule 10 for more frequent events, CRC is powerless to ensure that unacceptable flooding in these events does not occur. Trusting the applicant to act only when they get complaints, as initially suggested by Mr Parsons and Mr Harrington, is not certain enough and not will give comfort to submitters, based on their past experiences as described to us. However, it is our view, based on evidence in relation to the Styx catchment, that for that catchment an additional target is appropriate.
- 295 We also agree that it is generally appropriate that the need for additional reporting of more frequent events, and the appropriate target for those events, is best determined through the SMP process. As before, we do not have the

information required to make that determination now. This is discussed later in this decision.

296 We therefore agree with the proposed condition which is now Schedule 2(s).

How are allowable increases in water level set and is the baseline year appropriate?

297 Mr Law's concern in this regard was the lack of information on how the allowable increases in water level in Schedule 10 had been set, and so how appropriate they were. The use of different baseline years in Schedule 10 caused confusion and a lack of credibility. In addition, Schedule 10 did not provide the reference design flood levels that will be used to test future performance.

298 The same issue was raised by Mr Potts. The baseline year for the Styx is 2012. This is post the earthquakes and some significant development, so includes both the changes made to the catchment by the earthquake and the effects of development. Therefore, the water level above which the additional allowable flood depth (100mm) is measured is significantly greater than historical water level, and so far greater than what was previously experienced by residents in the catchment. In his view this was not appropriate.

299 The baseline years selected for the four catchments range from 1991 to 2016, and the reasons for these were outlined in the joint witness statement. For example, the baseline year in the Heathcote catchment is 1991 as it was based on 1991 flood predictions. This predates significant development in the catchment. The baseline year for the Halswell is 2016, which arbitrarily refers to the date of notification of this consent application.

300 Mr Harrington, in the joint witness statement, clarified that the baseline year is used in the models to define the state of urbanisation in the catchment, for comparison with the extent of urbanisation in future years. This, and changes in the stormwater system to manage the effects of the urbanisation (eg. a new detention pond), are the only variables altered in the model when it is used to assess compliance with target levels. So, for example, if the model is being run in 2024 compared to a baseline year of 2016, the 2024 topography is used for both years, so that only the changes resulting from, and in response to, urbanisation since 2016 are considered.

301 Having different baseline years in different catchments does not change the principle of setting an 'acceptable' level of flooding above a known starting point. A different baseline year would simply mean there may be a change to the target level.

- 302 The experts agreed that the baseline years set in Schedule 10 are appropriate. They also agreed that modelling is the appropriate way to test flood water level changes resulting from urbanisation, as it allows these effects to be isolated from other variables. They highlighted that it needs to be very clear which model inputs are modified when the modelling is carried out and which remain constant. We note that Section 4.3 of the EMP requires that significant changes to model parameters are reported on.
- 303 They also agreed that including design water levels in Schedule 10, as initially proposed by Mr Law, could be problematic, if the model updates result in changes to baseline flood levels. They did not reach agreement on whether the proposed allowable increase of 100mm for the Styx catchment was acceptable.
- 304 We accept the experts' view that the baseline years chosen are acceptable. We are satisfied that the critical matter is the allowable increase from the baseline year, rather than the baseline year itself. A different baseline year would mean a change to the allowable increase. The baseline years in Schedule 10 were chosen for reasons of practicality in terms of when investigations were undertaken or which flood predictions were used. As discussed later in relation to the Styx catchment, the submitters' criticism of the use of a post-earthquake baseline year in the Styx catchment appears primarily to be one of perception. Post-earthquake river and groundwater levels are higher than pre-earthquake levels (in relation to the ground level), so additional flooding on top of this is hard for submitters to accept. However, the critical matter is the appropriateness of the proposed target of 100mm. We consider this further in our discussion on the Styx River, below.

#### Need for a flood volume limit

- 305 Mr Law noted in his evidence that the Styx, Halswell and Otukaikino catchments were all sensitive to flood volume as well as flood level and recommended including limits on flood volume in Schedule 7. The matter was also raised in a memorandum from Jolene Irvine, CRC Engineering Planning Advisor, and Matthew Surman, CRC Asset Management Engineer, appended to Mr Law's evidence, in relation to the Halswell catchment. CRC manages that Rating District and the CRC engineering section gives advice to the Rating District Liaison Committee.
- 306 The authors highlighted the sensitivity of the Halswell catchment to the cumulative effects of multiple discharges, in terms of flood volume, as well as flood depth. Future development has the potential to increase peak flows and volumes in drains, and to increase land drainage base flows. Ms Irvine and Mr

Surman noted that while the proposed full flood attenuation standard for the Haswell (0mm increase in water level in a 1 in 50 year flood) avoids increasing peak flows in the critical storm event, the cumulative effects of the increased volume, and the cumulative discharge over multiple events, are not considered in detail in the application. They considered as a result that a decrease in performance and/or an increase in maintenance costs could be expected for the scheme over time.

- 307 The memorandum included details of rainfall events and drainage times in the catchment, showing that drainage of productive land in some sub-catchments can take between 10 to 20 days for single events and longer for multiple events. These durations are sufficiently long to kill pasture. They estimated that an additional baseflow of 100 l/s would cause an average increase in ponding duration of 11 hours, which would cause additional pasture die off.
- 308 The memorandum made a number of recommendations, including identifying additional flood targets for the catchment. A target of no more than a 30mm increase in water depth, for a maximum of 2 hours, above the 4.8m level at Ryans Bridge, was proposed. While not a volumetric limit, this goes further than a simple level increase and would go some way to limiting the volume of discharge. The memorandum noted that the effects of this target could not be quantified until the hydraulic model for the catchment being prepared by CRC is operational, but would set an initial target until a review could be undertaken.
- 309 This issue was discussed in the joint statement of water quantity experts. Mr Harrington opposed the suggestion of including water volume limits in Schedule 10, as water levels and flood volumes are related (volume is a level over a given area), but it is the level, rather than the volume, that is generally critical for the community. Water levels are easy to record and understand. Conversely, a volume is not easily observable or meaningful. While a flood volume could be calculated by modelling, identifying appropriate volumetric limits would require significant investigation and need to be undertaken as part of the SMP review process.
- 310 Mr Potts also considered that volume was important to understand in certain locations, including the lower Styx catchment where ponding occurs in areas separated from the river by higher ground, and where ponding duration is an issue for residents. The effect of controlling volume would be to control the quantity of flood water overtopping the riverbanks and the subsequent flood extent and duration of flooding. However, he accepted that it would be difficult to quantify in real time.

- 311 The experts agreed that flood volume is most relevant in the Halswell and Styx catchments, but less so in the Avon and Heathcote, and it would be possible to identify a reporting location for the Halswell catchment outside the applicant's boundary.
- 312 Mr Harrington proposed another change to Schedule 2(s), matters to be included in the SMPs, to read:
- 'identification of key locations ... where modelled assessments of water levels and/or volumes shall be made...'*
- This was agreed to by the experts.
- 313 We agree that the need for a volume target, and what that target should be, is best assessed through the SMPs process. We would expect, based on the evidence we have heard, that a volume limit will be set for the Styx and Halswell catchments. We have considered whether setting an interim volumetric limit, for example no increase in volume, or a limit similar to that proposed by Ms Irvine and Mr Surman for the Halswell catchment, is appropriate, but have decided that there is insufficient justification for either limit at the present time. Further work is needed to identify what the appropriate limit should be. We therefore agree with the proposed change to Schedule 2(s) and consider that this will improve flood mitigation in these catchments.

Need for receiving environment objective in Schedule 10

- 314 Mr Reuther proposed that a Receiving Environment Objective to be included in Schedule 10 that reflects Policy 4.17, as follows:
- 'Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety'*
- 315 Mr Harrington argued that it would be difficult to comply with such an objective, as some of the targets in Schedule 10 allow for an increase in flood depth. In addition, erosion is always a risk in hill catchments. His preference was for such a statement to be a guide, rather than a fixed objective.
- 316 Mr Reuther acknowledged the difficulty of compliance with the objective. He noted that Condition 23 as worded does not explicitly require the applicant to meet the Schedule 7 attribute target levels or use them as a trigger for further mitigation. In the absence of a clear objective in Schedule 7, it is uncertain what is required to achieve compliance with Condition 23 and how the condition can be enforced.



317 Condition 23 (as originally proposed) was worded as follows:

*‘The consent holder shall use all reasonable endeavours to mitigate the effects of the discharge of stormwater on water quantity. The extent of mitigation of effects shall be measured by the Receiving Environment Objectives and Attribute Target Levels monitoring described in Schedule 7.’*

318 As an alternative to including an objective, Mr Reuther proposed amending the wording of Condition 23 such that it requires the effects of the stormwater discharges on water quantity to be minimised to an acceptable level. The acceptable level would be identified through the SMP process and described in Schedule 10. In his view, this would ensure the proposal would not be inconsistent with Policy 4.17.

319 We prefer that Schedule 10 contains as objective. Mr Pizzey, in his submissions in reply, proposed the following objective:

*“To mitigate for the risk of inundation, damage to downstream property or infrastructure or human safety through management of stormwater run-off volumes and peak flows. The degree of mitigation will be measured against the attribute target levels for each receiving environment.”*

320 In our view, this is not a clear objective, being more closely aligned with policy wording. An objective should state the target to be reached. We therefore prefer an amended version of Mr Reuther’s proposed objective, which is:

*‘Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety above an acceptable level, determined by the attribute target level for each catchment.’*

321 We also note Conditions 57-58, which detail responses to flood monitoring. These require that where the attribute target levels are not met, an assessment is made as to the reasons for this and whether best practicable options to mitigate the adverse effects of flooding have been carried out.

322 We consider, with some minor amendments, these changes appropriate.

#### Flooding in the Styx catchment

323 Submissions and evidence were received from a large number of submitters, outlining a long history of concerns and dissatisfaction with water management within the Styx catchment, particularly since the earthquakes in 2010-11.

324 The catchment is managed using the ‘partial detention’ strategy, with new developments having a first flush basin and wetland. This requires that the

initial 25mm of rainfall is treated, with additional storage provided by back-up flooding to 500mm depth over wetlands. The SMP explains that this option was chosen as it requires over 15 ha less total footprint of detention facilities compared to 'standard detention' (detention of additional run-off for storms up to the 2% AEP), 'without increasing flood damage significantly'. Mr Norton and Mr Harrington explained that in larger storm events, water would flood across the flood ponding area in the lower catchment, raising water levels by up to 100mm. As the lower catchment is wide and flat, it is able to absorb a significant additional flow with only a small increase in water level.

- 325 Mr Harrington also explained that the model used to calculate water levels in the catchment overstates the likely water depth in the downstream floodplain due to a difference in land assumed area to be developed in the model and the land actually zoned (and therefore able to be developed) in the District Plan. This provides a margin of error in the estimated flood depths.
- 326 The submissions and evidence built up a picture of the existing state of the catchment and the effect of flooding events, particularly since 2011. Detailed submissions and evidence from Penny Hargreaves, Jan Burney and Gary Sharlick, Barry Robertson (speaking on behalf of a number of submitters), Raymond and Pauline McGuigan, Susan McLaughlin, the Snook Family Trust and the Rodrigues were very helpful in this regard, particularly the many photos of the catchment. The evidence on the state of the catchment at the present time was not disputed by the applicant's witnesses. We do note however, that parts of the evidence strayed beyond the scope of this consent and we have disregarded any evidence of this kind. We also acknowledge the strength of feeling about the flooding issues and the lack of trust that has arisen between local residents and the applicant over flooding issues in the catchment in recent years.
- 327 The catchment has been subject to extensive development at its upstream end, but is largely rural at the downstream end. Parts of the lower catchment were red zoned following the earthquakes, but a number of houses both within and outside the red zone continue to be occupied. We were advised by Ms Burney that there are approximately 50 houses still occupied in the Brooklands area.
- 328 Ms Hargreaves and Mr Robertson described the change in the river environment from approximately 1998, from a clear, shingle based river to deep mud. Ms Hargreaves noted that the river did not previously flood. Graphs provided by both Mr Harrington and Mrs McGuigan from the Radcliffe Road monitoring site showed consistent water flows from 1992 to the present time, but a gradual increase in water level across the same period.

- 329 The higher river levels cause frequent and prolonged flooding of some areas, including facilities at the Janet Stewart Reserve. Ms Hargreaves described how high water levels meant that drains flowing into the river can't empty, causing water to back up. This was exacerbated by streams and drains containing land drainage water from the subdivisions. High water levels in drains had caused part of Marshlands Road to collapse. Stagnant water caused unpleasant smells and a problem with mosquitoes. The lack of drainage also caused problems for farmers. Flooding had occurred around the base of the Radio Network tower.
- 330 The changes in the river were generally blamed by submitters on subdivision works in the upper catchment, causing large quantities of silt to enter the river, together with a lack of maintenance. This had been exacerbated by significant earthquake damage to the river, including cracks in river banks and narrowing of the river channel. An increase in willow growth further narrowed the channel and trapped sediment. High weed growth now occurred and this trapped further sediment. This had led to a significant reduction in channel capacity. Ecological plantings in the river had prevented the sediment being cleared in some areas and some damaged banks had not been repaired. The high sediment levels also affected the instream environment, including fish habitat. Sediment continued to enter the river from the northern motorway works.
- 331 We also heard considerable information about flooding in the lower catchment during 2013 in particular, but also in other years. Ms Hargreaves stated that during the significant flood in June 2013, categorised as a 1 in 8 year flood, water backed up from the river mouth as far as the Prestons subdivision, causing the river to breach.
- 332 Several submitters noted a recent (late 2018) notable drop in water levels in the lower river, following a long period of high water levels. Various theories were provided as to the cause, including one from Ms Hargreaves, who described a conversation with a weed cutter who had removed a 'mud plug' in the river while weed cutting near Brooklands, resulting in a sudden drop in water levels, leaving the weed cutter boat dry.
- 333 Several submitters mentioned the Styx River Working Party, which had discussed matters relating to the management of the Styx River over the last two years. They highlighted their frustration in what they saw as a lack of information provided by the applicant and the lack of opportunity for community involvement and representation in addressing the ongoing issues in the catchment.

- 334 Submissions and evidence from Antonio and Kerrie Rodrigues and the Snook Family Trust focussed on the Brooklands area, particularly the area of Lower Styx Road and Earlham Road, where both Ms Snook and the Rodrigues live.
- 335 Ms Snook, representing the Snook Family Trust, noted that in recent years the area had been re-classified from a flood management area to a flood ponding area. With a 3,000m<sup>2</sup> section, the family considered the house to be residential and to have insufficient land to mitigate flooding. She considered the river had no capacity for additional flow and the flooding allowed under the consent (up to an additional 100mm depth) would flood her land and reduce safety. She requested that further work was undertaken to increase the capacity of the river channel, remediate earthquake damage and increase the priority of addressing flooding issues.
- 336 Mr and Mrs Rodrigues own the properties at 3, 5, 7, 9 and 11 Earlham Street. They outlined the significant changes that had occurred in the area since the earthquakes, including damage to the land and significant deposition of fill on CERA and neighbouring land, which had filled in a drain and cut off secondary flow paths. There was also fill from the construction of dwellings on adjoining properties. These changes meant that their property was now sitting in a basin surrounded by higher land, so that when flooding occurred water could not drain away. They were concerned that flood events would worsen as a result of stormwater management and climate change effects.
- 337 The Rodrigues described that since the earthquakes the property had been repeatedly flooded and ponding occurred for months during winter. Water surrounding and sitting under the house after flood events caused mould, damp, odour, problems with vermin, mosquitoes and affected access to the house. This had understandably caused health effects and significant stress. They considered that no further stormwater should be discharged into the Styx River.
- 338 Both Ms Snook and Mrs Rodrigues described the Styx River flooding across Lower Styx Road at Earlham Street. This had occurred in June 2013, June 2014, April 2017 and July 2017. Ms Snook provided cross sections of the river at this location showing the river bank to be higher on the rural side than on the road side, meaning flooding occurred towards the road and houses.
- 339 Mr Robert Potts, an environmental engineer, appeared on behalf of the Rodrigues. He noted that some of the Rodrigues' observations and photos of flooding across Lower Styx Road were at odds with data held by the applicant,

as flooding in 2 to 10 year return period events should not flood across the road due to the road level being higher than the river levels.

- 340 He acknowledged the applicant's position that as additional flood detention and wetlands were constructed upstream, the situation at Lower Styx Road in the smaller flood events would improve. However, large floods are predicted to result in an 800mm flood depth on the property with 400-600mm at the house site. If an extra 100mm water depth +/- 20% was allowed as (originally) proposed, that would extend the period of inundation at the property and bring the water levels close to hazard level (1,000mm water depth).
- 341 Mr Potts acknowledged there is an existing flood nuisance at the property due to high groundwater levels and predicted sea level rise, but that this should not be exacerbated by allowing additional flooding. The filling that had occurred in the Flood Ponding Area meant that this land could no longer be relied on as a ponding area. The fill had altered overland flow paths and water could no longer drain to the north. Localised rainfall, unable to drain away due to the elevated groundwater levels, would also contribute to water ponding in the area. Best practice would be to manage future development to be neutral with regards to downstream flooding, rather than using the partial detention approach. Alternatively, if the area is to be managed as a flood ponding area, then mitigation should be put in place or the dwellings abandoned.
- 342 In addition, he considered that management of weed growth and sediment deposition in the river was being relied on to maintain channel depth and manage flood effects, and therefore should be part of the consent conditions.
- 343 Mr Potts considered that LWRP Policy 4.17 would not be met with the partial detention proposal for the catchment. He emphasised that the existing land pattern, following earthquake damage and fill, together with high groundwater levels and incursion of water from Brooklands Lagoon, together form the existing environment. The impact of the discharges needed to be assessed against this. Any exacerbation of flooding or prolonged elevated river levels due to upstream development is within the scope of the application and should be avoided. He also noted that increased water levels in drains (as described by other submitters) will consequently raise groundwater levels as these are related.

#### Weed growth

- 344 The applicant's evidence was that the primary reason for high water levels in the Styx River and flooding at relatively small flood events, was due to weed levels in the river, which could raise water levels by 0.8 to 1m.

- 345 This matter was considered at some length by the water quantity experts, through the joint witness statement, who concluded that the inaccuracy in the model was most likely due to high weed growth at the time, an annual event. This conclusion was based on the seasonal nature of water levels within the lower Styx, which tend to be higher in the summer/ autumn and lower in the winter / spring. Flows do not show the same seasonal variation, and weed growth (which was agreed by all parties to occur) is the obvious explanation for the level changes.
- 346 We note that several submitters did not agree that weed is the main cause, considering that the changes to channel capacity discussed earlier were a significant cause. Ms Snook highlighted that water levels do not always respond to the weed cutting. In response Mr Harrington noted the very rapid rate of weed growth and the time taken to cut the whole river (several weeks), meaning that weed may be growing back almost as fast as it is cut.
- 347 In the water quantity experts' joint statement, it was explained that the Styx River model is calibrated against the 2008 1 in 10 year rainfall event, therefore the modelling results assumes a similar amount of weed will be present to that in 2008.
- 348 Weed harvesting is undertaken, but weed growth to an extent that causes increased river levels still occurs. This means that storm events at a time of high weed growth will result in higher water levels than predicted by the model. Mr Parson's undertook sensitivity analysis of the model to the bed roughness value (in effect the amount of weed present). This showed that where high roughness is assumed (equivalent to a heavily overgrown channel), a 1 in 10 year rain event resulted in water levels exceeding modelled results by up to 300mm, and exceeding the calibrated 1 in 50 year event in the mid reaches of the river, between Earlham Street and Redwood Springs. This matches the observations of the June 2013 flood event.
- 349 In areas where the river banks overtop in the 1 in 10 year storm event, the depth of flooding will be affected by the amount of weed. If more weed is present than assumed in the model then deeper flooding, and flooding over a greater area than predicted, may result.
- 350 Given the importance of weed growth, the applicant proposes to investigate the best way of managing this, and determine the most appropriate approach to including the variable growth in the model. This work is outlined in Schedule 4 (r) – (x) and must be completed within four years of the commencement of the

consent. We note that the next SMP review is due to be completed by 30 June 2023.

- 351 In addition, until this work is complete, the applicant has included a trigger of 10.1m water level depth at the Lower Styx monitoring site, at which point weed cutting in the river will be prioritised and will begin no later than 40 days after that trigger is reached.

#### Ponding of water

- 352 A major concern relating to the Rodrigues' situation was the extended ponding of water on their land. We received evidence on this matter in the experts' first joint statement. There is no constructed stormwater network at this location, and water drainage relies on soakage to the ground and overland flow across 930 Lower Styx Road to Barkers Drain, which discharges into Brooklands Lagoon. The drain is flat, low lying, tidally influenced and poorly defined in part, giving limited capacity. Aerial laser survey data (LIDAR images) were presented showing the changes in land elevation between 2003 and 2015. These show a lowering of land of approximately 250mm following the earthquakes. The images show changes to the head of Barkers Drain near the Rodrigues property, including realignment and partial filling, and the creation of a building platform to the north of the Rodrigues property. The 2015 image shows that the overland flow path from the Rodrigues' property has raised, presumably as a result of filling.
- 353 Drainage of the Rodrigues' property appears to be impeded by the land surface changes on 930 Lower Styx Road. These could result in ponding on both 930 Lower Styx Road and the Rodrigues property, up to 250mm. Ponding may also be exacerbated by increased run-off from impermeable surfaces associated with the new buildings on 930 Lower Styx Road, as water cannot soak away when groundwater levels are high.
- 354 They did not consider that flooding from Brooklands Lagoon or the Styx River would be materially impacted by the filling given the location of the fill relative to the flood source. We take this to mean that the filling wouldn't affect where floodwaters go and how deep they are, rather that it just affects the fact that the water can't drain away.
- 355 The experts noted that prior to the earthquakes, ponded water would have dissipated fairly quickly through the sandy soils, but elevated groundwater levels relative to the ground surface following the earthquake has reduced this. While the earthquakes caused an initial lowering in levels, this has now returned to pre-earthquake levels. However, the ground lowering of 200 – 300 mm mean

that levels appear higher than previously and will cause surface ponding more frequently and for longer periods.

356 Barkers Drain can only remove surface water from the area. Restoration of groundwater levels to pre-earthquake levels relative to the ground surface would require a pumped drainage system. This would not provide flood protection, but would reduce long term surface ponding. Mr Pizzey advised that the applicant had begun an enforcement investigation into the filling at Brooklands, and that this enforcement action was beyond the scope of our decision.

357 The experts also agreed that the situation could be improved by constructing a channel through the filled area to Barkers Drain. They recommended that the applicant instigates the restoration of the natural flow pattern using such a channel.

358 Neither Ms Snook nor the Rodrigues agreed that reinstatement of Barkers Drain was an appropriate solution, as it may exacerbate flooding issues by allowing water to flow from Brooklands Lagoon. They sought a more extensive upgrade of the drainage system, with the Rodrigues identifying a need for stop banks, pump stations and house lifting.

359 They also noted that the 2015 LIDAR image does not show fill since this date, and most of the North East Lower Styx Ponding Areas has been filled.

360 The second joint witness statement further addressed the issue of filling. The experts agreed that the filling at Earlham Street would have an immeasurably small effect on flood levels generally, as a very small percentage of the floodplain is affected. However, reinstatement of floodplain storage in the local area and reinstatement of Barkers Drain would reduce the duration of ponding on the Rodrigues property.

361 We understand the experts also agreed that sustained high groundwater levels in the Earlham Street area are not related to urbanisation effects upstream, but to local rainfall recharge. Reinstatement of Barkers Drain is unlikely to notably lower groundwater levels but rather facilitate the faster drainage of water on the land surface.

362 We have summarised the issues that arise from the evidence as follows:

- (a) whether more stormwater should be discharged into the catchment;
- (b) the appropriateness of the partial detention strategy, and if so, whether the attribute target level of 100 mm is appropriate; and
- (c) the impact of the filling in the Brooklands area.



Should additional stormwater be discharged into the catchment?

363 Some submitters sought that no additional stormwater is discharged into the Styx River. We think it is unrealistic to expect that no more stormwater will, or should be discharged. Christchurch is growing and additional development will occur. It is however important that any stormwater is discharged in an appropriate manner to avoid or minimise adverse effects. What we consider to be appropriate is discussed below. Arguably this has not always occurred in the past. It is also important that CRC can monitor and enforce compliance with targets.

Is the partial detention strategy appropriate for the Styx catchment, and if so, is the target of 100mm acceptable?

364 A partial detention strategy for future development allows some additional flooding to occur within the catchment in higher rainfall events. That is not to say that flooding would not occur with existing development - it would, but the depth of flooding will be increased as a result of the additional development. The applicant's rationale for using a partial detention strategy, as explained in Part B of the Styx SMP, is that it requires 15ha of detention facilities less than the 'standard detention' strategy, which is full attenuation of additional run-off up to the 1 in 50 year event. The cost saving to the applicant (and ultimately the developers and/or ratepayers) is \$29M. This must be balanced against the cost and inconvenience to residents and landowners in the area from the additional flooding.

365 Most of the evidence we received on flood effects was in relation to the 1 in 50 year event. In a rainfall event of this magnitude, with the partial detention option, flooding to depths of up to 1m will occur across the lower Styx floodplain. Of this, between 80 and 110 mm will be due to additional development (that is development since 2012 which is the baseline year in the model and future development allowed for under the city's zoning rules). A significant proportion of the catchment is rural. While much of the area has been red zoned, a number of residents still live in the area.

366 Mr Potts noted that full attenuation of up to a 1 in 50 year flood was already required in the catchment for some developments, such as the Prestons development. His view was that it was not unreasonable to expect this of all new developments. We do not require this, but consider that some additional attenuation is appropriate.

367 Having considered the additional impact of development in the catchment, we consider that the approach taken by the applicant of allowing an increase in

flood depth in a 1 in 50 year event is not unreasonable. This is a significant and very infrequent event. The lower catchment is low lying, has been identified as a Flood Ponding Area in the District Plan, and will flood in an event of this size even without further development. The impact on the residents of a relatively small additional depth of flooding across predominantly rural land at such an infrequent event is, in our view, outweighed by the significant cost saving of taking a partial detention approach. We have also taken into account that the modelled flood depths are conservative, due to part of the upper catchment being included in the model but not zoned for residential development and that sea level rise over the term of the consent is likely, in Mr Parsons' words, to be 'modest' (from which we assume less than the 0.5m allowed for).

368 However, in our view it is critical that the increase in flood depth does not result in any increase in above-floor flooding in any residential property. We do not think it reasonable that any residence should be subject to increased flooding in this scenario. We have therefore amended Schedule 10 such that modelled flood levels for the 1 in 50 year flood event shall not result in any increase in above floor level flooding in any residential dwelling existing at the date of commencement of this consent. In our view, this approach is more consistent with Policy 4.17:

*'stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety.'*

369 We are more concerned about the impact of more frequent rain events, which have far more potential to cause a nuisance to residents, both because of their increased frequency and due to the high groundwater levels and flat contour, resulting in water ponding for long periods.

370 Mr Harrington explained that in rain events up to the 1 in 5 year event, river levels were reduced, due to upstream detention. These events are not an issue. Our concern is with events up to the 1 in 10 year event.

371 The applicant provided maps showing flood depths for the 1 in 10 year rainfall event with existing development and with maximum probable development. These show some flooding with existing development of rural land and residential-scale properties along Lower Styx Road north of Earlham Street. We do not know how many of these properties are still lived in. The Maximum Probable Development map, which also includes an additional 0.5m sea level rise and 16% increased rainfall intensity, as with other modelling, shows significantly more flooding of rural land, and a slight increase in flooding of the

residential-scale properties. Mr Pizzey advised that in this scenario flooding also occurs from the Brooklands Lagoon.

- 372 We note that a number of submitters commented that the maps were inaccurate as they are based on old (2011) LIDAR information (pre-land filling) and also do not reflect that flooding experienced in the 2013 flood (a 1 in 8 year event). In relation to the first point, we note our discussion earlier that the model (including the land surface data) must be updated prior to each compliance modelling run and so up-to-date LIDAR information will need to be used at that stage. In relation to the second point, it has been established that the 2013 flood event was at a time of high weed and the current model does not accurately reflect this. It is therefore to be expected that the flood depths do not reflect that experience. This is discussed further below.
- 373 In our view it is appropriate that there is no additional flooding of the lower catchment at this time as a result of additional development up to the 1 in 10 year event.
- 374 We acknowledge the water quality experts agreed that additional targets, brackets and other matter(s) should be set through the SMP process. We agree with that approach. However, in the Lower Styx catchment there are significant issues which were the subject of detailed evidence from the submitters. There are further investigations proposed into how they can be addressed. The SMP is to be reviewed by 2023 and the issue of appropriate return events and target levels will be addressed as part of that review. Given the sensitivity of this environment to the discharge of additional stormwater, the experiences of the submitters (particularly the 2013 flooding), we consider the appropriate resource management response is to set an attribute target level now for the 1 in 10 year event. We consider there should be no increase in the river level as a result of increased stormwater pending the review. We have amended Schedule 10 accordingly. If the SMP review identifies alternative target levels or return periods, the applicant may seek to vary Schedule 10.
- 375 We acknowledge that this will result in some additional cost to the applicant and/or developers to develop additional detention upstream. We have no evidence on what that cost might be, but, presume it would be less than the cost of providing full attenuation for a 1 in 50 year flood event. In any event we consider the costs in terms of effects on residents of increased flooding in a 1 in 10 year event are not acceptable.
- 376 It is also important to note that the target depths are meaningless if the model does not reflect the state of the river and catchment. All experts agreed that

this was important (noting that all models are inaccurate to some extent). The accuracy of the model was of some concern to us during the hearing, given the extent of flooding described in the 2013, 1 in 8 year event.

377 As described earlier, the applicant proposes to investigate weed management in the river, and in the interim has set a trigger water level that will be used to prioritise weed cutting in the river.

378 To address other potential issues with the model, such as changes in cross sections of ground surface, we were reassured by the explanation that the model will be updated as appropriate to take account of any such changes in the catchment that could affect the model accuracy (the so-called 'non variant factors' in Schedule 10) prior to each model run being undertaken, at five yearly intervals.

#### Poor drainage / the impact of the fill In the Brooklands area

379 We accept the joint witnesses' view that the filling that has occurred will have a small effect on storage within the floodplain generally. However, it clearly has a significant impact locally, particularly through removal of secondary flow paths. We also accept that high groundwater levels in the area are not due to stormwater discharge, but to local rainfall recharge, exacerbated by tidal influences. However, due to these factors, any water that does flood into the area from the Styx River as a result of upstream stormwater discharge, will lie on the ground for long periods. The height of the road to the West, and loss of drainage channels / flowpaths to the North and East, means the water has nowhere to go. This is the environment into which this water is discharged. With the changes we have made to conditions, in particular, requiring no increase in flooding in the 1 in 10 year flood, and reassurance that weed will be more effectively managed in future, we consider the nuisance effects resulting from additional development in these smaller flood events will be minimal or non-existent. As discussed earlier, in larger floods, there will be effects, but these will be infrequent and the flooding resulting from additional development will be a small proportion of the flooding that is predicted to occur in these events.

#### Other Matters

380 A number of other specific matters were raised by submitters. These include:

(a) that the lower Styx catchment had not been prioritised for stormwater management under the LDRP. The applicant should prioritise recovery work based on the growth rate in the catchment as a whole, not the population in a particular area;

- (b) the need for ongoing maintenance of wetlands, other stormwater detention mechanisms and the network, to ensure they continue to operate as designed; and
- (c) the need to consider alternatives, including piping water directly into the Waimakariri or Brooklands lagoon;

381 In response to these, the prioritisation of works under the LDRP is a matter for the applicant. It is not appropriate for us to comment on this in relation to this consent application.

382 We agree that there is a need for appropriate ongoing maintenance of the stormwater facilities and devices, and the network. Mr Harrington advised that regular maintenance of wetlands required for stormwater quality purposes would address any issues that might affect stormwater detention. Should detention basins require sediment removal, it is likely to be picked up through normal maintenance programmes.

383 Mr Pizzey, both throughout the hearing, and in his submissions in reply,<sup>22</sup> went to some lengths to establish that the resolution of concerns in relation to dredging and maintenance of waterways was not within the scope of the application and that any condition in that regard, if not volunteered, would be unreasonable and potentially ultra vires. He submitted that maintenance, dredging and weed clearance is an operational and maintenance power of both the CRC and the applicant under other legislation and that the manner in which the applicant exercises that power is not subject to the application. He submitted that any concerns regarding those matters must be raised and responded to in other forums.

384 We do not agree that the distinction is as clear as Mr Pizzey submits. The state of waterways is not an effect of itself. We consider that, if the state of the waterways cause or exacerbate flooding from stormwater, that is directly connected to an adverse effect of the activity on the environment. We accept that we do not have the jurisdiction, and we do not purport to, to impose obligations on the applicant under the LGA.

385 However, we consider that the degree that the state of river channels, including their banks, is impacting on the ability to accept and convey stormwater without causing or exacerbating flooding should be investigated in the responses to flood modelling addressed in Conditions 57 and 58.

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<sup>22</sup> Submissions in Reply for applicant 8 April 2019 at paras 107-115

386 We heard considerable evidence in relation to changes to the waterways, including obstructions, sedimentation and bank collapse, and the perceived in the Styx catchment in particular. The issue was also identified in the Halswell catchment. Our changes to Conditions 57 and 14 are to facilitate investigation of that issue and, potentially, methods to address.

#### Evaluation

387 Overall, for the reasons addressed in our assessment, we consider, subject to the additional conditions we have identified and discussed above, stormwater quality / flooding issues in the Styx catchment have been appropriately addressed. In terms of considering alternatives, our decision sets out what we consider to be acceptable limits around the stormwater discharge, such as flood levels that must be met. How these are achieved is up to the applicant, and it is for them to consider if alternative solutions, such as discharge directly to the Waimakariri River, is appropriate.

#### Halswell catchment

388 The Halswell River arises in the south-west part of Christchurch City and flows south through the Selwyn District, discharging into Lake Ellesmere. The lake is closed for most of the year and water levels gradually rise, causing flows to back up in the river. The lake is opened at most twice a year, allowing it to drain to the sea. There is a drainage district within the catchment, with properties rated to maintain the drainage system. The Halswell River Rating District Liaison Committee submitted on the application, with Mr Jim Macartney, chairman of the Committee and Ross McFarlane, Committee member representing the upper catchment, speaking to the submission.

389 Mr Macartney and Mr McFarlane explained that the drainage scheme is not a flood control scheme, but, is intended to remove rainwater following 'normal' rainfall. They described how the river and drainage system suffered significant damage during the Christchurch earthquakes.

390 The upper Halswell catchment has seen significant development in recent years. Mr Macartney and Mr McFarlane noted that since the earthquakes, the density of development in the catchment had increased from 10 to 15 houses per hectare. 1,375 homes were built following Plan Change 60. The Committee's concerns were that an increase in both stormwater and land drainage flows (intercepted groundwater from temporary or long term subsurface drainage) compromised land drainage and increased the frequency and duration of flooding. The interception of groundwater increased baseflows

in the drains, reducing channel capacity. Some drains were historically dry, whereas following development they flowed regularly. An increase in built area meant that the land now absorbed less rainfall. Together, these had caused problems such as bank erosion, trees falling into drains, and widening and deepening of creeks, resulting in an increase in drainage maintenance and upgrades. The submitter was concerned that with ongoing development, drain flows and associated maintenance costs would continue to increase.

- 391 Mr Norton explained the operation of the detention ponds in the Longhurst subdivision. Prior to development, a 1 in50 year storm generated in the order of 40,000m<sup>3</sup> of surface water runoff. Post development, 117,000m<sup>3</sup> is generated, 41,000m<sup>3</sup> is released immediately, with the rest being retained and gradually released over four days. The critical flood duration in the catchment is 60 hours, so releasing the water over 96 hours means it is released as flows subside.
- 392 This management approach was not in place in subdivisions prior to 2003. To mitigate these effects, the South-West SMP contains plans for significant retrofitting, so that a proportion of stormwater generated in older subdivisions is also detained. Within the Halswell catchment, 44 hectares of existing urban area is included in retrofitting plans.
- 393 The Halswell River Rating District Liaison Committee was critical of what they considered to be a lack of management of the increased volume of stormwater run-off. Infiltration systems were encouraged but would not operate effectively where there is a high water table. Mr Macartney also noted that the requirement in the previous City Plan for collection of roof rainwater in the catchment (Rule 8.1.38, in the Living G (Halswell West) Zone), to mitigate run-off had not been carried over to the new City Plan.
- 394 Mr Macartney and Mr McFarlane acknowledged that detention basins were a good approach to flood management, but argued that if there were frequent rain events, there was no time for flow from the detention basins to pass down the network before the next event, so they were ineffective.
- 395 The Liaison Committee sought that a percentage of development contributions collected for new developments were spent outside the applicant's boundary, to mitigate effects of the development on land further downstream. Mr Macartney suggested that these funds could pay for retirement of land more severely impacted by flooding, to be used as additional flood detention areas.
- 396 A memorandum from Jolene Irvine, CRC Engineering Planning Advisor, and Matthew Surman, CRC Asset Management Engineer, dated 24 March 2016

was appended to Mr Law's evidence. The memorandum outlined the challenges of providing efficient and economic land drainage in the catchment, given the flat gradient and the ongoing increases in stormwater discharges from developments. It noted that the expected flow increase in the catchment is not quantified in the application. While additional flood detention in the upper catchment would manage peak flow (and so was supported), it would not reduce the total volume of the discharge. A number of mitigation options were suggested for consideration, following the completion of a hydraulic model for the catchment. This model is currently being developed.

- 397 Ms Irvine and Mr Surman made several recommendations, including managing flood volume, which we have discussed earlier. Other recommendations included requiring consultation with the CRC Regional Engineer and the River Liaison Committee during the review of the SMP in the Halswell and Little River Rating Districts, and that conditions provide for review of the consent conditions if there is an increased duration or extent of flooding, reduced drainage, increase drainage maintenance costs or bank erosion resulting from the exercise of the consent.
- 398 In his evidence, Mr Harrington re-iterated that land drainage discharges are not covered by this consent application. He also questioned whether they lead to significant increased flooding in major events. In theory, the drainage brings sub-surface flow to the surface at a point higher in the catchment than would normally occur, but, does not increase it. This may reduce spring flow lower in the catchment, but does not increase the total volume of water flowing through the catchment, and therefore should not increase flooding volumes downstream.
- 399 He also considered that the drained land would absorb more rainfall, as long as the absorption rate was not limited, thereby reducing rainfall run off.
- 400 He noted that similar concerns were raised in the hearing for the South-West stormwater consent, and resulted in additional water level monitoring points being installed. Data from these points will enable an objective assessment of flooding impacts which can be incorporated in to the next SMP.
- 401 We visited the catchment and observed the land drainage flow and stormwater pond discharges immediately downstream of the Longhurst subdivision. We also saw a number of large pines that has collapsed across one of the drains as a result of channel erosion, and the subsidence at Sabys Road. These were all highlighted in the Liaison Committee's evidence.



### Evaluation

- 402 We acknowledge the full attenuation target for this catchment, and agree that this is best practice. We accept that there is a particular issue with the volume of discharge in this catchment, not just the rate, and we have decided earlier that consideration should be given to including a volume target in the SMP when it is reviewed.
- 403 We also accept that land drainage discharges are not managed by this consent. However, they reduce the capacity of the drains into which stormwater will flow and consideration should be given in future subdivisions to managing these discharges more appropriately.
- 404 In response to the Liaison Committee's request that development contributions are used to mitigate effects on land downstream of the catchment, we have no jurisdiction to determine where and how these funds are spent. We encourage the Committee to seek additional funding from both the applicant and CRC through the annual plan process to facilitate this.
- 405 The applicant proposes to review the SMP in 2021 and we consider this appropriate. We agree that consultation with the CRC Regional Engineer and the River Liaison Committee would be beneficial during the review of the SMP and that appropriate review conditions are included, as requested by Ms Irvine and Mr Surman. To that end, we have amended Condition 4 to require this. Condition 63 already provides for review of the consent on the basis of adverse effects which may arise. Overall, we consider the stormwater quantity effects are appropriately addressed.

### Little River

- 406 The Little River Waiwera Community Trust made a submission highlighting flooding issues with Little River, caused in part by inadequate infrastructure. The primary concerns were the need for clear guidance on the various responsibilities of the applicant, CRC and the NZ Transport Agency (**NZTA**) in relation to the infrastructure, and that the necessary remedial works be undertaken.
- 407 Robert Burch, Chairman of the Little River Waiwera Community Trust, appeared and outlined the community's desire for a co-ordinated approach from the applicant, NZTA and landowners, to manage drains on private property. This might include a wetland to manage stormwater discharges, developed in association with Ngāi Tahu and local Rūnanga. Flooding in the area was such that properties could no longer be insured and this was undermining the

sustainability and resilience of the community. Robert Churcher, owner of the local Challenge service station, outlined his experience of damage and business closure from two 'minor' flooding incidences. Existing infrastructure needed to be improved to cope with rain events.

408 The submission also identified issues with wastewater treatment, which are beyond the scope of this hearing.

409 In response, Mr Harrington provided a report by Tim Ayers, the applicant's Area Supervisor Land Drainage (Banks Peninsula), identifying work proposed by the applicant and CRC to remediate some of the issues. Other issues were caused by drains in the area backing up when water levels in the Okana River are too high to allow them to drain, which cannot not easily be resolved.

#### Evaluation

410 The issues raised by the submitters appear to relate to the appropriateness of existing infrastructure, rather than the management of the stormwater discharge per se. The Extra-Over Detention strategy proposed for Banks Peninsula is best practice, but will only manage new developments. There was no indication in the evidence we received that retrofitting additional stormwater detention in Little River is planned although these must be considered when the SMP is developed. The proposed timeframe for the SMP for Banks Peninsula is within three years of the commencement of the consent. While we are encouraged that some work is planned to resolve the existing issues, not all appear to be easily resolved, given the low lying drains which feed into the Okana River. We encourage the applicant to work with the Community Trust, NZTA, the Rūnanga and CRC to resolve the remaining issues.

#### Other Catchments

411 Only one submission was received in relation to water quantity effects in the Avon catchment. The Avon Rowing Club sought to ensure that stormwater is managed onsite to ensure flows are attenuated where suitable to reduce stormwater pressures on the waterway. The submitter noted that while flood flows are not typically an issue for the club, these measures would ensure that the Club's operations are not adversely affected by high rainfall events.

412 The Avon Rowing Club did not appear. No submissions were received in relation to flooding in the other catchments.

413 Schedule 10 has a target level of 50mm maximum increase in flood level at the Gloucester Street Bridge. No concerns were raised in relation to this target.

### Overall Evaluation

- 414 We have addressed the stormwater quantity effects at some length. Such effects are important and impact directly on the community.
- 415 We have carefully considered all of the matters raised by the submitters, and all of the evidence presented. We conclude that, subject to the additional conditions we have incorporated, water quantity effects are appropriately addressed.

### **Groundwater quantity**

- 416 The channelling, detention and subsequent discharge of stormwater elsewhere has the potential to affect groundwater levels both by lowering them in areas where rain is no longer infiltrating into the groundwater, and raising them in localised areas where stormwater is discharged to ground. This can have subsequent effects on stream flows, as groundwater feeding springs and streams may be either reduced or increased. Discharges of stormwater to land generally occur in western part of the city, where groundwater levels are sufficiently lower than the ground surface to enable the discharge.

- 417 Conditions 6(d) and (e) (as revised in February 2019) include as part of the purpose of the SMPs to:

*'provide for discharge of stormwater to land infiltration systems where reasonably practicable so as to demonstrate the means by which the stormwater contribution to groundwater and spring-fed streams will continue';*

and to:

*'demonstrate the means by which Christchurch City Council stormwater infiltration facilities constructed by, or on behalf of, the consent holder, after the commencement of this consent shall be designed, located and operated to avoid, remedy or mitigate adverse effects of groundwater mounding on other land in anything more frequent than the critical 2% Annual Exceedance Probability Event.'*

- 418 Schedule 2(l) requires that SMPs shall include:

*'consideration of any effects of the diversion and discharge of stormwater on baseflow in waterways and springs and details of monitoring that will be undertaken of any waterways and springs that could be affected by stormwater management changes anticipated during the life of the SMP'.*

- 419 The general city conditions for areas not covered by an SMP require the assessment of water quantity effects for any new development.
- 420 There are no specific targets for groundwater quantity in the proposed conditions. Mr Reuther did not consider that specific targets were needed, as the effects of intercepting rainfall on groundwater levels can be modelled and measures to mitigate potential effects implemented at the time of SMP development.
- 421 Mr Etheridge estimated the reduction in baseflow in the spring fed rivers from reduced groundwater recharge, and concluded that significant effects are unlikely. He recommended a condition requiring infiltration basins to be installed wherever technically feasible to do so, and the effects of stormwater interception to be assessed as part of the development of each SMP. Discussion between Mr Etheridge and Mr Callander to address these issues resulted in some changes to the proposed conditions, including mapping spring locations in the SMPs to that the potential effects on these could be considered in stormwater planning (condition 6(j) (now (k) in Schedule 2(l) and Schedule 2(v)), and that SMPs include:
- ‘an assessment of the potential change to the overall water balance for the SMP area arising from the change in pervious area and the stormwater managements proposed’ (condition 6(t) (now (v) in Schedule 2(l) and Schedule 2(v)).’*
- 422 With these changes, Mr Etheridge considered that the effects on groundwater quantity would be acceptable.
- 423 The applicant proposes to monitor groundwater levels across the city on a monthly basis. Changes in spring flow will not be monitored directly, but any reports of changes from CRC or the applicant’s staff, or members of the public, will be investigated. In addition, the applicant will undertake a detailed study of three infiltration basins to assess localised changes in groundwater levels and spring flows.
- 424 Mr Etheridge had initial concerns about the non-targeted nature of the monitoring. Mr Callander’s response was that more detailed monitoring was not justified. The focus of controls should be on good catchment management, rather than monitoring. The main effects of concern are localised ponding around infiltration basins and a good understanding of this should be achieved by the detailed study of three basins described above. Mr Etheridge accepted this point of view.

### Evaluation

425 We are satisfied that the proposed conditions adequately manage the potential impacts on groundwater quantity.

### Cultural Values

#### *The Hearing – Summary of Evidence and Submissions*

426 Rūnanga did not submit on the proposal we are considering. We note that Te Rūnanga Ō Ngāi Tahu and Papatipu Rūnanga had submitted in opposition to the June 2015 application. The s.42A reporting officer, Mr Reuther, in the absence of comments from Nga Rūnanga, was unable to conclude what the effects on cultural values will be, and he considered this an important matter to be resolved at the hearing.<sup>23</sup>

427 In opening, Mr Pizzey submitted that, even without reference to Mr Pauling's evidence (discussed further), there is sufficient evidence to conclude the adverse effect of the proposed activity on Nga Rūnanga is not more than minor. He noted Nga Rūnanga do not oppose the application. He submitted this was significant in the context in which Nga Rūnanga opposed the south-west catchment consent, the Styx catchment consent and opposed the original form of the application when notified. He submitted that reasonable conclusions on adverse effects can be withdrawn by the inference from those facts and the content of the Mahaanui letter to CRC and the deed appended to Mr Adamson's evidence. He submitted that it was reasonable to conclude that Nga Rūnanga does not oppose the application because changes to the application, in the context of the agreement recorded in the deed, mean that the proposed conditions for consent appropriately address their concerns such that the adverse effects are not more than minor.<sup>24</sup>

428 In response to questions, Mr Pizzey confirmed that the referenced letter and deed did not constitute written approval. We agree.

429 Mr Craig Pauling, who is employed by Boffa Miskell Limited as Kararataki Te Hīhiri (Strategic Advisor Maori) provided evidence. That evidence addressed the engagement process with Papatipu Rūnanga, the concerns regarding tangata whenua values information gaps identified by the reporting officer and addressed his involvement in the process.

430 Mr Pauling was involved in the engagement with Papatipu Rūnanga and Mahaanui Kurataiao Ltd (**Mahaanui**) following the lodgement of the original

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<sup>23</sup> S42A Report at para 645

<sup>24</sup> Opening Submissions Mr Pizzey at para 133

Application, and the outcomes of this engagement. He also commented on concerns regarding information gaps in relation to tangata whenua values raised by CRC officers in the s.42A Report.

- 431 Mr Pauling acknowledged that he is not here directly representing Papatipu Rūnanga, but as a consultant for Mahaanui. However he was involved in the management of the overall process, including engagement with Papatipu Rūnanga by Mahaanui, through the Rūnanga Working Focus Group.
- 432 Mr Pauling had considerable involvement in the application, including in the development of the CIA for specific SMPs, he authored the cultural values section of the application overview and for the AEE, he facilitated separate hui prior to the lodging of the 2015 application and assisted the applicant's staff to work with Mahaanui to develop and implement a process for working in partnership with the six Ngāi Tahu and Papatipu Rūnanga within the Council area. He noted a number of specific issues relating to the involvement of Papatipu Rūnanga.
- 433 Mr Pauling considered that the agreement reached was a positive outcome to the engagement and deliberation process. It provided for ongoing relationships that were supported by funding and dedicated kaimahi, and particularly the requirement for working together to determine cultural targets and methods within the EMP. He considered, most importantly, the agreement recognises the mana of Papatipu Rūnanga as a partner with the applicant in the resource management issue of critical importance to them. This provided for potential mana whenua to both inform and improve the future treatment and management of discharges.
- 434 A number of submitters had raised issues in relation to Mahinga Kai. Mr Pauling's evidence was that Mahaanui was the most efficient informal channel for dealing with Mahinga Kai loss.

#### Evaluation

- 435 Our evaluation requires us to have careful regard to the agreements reached between Papatipu Rūnanga and the applicant. They allow for, and indeed provide for, ongoing collaboration on the identification and management of cultural values and traditions important to Ngāi Tahu.
- 436 The engagement process and the commitments made reflect mana to mana relationships between the applicant and the respective Papatipu Rūnanga. We consider the arrangement and the engagement provides an appropriate

mechanism to mitigate the effects on cultural values over a timeframe that is acceptable to Mana Whenua.

- 437 While the agreement does not necessarily deal with all the issues that Papatipu Rūnanga have raised within the CIAs and through the engagement process, including concerns around the uncertainty of effects on catchments where SMPs and CIAs have not yet been undertaken, it has dealt with the majority of these and demonstrates a pragmatic approach by Papatipu Rūnanga to finding solutions to concerns around cultural effects. To this end, it is important to note that no submission was filed by Te Rūnanga o Ngāi Tahu or Papatipu Rūnanga, on the 2018 Application.
- 438 We consider the agreement satisfies a number of key matters raised in the Mahaanui summary on initial engagement; the recommendations of the four CIAs completed to date; and the submission of TRoNT and Papatipu Rūnanga on the original application; as well as matters noted in the s.42A Report from CRC. The agreement provides for:
- (i) The ongoing involvement of Papatipu Rūnanga in stormwater management with the applicant in a structured way, with agreed resourcing and support;
  - (ii) An agreed reduction in the duration of the consent from 35 to 25 years;
  - (iii) Cultural / mana whenua values monitoring to be carried out by Mahaanui on behalf of Papatipu Rūnanga as part of the EMP, including working with the applicant on establishing appropriate objectives and targets for cultural values;
  - (iv) CIAs to be developed as part of all catchment SMPs, as well as the involvement of Papatipu Rūnanga (via Mahaanui) in the implementation of SMPs, including the design and development of stormwater treatment devices and facilities;
  - (v) In relation to the s.42A Report, the agreement provides evidence that Papatipu Rūnanga are satisfied that mana whenua values monitoring approach within the application (as outlined in parts 584-588 & 644-645 of the s.42A Report) by agreeing to work through targets and the finalised monitoring approach with the applicant via a specific resourced advisor. This also includes undertaking the monitoring; and
  - (vi) Ongoing collaboration specified in the proposed consent conditions including agreeing to this collaboration (part 588d); involvement in preparing and reviewing CIAs and determining cultural effects for all catchments over time (part 589); as well as a pragmatic approach to

the Maahanui Iwi Management Plan (**IMP**) policies opposing global consents and direct discharges (part 590).

439 We consider the effects on cultural values have been appropriately addressed.

#### Recreational and Amenity Effects

440 As identified by Mr Reuther, stormwater discharges can result in changes to river flows and poor water quality can impact on recreational use, including water sports and shellfish gathering. This is mostly attributed to microbial contamination (e.g. from faecal coliforms). The issue of effects on amenity and recreational values was raised in the submissions of the Arawa Canoe Club and FK Fraser in particular. These identified concerns around water quality rendering the receiving waters unsuitable for water sports.

441 The AEE addressed this issue very briefly and we received no evidence in relation to recreational use of the surface water waste and coastal environment. We understand from the submissions and evidence that some of the surface waterways are used for recreational purposes such as fishing, whitebaiting and contact recreation including kayaking and rowing.

442 In terms of the coastal environment, we are aware that the estuary of the Heathcote and Avon Rivers / Ihutai has reasonably high levels of recreational use including windsurfing, kite sailing and sailing. We also understand that Brooklands Lagoon has a degree of recreational use.

443 In terms of the coastal waters, Mr Reuther's evidence was that the main concern is, similar to fresh water, the concentration of faecal indicator bacteria in the water and hence the likely presence of pathogens. He noted the coastal waters to be managed for contact recreation under the RCEP include Cass Bay, Akaroa Harbour and Lyttelton.

444 Mr Reuther noted that the quality of stormwater network discharges can influence the suitability of estuarine and coastal water for contact recreation and shellfish gathering, where a significant concentration of faecal indicator bacteria and metals and other contaminants in stormwater having the potential to contaminate shellfish flesh and food safety guideline values for shellfish flesh. He noted that only the Akaroa Harbour had a classification of Coastal SG and therefore the water quality must be managed for shellfish gathering.

445 Overall, Mr Reuther was satisfied that, provided monitoring was carried out on a regular basis, potential adverse effects on amenity and recreational values can be adequately addressed.



### Evaluation

446 Overall, we consider the amenity effects have been appropriately addressed. Amenity is of course much wider than recreational values. Flooding and extended periods of ponding can impact on amenity values, as is illustrated in the Styx catchment. That matter has been addressed separately.

### Effects on Property, Persons and Organisations

447 These were identified by Mr Reuther in paragraph 591 of his s.42A Report. He identified that several submissions had raised potential adverse effects on property, persons and organisations. These included Christchurch International Airport Limited (**CIAL**), NZ Steel, LPC and Styx residents. Ms West followed the same approach in her evidence in chief.

448 In terms of the residents in the Styx catchment, we have addressed that issue in our water quantity analysis. In relation to CIAL, the primary issues raised related to bird strike and particular issues in relation to consents held. These concerns were addressed by the applicant by the inclusion of conditions and CIAL has advised that those conditions satisfy its concerns.

449 We note that one of the conditions proposed is that any stormwater management system controlled by the applicant within 3km of the airport is to be designed so that the infiltration basins shall fully drain within 48 hours of the cessation of 2% AEP storm events; sufficient rapid soakage overflow capacity shall be provided to minimise any ponding outside of infiltration areas; and landscape design to limit attractiveness to birds through the use of suitable non-bird attracting species.

450 At the reconvened hearing we questioned the stormwater experts in relation to that condition. We asked whether there were any concerns from a water quantity perspective in relation to the conditions addressing the stormwater facility design requirements. None of the stormwater experts had any concerns in that regard. We consider that the agreed changes are acceptable and appropriate.

451 LPC provided some very helpful evidence in relation to the conditions originally proposed. It also provided a response to the draft conditions which were circulated on 8 February 2019.

452 LPC's submissions addressed both the complexity and readability of the conditions. We have made a number of changes in an effort to address those concerns.

453 It also had concerns in relation to what it described as “open ended” changes to the schedules without community input. It considered such changes should be in accordance with s127 of the RMA. Mr Pizzey addressed this issue in his reply of 8 April 2019. We have found this a difficult issue. Mr Purves suggested an alternative condition limiting the circumstances where the levels can be changed to where a review or variation of the LWRP, RCEP has been undertaken, or the introduction of a National Policy Statement of National Environment Standard which introduce new levels.

454 While there is some merit in that, we are satisfied that the ability to amend the attribute target levels in Schedules 7 to 8 in the event the guidelines were updated is acceptable. There is no suggestion by the applicant that the Receiving Environment Objectives or matters other than specified upper limit concentrations can be amended. We consider that those objectives, and the attribute target levels which relate to most statistically significant increase various contaminants cannot. The revised Condition 53 is:

*‘The Attribute Target Levels in Schedules 7 to 8 are taken from regional and national guideline levels. Should these guideline levels be updated, the upper limit concentrations in the Attribute Target Levels shall be updated to reflect this.’*

455 NZ Steel submitted in relation to the implications for the use of its roofing and cladding products. It supported the over-arching objectives to reduce the metal concentrations, but was concerned that the SMP process in particular could preclude the use of some products which have been shown to release significantly less zinc than older ones. NZ Steel wished to be involved in the development of the SMPs and IP to ensure its technical knowledge could be utilised and that there were no unnecessary cost implications for its clients, or restrictions on products to be used. Its concern appeared to be more that it may be caught a side wind rather than any direct concern with the proposed conditions of consent. We consider the conditions are appropriate and do not propose any further changes in relation to NZ Steel’s concerns. We have made changes to the development and process of the SMP which will provide NZ Steel an opportunity to raise any issues with proposed SMPs. We address that alteration in our discussion of conditions.

#### Positive Effects

456 The applicant addressed positive effects of the proposal in the AEE and in its correspondence of 9 July 2018.

457 Mr Reuther in the s.42A Report discussed the positive effects identified by the applicant. He did not disagree that the net reduction of contaminants entering the environment would give rise to positive effects primarily in the natural environment, as well as reductions in sediment loads. He did not disagree that those matters would give rise to positive effects on cultural, amenity and recreational values for local residents. He did have concerns regarding uncertainty. It appears, from Mr Reuther's letter of 5 April 2019, that his concerns have been addressed. We accept that there are positive effects, including improvement to water quality, and the overall benefits of providing a functioning reticulated stormwater system providing for conveyance, treatment and discharge of stormwater is positive.

#### Overall Finding on Effects

458 We have addressed what we consider to be the relevant effects in some detail. Overall, we consider the effects on the environment, subject to the conditions, are acceptable.

#### **S104(1)(b) of the RMA**

459 S104(1)(b) of the RMA requires, subject to Part 2 of the RMA, to have regard to any relevant provisions of:

- “(i) a national environmental standard:
- (ii) other regulations:
- (iii) a national policy statement:
- (iv) a New Zealand coastal policy statement:
- (v) a regional policy statement or proposed regional policy statement:
- (vi) a plan or proposed plan: ...”.

460 Mr Reuther provided a comprehensive analysis of the relevant statutory documents at paragraphs 653-915 of his s.42A Report. Ms West, for the applicant, again provided a comprehensive assessment in paragraphs 173-283 of her primary evidence.

461 There appeared to be little, if any, disagreement as to the relevant statutory documents. There were different opinions expressed as to the consistency or otherwise with the relevant objectives and policies. As noted by Ms West, there were many areas of agreement between the assessment and the Officer's Report and Ms West. Ms West described her assessment generally considered more areas of consistency with the relevant objectives and policies, whereas the Officer's Report finds more areas of potential inconsistency.

- 462 For convenience, we record the relevant provisions were identified as:
- (a) the National Policy Statement of Freshwater Management 2014 (**NPS-FM**);
  - (b) the New Zealand Coastal Policy Statement (**NZCPS**);
  - (c) the National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (**NES-CS**);
  - (d) the National Environment Standards for Sources of Drinking Water (**NES-DW**);
  - (e) the Canterbury Regional Policy Statement 2013 (**CRPS**);
  - (f) the Canterbury Land and Water Regional Plan (**LWRP**);
  - (g) the Waimakariri River Regional Plan (**WRRP**);
  - (h) the Regional Coastal Environment Plan (**RCEP**);
  - (i) the Lyttelton Port Recovery Plan (**LPRP**); and
  - (j) the Christchurch District Plan (**CDP**).
- 463 We confirm that we have had regard to the relevant provisions of NPS-FM, the NES-DW (which is relevant insofar as Regulation 7 directs that a Regional Council must not grant a discharge permit for an activity that will occur upstream or an abstraction point for a residential drinking water supply) if the activity is likely to introduce or increase contaminants in the drinking water to the extent that it would no longer meet the health quality criteria, or exceed the guideline values.
- 464 A condition is proposed that requires specific setbacks of stormwater discharge points from domestic drinking water supply wells and in the end Mr Callander and Mr Ethridge were in agreement in relation to protection of drinking water supply wells and we consider the proposal is consistent with the NES-DW.
- 465 In terms of the NPS-FM, it was addressed at some length by Mr Reuther and by Ms West. Mr Reuther noted that the LWRP in its current version gives effect to the NPS-FM insofar as it is required to. He also concluded that the CRC's Progressive Implementation Programme would ensure the relevant NPS-FM policies are implemented by 2025 or 2030. Overall he concluded that, while the proposal was inconsistent with some of the policies, it was not contrary to the provisions overall.
- 466 We have considered all of the matters raised in relation to the NPS-FM. We have had regard to it, but consider our decisionmaking is better informed by reference to the implementing regional plans.

New Zealand Coastal Policy Statement

- 467 Both Mr Reuther and Ms West address the NZCPS. Objective 1 is identified as relevant, as were a number of policies. While Mr Reuther identified that there was little information known about the impacts of stormwater discharges in the coastal environment, the proposal did at least maintain coastal water quality and the improvements sought for the discharge quality should result in a reduction of stormwater contaminants entering the estuary and prevent the further degradation and stress to that and other ecosystems.
- 468 We note Policy 23(4) of the NZCPS addresses the managing of discharges in stormwater and requires steps to be taken to avoid adverse effects of stormwater discharge on the coastal environment. Mr Reuther considered the proposal to be generally consistent with the policy, although the applicant is required to repair and upgrade where necessary the reticulated wastewater network and the resource consent application in that regard is currently being processed.

Canterbury Regional Policy Statement (CRPS)

- 469 Both Mr Reuther and Ms West identified a number of policies and objectives in the CRPS. Ms West identified that in her view the LWRP gives effect to the CRPS.
- 470 We have had regard to the provisions identified, but agree with Ms West that the assessment of the LWRP gives effect to the CRPS and our focus is on the relevant objectives and policies of that plan.

Canterbury Land and Water Regional Plan (LWRP)

- 471 As outlined by Mr Reuther, the LWRP provides the regulatory framework to support the recommended outcomes from the collaborative Canterbury Water Management Strategy process. Its purpose is to provide clear direction on the management of land and water through the Canterbury region in order to meet community aspirations for water quality in both urban and rural areas. Mr Reuther undertook an assessment of the relevant objectives and policies and provided his opinion on the overall consistency of the proposal with the LWRP objectives and consistency with each relevant policy, before providing an overall assessment considering all of the relevant provisions addressed.
- 472 Both Mr Reuther and Ms West identified that s3 contains a number of objectives which are to be read and considered together and that s4 sets out the strategic policies that implement the objectives in s3 and are to be read in their entirety and considered together.

473 Mr Reuther identified the most relevant objectives as:

- (a) Objective 3.2 – land and water are maintained as integrated natural resources to recognise and enable Ngāi Tahu culture, traditions, customary uses and relationships with land and water; and
- (b) Objective 3.2 – water management applies the ethic of Ki uta ki tai – from the mountains to the sea - and land and water are managed as integrated natural resources and recognises the connectivity between surface water and groundwater, and between freshwater, land and the coast.

474 Mr Reuther also noted Objectives 3.6, 3.8, 3.8A, 3.11, 3.13, 3.15, 3.16, 3.17, 3.22 and 3.24. He considered the proposal will ensure stormwater discharges are managed in an integrated way across the Christchurch District and that this integration will ensure the effects of land use change within each catchment and the influence of stormwater discharges on groundwater and surface water is appropriately addressed in a more cohesive manner. He concluded that the proposal was not entirely consistent with the objectives, but it was not contrary to the LWRP objectives overall.

475 We have had regard to all of the policies identified.

476 Policy 4.1 provides:

*“Lakes, rivers, wetlands and aquifers will meet the fresh water outcome set in ss6-15 within specified timeframes. If outcomes have not been established for a catchment, each type of lake, river or aquifer should meet the outcomes set in Table 1 by 2030.”*

477 The LWRP has not set freshwater outcomes in the sub-regional ss.9 and 10. Table 1(a) sets out the freshwater outcomes for Canterbury rivers and these include indicators for ecological health, macrophytes, periphytes in siltation and microbiological indicators.

478 While the outcomes are not currently met in the Avon and Heathcote catchments, Mr Reuther’s opinion was that, while the proposed receiving environment objectives and targets incorporated the most relevant parameters from that table, it is unlikely that the targets would be met by 2030 due either to limitations to implement mitigation methods or due to there being other influences on those measures that are not stormwater related. Mr Reuther considered the applicant had shown initiative to work towards meeting the freshwater outcomes. The proposal was in his view inconsistent with this policy

as the timeframe will not be met.<sup>25</sup> Ms West agreed with that statement. She identified that the consistency with Policy 4.1 may be limited, given the outcomes of Table 1(a) are not expected to be met by 2030. She understood, on the basis of Dr Margetts' evidence, that Table 1(a) relates to many parameters that are not always contributable to stormwater, or solely stormwater and that was why the receiving environment objectives and attribute target levels have been developed as appropriate parameters against which to assess the compliance of the proposed consent.

479 We agree with Ms West's analysis. That is also reflective of Mr Reuther's commentary.

480 Policy 4.2 is a similar policy, requiring the management of lakes, rivers and aquifers to take account of freshwater outcomes, water quantity limits and the individual and cumulative effects of land uses, discharges and abstractions to meet the sub-regional sections of Schedule H8. Both Mr Reuther and Ms West considered the proposal would be consistent with the policy. We agree.

481 Policy 4.7 provides:

*"Resource consents for new and existing activities will not be granted if the granting would cause a water quality or quantity limit set in ss6–15 to be breached or further over allocation (water quality and/or water quantity) to occur or in the absence of any water quality standards in ss6-15, the limits set in Schedule 8 to be breached. However replacement consents or new consents for existing activities may be granted to allow the continuation of the existing activities at the same or lesser rate or scale, provided the consent contains conditions that contribute to the phasing out of the over-allocation (water quality and/or water quantity) within a specified timeframe ..."*

482 We have had regard to this policy. We do not consider this application is for the continuation of the existing activities at the same or lesser rate or scale given it is to accommodate urban growth, and the associated increased stormwater.

483 Policy 4.8A provides for a number of matters of which we are to have regard. These include; the extent the discharge would avoid contamination; the extent to which it is feasible and dependable that any more than minor adverse effects on freshwater, and on any ecosystem associated with freshwater, resulting from the discharge would be avoided. We must have regard to the extent to which the discharge will avoid contamination that will have an adverse effect on the health of people and communities as affected by the secondary contact with

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<sup>25</sup> S42A Report at para 805

stormwater and the extent to which it is feasible and dependable that any more than minor adverse effects on the health of people and communities resulting from the discharge will be avoided. Overall, we consider this proposal is generally consistent with that policy, given the anticipated improvement in water quality.

484 Policy 4.16 provides that any reticulated stormwater system for any urban area is managed in accordance with a SMP that addresses a number of specified matters. These are the management of all discharges, for those established or extended after 11 August 2012, the discharge is subject to land base or designed treatment systems or wetland treatment prior to discharge to a lake or river and again references the Table 1.

485 Policy 4.16(d) provides:

*“the management of the discharge of stormwater from site involving the use, storage or disposal of hazardous substances”.*

486 Sub-Policy (e) provides:

*“where the discharge is from an existing local authority network, demonstration of a commitment to progressively improve the quality of the discharge to meet condition (c) as soon as practicable but no later than 2025”.*

487 Mr Reuther considered that Policy 4.16 provides a very clear message to network operators and the public that network operators must show a commitment to progressively improve the quality of the discharge by 2025 and to work towards meeting the specified freshwater outcomes. Mr Reuther expressed some concerns in relation to the level of certainty required under that policy, but he did not consider it was contrary to the same, provided recommended changes were made. We agree with Mr Reuther’s assessment.

488 Policy 4.16A provides:

*“Operators of reticulated stormwater systems implement methods to manage the quantity and quality of all stormwater directed to and conveyed by the reticulated stormwater system, and from 1 January 2025 network operators account for and are responsible for the quality and quantity of all stormwater discharged from that reticulated stormwater system.”*

489 This policy was discussed at some length during the hearing, in particular in relation to the potential exclusion of sites. We have addressed that issue earlier in our decision.



490 Policy 4.17 provides:

*“Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety.”*

491 Mr Reuther noted the proposed conditions provided a maximum allowable increase in the modelled 50-year ARI flood level for each of the main river catchments, while within the unmodelled catchments new development is not to exceed the pre-development flows. He considered the proposal was not contrary to the policy, but noted the recommendations of Mr Law in relation to additional modelling points and information about the adequacy of maximum water level increases.

492 Ms West, in her evidence, identified Policy 4.17, but did not provide a conclusion as to whether this application, particularly in relation to areas where there is an increase in levels, was contrary or consistent with that policy. That question was asked directly of Ms West and she confirmed her view that it was not contrary to the policy. Mr Pizzey also addressed this issue in reply and we have addressed it in our consideration of the water quantity issues, particularly in relation to the Styx catchment.

493 Policies 9.4(9) and 9.4(10) also relate to inundation issues, requiring prevention of any increase in inundation in the lower catchments by reference to the Avon or Heathcote catchments. We received no evidence or submissions relating to inundation in the Avon or Heathcote Catchments. Policy 9.4(1) again addresses the prevention of any increase in inundation of land in the Halswell River catchment. We note that no increase is sought in Schedule 10 in relation to that catchment.

494 Policy 4.11 in Plan Change 5 provides:

*“The setting and attainment of catchment specific water quality and quantity outcomes and limits is enabled through:*

*(a) limiting the duration of any resource consent granted under the region-wide rules in this Plan to a period not exceeding five years past the expected notification date (as set out in the Council’s Progressive Implementation Programme) of any plan change that will introduce water quality or water quantity provisions in ss5-16 of this plan; ...”*

495 This issue is relevant in terms of the duration of this consent and we address it in our consideration of that issue.

Waimakariri River Regional Plan

496 The provisions of the WRRP apply to the Waimakariri River catchment. The Pūharakekenui / Styx River catchment is within the area covered by the Plan, however the WRRP was amended pursuant to s.27 of the Canterbury Earthquake Recovery Act 2011 to specify that water quality in this catchment is to be managed by the NRRP. Given the water quality sections of the NRRP are now inoperative, Mr Reuther, and we accept, considered that the LWRP applies in relation to the management of the water quality.

497 We have had regard to the identified provisions.

Canterbury Regional Coastal Environment Plan (RCEP)

498 Both Mr Reuther and Ms West identified that the purpose of the RCEP is to promote the stable management of the natural and physical resources of the coastal marine area (**CMA**) and the coastal environment, and to promote the integrated management of that environment.

499 Objective 7.1 of the RCEP was addressed by Mr Reuther in his paragraphs 884-898 of his s.42A Report and by Ms West in paragraphs 272-279 of her evidence in chief.

500 Objective 7.1 of the RCEP provides for the enabling of cultural, social, recreational, economic, health and other benefits and the quality of the water in the coastal marine area, while maintaining the overall existing high natural water quality and maintaining and, where appropriate, enhancing amenity values. It provides for the safeguarding of the life supporting capacity of the water, the safeguarding and, where appropriate, enhancing its value for mahinga kai, protecting wāhi tapu and wāhi taonga of value, preserving the natural character and protecting outstanding natural features and landscapes, and recognising the intrinsic values of ecosystems and any finite characteristics.

501 Policy 7.1 addresses those areas where water quality classes for parts of the CMA have not been established. Essentially any consent shall not unreasonably restrict existing lawful uses of the coastal water and provide that the discharge shall not, after reasonable mixing, have more than minor adverse effect.

502 Policy 7.2 relates to the establishment of water quality classes ... and control the discharge of contaminants in water within parts of the CMA defined in Schedule 7 that contain areas of degraded water quality or which need classification to reflect existing or potential uses of the area. Mr Reuther

advised that the Ihutai / Avon / Heathcote estuary, Lyttelton Harbour and Akaroa Harbour are coastal waters where the water quality classes have been set.

- 503 Policy 7.4 addresses point source discharges of contaminants and/or water. In essence, that is largely a repetition of s.107.

#### Lyttelton Port Recovery Plan

- 504 This was identified in the evidence of Ms West and Mr Purves for the port company. This plan directs changes to RMA plans, including the RCEP and the LWRP, to enable structures to be rebuilt and also addresses new structures and activities.
- 505 Objective 10.1 now provides for the expedited recovery of Lyttelton Port as a matter of priority, while recognising the relationship with managing any adverse effects recovery activities have on various values.
- 506 Policy 10.1.13 addresses stormwater. It imposes an obligation to manage the quality of stormwater generated within the operational area of the Lyttelton Port and discharged into the coastal marine area by ensuring a number of matters, including design, construction, interceptors, cargo handling and earthworks.
- 507 It was noted that the stormwater from within the Port's operational area is to be managed by LPC and does not form part of this consent application, but there are some operational areas that do discharge to the network and therefore form part of this application.

#### Christchurch District Plan

- 508 Mr Reuther addressed a number of objectives and policies in the CDP which he identified as relevant.
- 509 He identified a number of objectives and policies which related to infrastructure, the importance of and safeguarding of water, the avoidance of sediment and contaminants entering water bodies as a result of stormwater disposal and the avoidance of transferring or creating unacceptable natural hazard risks.
- 510 Ms West considered the objectives and policies as relevant to potential developments that trigger the need for resource consent that need to be taken account of as part of those processes rather than directly related to this application, but she agreed with Mr Reuther's opinion that it was generally consistent.
- 511 We have had regard to the objectives and policies identified by Mr Reuther, but agree with Ms West that they are more relevant to potential developments.

### Overall Evaluation

- 512 We consider that the relevant provisions of the statutory documents really identify two principal issues. These being those associated with water quality, and those associated with addressing natural hazards, relevantly flooding. Overall we consider that the application, subject to changes we have made to various conditions, is largely consistent with the overall objective and policy framework.

### **Other Matters**

#### Mahaanui Iwi Management Plan 2013 (IMP)

- 513 Mr Reuther and Ms West both identified the relevant provisions of the Te Rūnanga O Ngāi Tahu Freshwater Policy Statement and the IMP. Mr Reuther identified the relevant objectives and policies in paragraph 918 of his s.42A Report and we agree those identified are relevant.
- 514 Ms West addressed this in paragraphs 288-296 of her evidence. In particular, Ms West focussed on Objective 6.4 which promotes collaborative management initiatives that enable the active participation of Ngāi Tahu in freshwater management and the implementing policies. She considered the application promotes collaborative management through the ongoing engagement with Papatipu Rūnanga, including input into the development review of SMPs, the provision of monitoring and reports required and the proposed conditions and the completion of CIAs for each of the four completed SMPs.
- 515 In relation to the IMP, Mr Reuther and Ms West both addressed this. As noted earlier, it was also a matter we discussed with Mr Pauling. We consider the collaborative management process anticipated by the agreement seems to largely meet the concerns expressed in the IMP, although strictly interpreted the application conflicts with some of the particular policies, including the fact that untreated stormwater will lead to waterways and coastal water, that this is a global resource consent covering a number of catchments, and that the duration requested is greater than 15 years.

### **S104(2)A of the RMA**

- 516 S104(2)A directs that, when considering an application affected by s.124, we must have regard to the value of the investment of the existing consent holder. This was not addressed during the hearing. It appears that it is not applicable. For completeness, we note there has been significant investment by the applicant in infrastructure.

### **S105 of the RMA**

517 S105 provides:

*“If an application for a discharge permit or coastal permit is to do something that would contravene s15 or s15B, the consent authority must, in addition to the matters in s104(1), have regard to:*

- (a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
- (b) the applicant’s reasons for the proposed choice; and*
- (c) any possible alternative methods of discharge, including discharge into any other receiving environment.”*

518 Mr Reuther addressed this issue briefly in paragraphs 996-998 of the s.42A Report. He noted it had been addressed in the AEE and noted the scale of the established development throughout the district and existing stormwater infrastructure. He also noted that the applicant will be required to look into identifying alternative ways to manage stormwater through the SMP and IP process. He considered there were “little to no” alternatives as to where the stormwater is discharged.

519 Ms West addressed this in her evidence at paragraphs 150-155. She considered that the nature of the discharge had been discussed by Mr Harrington in his evidence, and the sensitivity of the receiving environment addressed through the development of the attribute target levels by Dr Margetts. She agreed with the Officer’s Report and noted it was important that the stormwater is discharged via a legacy network that has been developed over many years and through decisions made by previous Councils as well as the current one. She considered the stormwater network to be an important physical resource for the community and it benefits the community environmentally, socially and economically as it provides a mechanism for the management of stormwater generated and associated with development in the city. She considered the proposed conditions which require SMPs to identify the most appropriate discharge method in each catchment were of value. She provided the example of the Styx catchment, where she understood the most appropriate discharge method for stormwater is discharge via treatment facilities to surface water. The alternative of discharging to ground is not the preferred option given the location of much of the area over the LWRP Christchurch Groundwater Protection Zone. She considered the application has had regard to s105 of the RMA.

- 520 Ms Hargreaves raised the alternative of piping water directly into the Waimakariri River or Brooklands Lagoon. As noted earlier in our decision, we have set out what we consider to be acceptable limits around the stormwater discharge, such as flood levels that must be met. How they are to be achieved may require the applicant to consider alternative solutions, including, potentially, discharge directly to the Waimakariri River and, in our view, improvements to its operations and maintenance of river channels. We consider the Lower Styx catchment is sensitive to any increase in flood levels. We understand that was accepted by the applicant.
- 521 Mr Pizzey addressed this in his opening submissions and cited Trio Holdings v Marlborough District Council<sup>26</sup> and Mahuta v Waikato Regional Council<sup>27</sup>. Mr Pizzey submitted that, taking into account the limited obligation for the applicant to consider alternatives which arise in terms of s105, the applicant gave adequate consideration to alternatives that would avoid, remedy or mitigate the effects of the discharge and made a reasonable choice.
- 522 As noted, we have considered the relevant matters under s105. We have had regard to the applicant's reasons for the proposed choice, which are addressed through the evidence and submission. Largely, the Application relates to an existing stormwater network and there is a need to continue discharges to manage the stormwater in the various catchments.

### **S107 of the RMA**

- 523 S107 provides for the restriction on grant of certain discharge permits. In summary, we are unable to grant a discharge consent if, after reasonable mixing, the stormwater discharges (either by themselves or in combination with the same, similar or other contaminants or water) is likely to give rise to any of the specified effects. These include the production of conspicuous oil, grease films, scums or foams, or floatable or suspended material; any conspicuous change in the colour or visual clarity; any emission of objectionable odour; the rendering of fresh water unsuitable for consumption by farm animals; or any significant adverse effects on aquatic life.
- 524 S107(2) provides that we may allow any of those effects if there are exceptional circumstances justifying the grant, or it is of a temporary nature, or if it is associated with necessary maintenance work and it is consistent with the purpose of the RMA to do so.

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<sup>26</sup> [1970] NZRMA 097

<sup>27</sup> Decision A91/98

- 525 Dr Margetts raised the exception of the discharge being of a temporary nature. We do not accept that. Ms West and Mr Pizzey for the applicant agreed that was not correct. That is our view also.
- 526 However, in all of the circumstances we consider there are exceptional circumstances in the present case. Exceptional circumstances of course require something out of the ordinary in terms of the significance and nature of the activity, and the consequences of refusing consent.
- 527 Overall, considering all of the relevant matters, it is our view that there are exceptional circumstances and there is nothing in s107 which would prohibit us from granting consent.

#### **The Gateway Test – s104D**

- 528 Having carried out the above assessment, we are still required to ask ourselves whether we are able to grant consent pursuant to s104D. We note there has been discussion in recent cases about when the s104D assessment is to be undertaken. That discussion is centred around whether the analysis should precede the overall assessment, or follow it. In this decision we have taken the latter approach.
- 529 Having considered the evidence and the submissions on this issue, we conclude that overall the activity is not contrary, as that is properly understood, to the relevant objectives and policies. The principal reason we do so is that in our opinion, subject to appropriate conditions, the granting of this consent will achieve an improvement in water quality and, with the addition of objective and added attribute targets to Schedule 10, the water quantity effects will be no more than minor.
- 530 We record that, in relation to the Styx catchment, that finding is something of a fine one.

#### **Part 2 RMA and Overall Evaluation**

- 531 As noted earlier, under s104(1) of the RMA the Consent Authority must consider applications “*subject to Part 2*” of the RMA. We have addressed the approach that we have taken.
- 532 Mr Reuther addressed this in paragraphs 939-976 of his Report. Mr Pizzey submitted, for the avoidance of doubt, that the granting of the consent would allow the applicant to provide for the social, economic and cultural wellbeing and the health and safety of residents, while appropriately responding to the

effects of that activity on the environment. It would, he submitted, allow the operation of a comprehensive stormwater network, providing for the long term growth of the community. Ms West addressed this in her primary evidence.

533 In terms of matters of national importance, we agree with Mr Reuther that the relevant matters are

- 6(a) *preservation of the natural character of the coastal environment ... wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate sub-division, use and development;*
- (c) *the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;*
- (e) *the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga; and*
- (h) *the management of risks from natural hazards.*

534 Overall, having considered all of the evidence on this matter, we consider that the natural character of the receiving environment can be preserved subject to appropriate conditions; particularly the relevant receiving objectives and targets. We note the overall thrust of the application is to improve the discharge quality. We consider that will be of benefit in the preservation of natural character, the protection of significant indigenous vegetation and the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wahi tapu and other taonga.

535 With regard to s.7 matters, we have had particular regard to s.7A(aa), (b), (c), (d), (f), (g), (h) and (i).

536 In terms of kaitiakitanga, we consider the development of the CIAs and the ongoing consultation between the applicant and Papatipu Rūnanga is of considerable value.

537 In terms of the efficient use and development of natural and physical resources, we have again had particular regard to that and consider that, given the setting of limits and the proposed improvement of water quality throughout the District, this is efficient from that regard. We also consider it is efficient in the economic sense in that it provides for the sustainable growth of Christchurch.

538 Amenity values are impacted by the discharge of stormwater. Overall, the impact of this application is largely positive, in that it enables the disposal of stormwater in a managed way. In the Styx catchment, increased flooding would negatively impact on amenity values. Overall however, we consider, with the conditions now incorporated, amenity values will at least be maintained. We



also consider the changes we have made will at least maintain the quality of the environment.

539 In terms of s8, we have taken into account the principles of the Treaty of Waitangi (Te Tiriti O Waitangi) and considered that the partnership approach with Papatu Rūnanga is a proper approach.

540 Overall, and largely on the basis that water quality will, over time, improve, we consider the granting of the consent, on appropriate conditions, will meet Part 2 and the purpose of the RMA.

#### **Term of the Consent s.123 – Consent Duration**

541 This issue was addressed by Mr Reuther in paragraph 1006-1027 of the s.42A Report. Mr Reuther referenced a number of cases and had regard to the “factors developed” through case law. These are outlined in paragraph 1008 of the s.42A Report and we consider that is an accurate summary of the relevant issues in that regard. Mr Reuther also identified the issues in relation to sub-regional section development and proposed Policy 4.11 of PC5 and the direction limiting the duration of any resource consent granted under the region-wide rules to a period not exceeding five years past the expected nomination date of any Plan Change that will introduce water quality or water quantity provisions in ss.6-15 of the Plan. Mr Reuther addressed the benefits and drawbacks with a “short term” duration, which he described as one of approximately eight years. He also addressed the “intermediate-term duration” and was of the view that a duration of 15 years would allow for development and notification of the Christchurch-West Melton sub-regional section; allow the plan change process to proceed through the notification, submission, hearing and potential appeals to process; and provide the applicant with sufficient time after the Plan Change becoming operative to develop an approach to respond to the new water quality and quantity outcomes and limits.

542 We note that Mr Reuther has now expressed his agreement with the appropriateness of all conditions, including term.

543 Ms West addressed this issue in paragraph 163-172 of her evidence in chief. Mr Pizzey also addressed those in some detail.

544 Overall, we accept that a 25 year term is appropriate, with a review condition. We agree with Mr Reuther that, in the absence of a review condition, the longer term would not be appropriate.

545 Having considered all of those factors, including the nature of the activity, the significant investment which will be required to implement the consent, the importance of ensuring that the various steps that the applicant proposes to implement are embedded and to allow an appropriate time for the improvement to be attained, the unnecessary reconsenting costs on the applicant and therefore the community of a shorter duration, the 25 year term is appropriate.

### **Conditions**

546 Throughout this process, we have been provided with a number of different versions of the proposed conditions. At times we have had difficulty in understanding how the conditions work, and how they fit together. The complexity and uncertainty of a number of the conditions was raised by a number of the parties. Mr Purves for LPC and Mr Enright for the Oil Companies and other planning witnesses identified issues.

547 Following the November hearing, there has been considerable work on the conditions by the applicant, and by CRC officers.

548 Mr Pizzey, in accordance with the timetabling directions, filed a memorandum of Counsel, a joint witness statement, amended draft conditions and an amended EMP on 8 February 2019.

549 In accordance with our directions, a number of submitters provided their comments in relation to those conditions. Ms J Burney in response raised a concern in relation to the adoption of the 2008 base line year for Lower Styx and a concern in relation to the use of the word “anticipated” in a policy context.

550 Submitter Ms Hargreaves filed a memorandum raising a number of concerns with the response from the applicant and provided a number of attachments.

551 Mr R McGuigan and Ms Pauline McGuigan also responded, firstly identifying some minor corrections that needed to be made to their evidence in chief, and provided a formal response to a number of matters raised.

552 Ms Susan McLachlan identified issues regarding filling and proposed some recommendations for our consideration. Ms McLachlan also commented on the proposed conditions.

553 Mr Robertson provided a response, identifying and repeating concerns expressed at the hearing.

554 Antonio and Kerrie Rodrigues responded, addressing largely issues concerning Barkers Drain, mitigation of flooding and weed management. Their response

also included a brief response from Mr Robert Potts, who provided expert evidence on their behalf in relation to stormwater quantity matters.

- 555 Ms Catherine Snook identified issues in relation to the proposed level increase within the Styx River; concerns in relation to the calibration of the hydraulic model against the August 2008 storm event; effect of filling near Earlham Street; and groundwater levels and their relationship to Styx River levels.
- 556 Mr Williams, Counsel for CIAL, addressed the proposed conditions put forward by the applicant to address its concerns.
- 557 Ms Kirk, on behalf of the Department of Conservation (**DOC**), commented on proposed conditions and the inclusion of DOC within the development and review of SMPs and associated IPs.
- 558 LPC provided further comment on draft conditions, expressing a number of concerns and seeking alterations.
- 559 Mr Enright replied on behalf of the Oil Companies, identifying concerns regarding the discretion residing in the applicant to exclude high risk sites and the uncertainty that entails. In terms of Condition 3, concerns were expressed as to the orthodoxy or otherwise of a consent condition that authorises a discharge “unless” the consent holder decides otherwise. The Oil Companies’ preferred approach was for all discharges to be consented, but with scope for the consent holder to apply to exclude those discharges through a s.127, or potentially s.128, RMA process. He provided alternative suggested wording.
- 560 The Ōpāwaho Heathcote River Network commented, supporting the changes without specifying which changes in particular but, we understand, the changes enabling engagement in a proposed liaison group.
- 561 We appreciate the considerable effort that has gone into finalising the proposed conditions.
- 562 In general terms, we consider those conditions appropriate. Many of the changes are to improve the readability of the conditions. We have however made a number of changes of a more substantive nature and these have been referenced in the body of the decision.
- 563 We have also added to the proposed conditions relating to the development of the SMPs (Conditions 4 - 8). In particular, we have added a requirement that drafts of new and reviewed SMPs are to be publically notified. This is to enable community involvement. We consider, given the scope and importance of the

SMPs, it is appropriate that the community has an opportunity to comment on reviewed or new SMPs and that regard is had to those comments.

- 564 The applicant has been clear that it intends the SMPs to be developed through a collaborative process. We are not satisfied that the consultation conditions proposed by the applicant were sufficient.
- 565 We have also made a number of changes in relation to the ESCP provisions and have addressed the reasons for those in the decision.
- 566 In terms of stormwater quantity, we have made significant changes to Schedule 10, including the addition of an objective in the management of stormwater quantity, and the addition of attribute levels for the Pūharakekenui / Styx River directing that modelled flood levels shall not result in any increase in above floor level flooding in any residential dwelling existing at the date of the commencement of this consent, and adding that the maximum increase in a 10% AEP event in that catchment shall be zero.
- 567 We heard significant evidence on the issues faced by the residents in the Lower Styx. We consider that is a catchment which is very sensitive to any increase in stormwater discharge. We acknowledge the frustration expressed by a number of the residents. We acknowledge they have been faced with substantial issues following the Canterbury earthquake sequence. As noted, our jurisdiction is somewhat limited. It is not our role to address the more substantive issues facing that catchment which have arisen following the Canterbury earthquake sequence, but those issues render the catchment more sensitive than it was.
- 568 We note the combined experts' view that weed management is critical. Nevertheless, the evidence from the submitters relating to the apparent changes in the condition of waterways, and the apparent lack of maintenance, is compelling. We have concluded that those matters need to be investigated and considered in any responses to flood modelling.
- 569 We have also added to the role of the STPRP so that the assessments and investigations under Condition 57 will be reviewed by that Panel.
- 570 We have also added an advice note at Schedule 2 advising that any changes to the Receiving Environment Objective and Attribute Target Levels set out in Schedule 10 can only be made to an application to change the conditions of consent pursuant to s127 of the RMA. It is our view, given the significance of the objective, and the attribute levels, a formal RMA process is required.

### Conclusion

- 571 In reaching our decision, we have considered the actual and potential effects of the activity, and all of the relevant matters identified.
- 572 Overall, we find the adaptive management methodology proposed by the applicant is appropriate. We consider the amended conditions ensure there is a sufficient degree of certainty and avoid an unlawful delegation.
- 573 With the changes we have made to the conditions, we are satisfied water quality effects have been appropriately addressed and that the implementation of this proposal will lead, over a period of time, to an overall improvement in water quality.
- 574 In relation to water quantity effects, we acknowledge the difficulties experienced by residents in the Styx catchment in particular. However, we consider the changes we have made to the conditions will enable those concerns, insofar as they are within our jurisdiction, to be appropriately addressed.
- 575 In terms of the relevant provisions of the statutory documents we find, with changes we have made to the Conditions, the Application is consistent with the overall Policy intent.
- 576 This has been a hearing of some length and some considerable complexity. We have benefited considerably from the involvement of the submitters and we express our thanks to all of those who have participated.

### Overall Decision

- 577 Having considered all the above matters and carefully considered the evidence, submissions, application documents and relevant statutory documents, for all of the reasons set out above we consider the granting of consent is appropriate.
- 578 Consent to discharge stormwater for a term of 25 years is **granted** pursuant to s104, s104B and s104D of the RMA, subject to the **attached** conditions.




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David Caldwell

*e. Christmas*

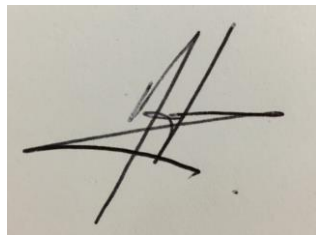
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Emma Christmas

A handwritten signature in black ink, featuring a stylized, cursive script with a prominent loop and a horizontal stroke.

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Hoani Langsbury

A handwritten signature in black ink, consisting of a large, bold, stylized letter 'H' with a horizontal stroke extending to the right.

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Hugh Leersnyder

Dated: 4 June 2019

# **CRC190445 A Comprehensive Resource Consent to Discharge Stormwater from within Christchurch City onto or into Land, into Water and into Coastal Environments**

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**ADVISORY NOTE** - *The following conditions for the Christchurch City Comprehensive Stormwater Network Discharge Consent have been prepared according to the agreed practices of the Joint Christchurch City Council & Canterbury Regional Council Stormwater Management Protocol, Report U10/12 (the Protocol). The Protocol establishes how Canterbury Regional Council and Christchurch City Council will work together to achieve integrated catchment wide stormwater management in Christchurch. The Protocol records the understanding between Canterbury Regional Council and Christchurch City Council but does not create legal obligations that are enforceable by either party. Appendix 4 of the Protocol sets out responsibilities pertaining to compliance and operations and notes the role of the Water Issues Management (WIM) Group in any enforcement matters.*

## **ACTIVITY**

### **Purpose and Location**

1. Except where excluded under Condition 2, this consent authorises the discharge of stormwater onto or into land or into surface water which:
  - (a) is generated from within the territorial boundaries of Christchurch City Council; or
  - (b) enters the stormwater network from outside the Christchurch City Council boundary.

### **Exclusions**

2. This consent excludes discharges:
  - (a) Emanating from land within Banks Peninsula that is outside the Settlement Areas of Banks Peninsula; and
  - (b) From private stormwater systems that bypass the stormwater network and discharge into the Coastal Marine Area; and
  - (c) Emanating from hardstand areas of non-residential existing sites discharging onto or into land via private networks unless the discharge has been previously authorised by the Christchurch City Council; and
  - (d) From any activity not existing at the commencement of this resource consent, re- development, or development site on the Canterbury Regional Council's Listed Land Use Register that is considered by the Christchurch City Council to pose an unacceptably high risk of surface water or groundwater contamination; and

*Advice Note: The identification of unacceptable high risk will be in the manner required by the Memorandum of Understanding for Stormwater Discharges in Christchurch City (2014), or successor document, between the Christchurch City Council and Canterbury Regional Council until a risk matrix is finalised under Condition 3 below.*

- (e) Emanating from any stage of a development site with a total area of disturbance exceeding 5 hectares on flat land or 1 hectare on hill land; and
  - (f) From any site listed on the attached Schedule 1 'Sites excluded from the Christchurch City Council Comprehensive Stormwater Network



Discharge Consent'

- (i) at commencement of this resource consent; or
- (ii) as a result of the process set out in Condition 3 below; or
- (iii) as a result of the process set out in Condition 47.

**Development of Risk Matrix and Transition Plan for Excluded Sites Post 2025**

3. Discharge into the stormwater network from the sites excluded by Conditions 2(d), 2(e) or 2(f) are authorised under this consent on 1 January 2025, or when current discharge permits expire or are surrendered for those sites, whichever is the latest, unless through the transitional arrangements set out below, or through the audits described in Condition 47, the Consent Holder determines that the discharge poses an unacceptably high risk of surface water or groundwater contamination. The transitional arrangements are:
- (a) Within 6 months of the commencement of this resource consent, the Consent Holder shall engage with the Canterbury Regional Council to obtain full details of all of the consented discharges excluded from this consent until 2025, including information on site activities, conditions and compliance records;
  - (b) Within 30 months of the commencement of this resource consent, the Consent Holder shall draft a risk matrix to identify and rate the risk associated with each of the stormwater discharges where information has been provided under Condition 3(a), and those discharges described in Condition 2(d) and 2(e). The criteria used to identify and rate the risk associated with each discharge shall be clear and objective. The risk matrix shall be developed as follows:
    - (i) Within 18 months of the commencement of this consent, the Consent Holder shall prepare a draft risk matrix and provide it to the Industry Liaison Group for comment;
    - (ii) The Consent Holder shall invite the Industry Liaison Group to provide comment within 2 months of providing the draft risk matrix to them for comment;
    - (iii) Within 3 months of receiving the comment referenced in Condition 3(b)(ii), the Consent Holder shall prepare a memo and/or revised risk matrix addressing that comment and circulate it to the Industry Liaison Group along with an invitation to an Industry Liaison Group meeting;
    - (iv) Within one month of the meeting held under Condition 3(b)(iii), the Consent Holder shall circulate minutes, including points of agreement and disagreement between the parties;
    - (v) Any changes to the draft risk matrix shall be provided to the Industry Liaison Group for feedback no less than 2 months prior to being submitted to Canterbury Regional Council.
  - (c) Within 3 years of the commencement of this consent, the Consent Holder shall provide to the Canterbury Regional Council a Transition Plan for the

discharges excluded by Conditions 2(d), 2(e) and 2(f) that includes, but is not limited to:

- (i) a description of the regulatory methods that will be used by the Consent Holder to ensure that previously excluded discharges will be subject to standards that achieve required environmental outcomes as described in Condition 3(e);
  - (ii) the risk matrix prepared under Condition 3(b);
  - (iii) a description of site-specific monitoring plans for particular sites from which the discharge is rated high in the risk matrix;
  - (iv) a description of the process that the Consent Holder will use to determine, in collaboration with Canterbury Regional Council and through engagement with affected site owners and/or operators, whether a site will remain excluded from authorisation under this consent due to its discharge posing an unacceptably high risk of surface water or groundwater contamination;
- (d) if as a result of the risk matrix and process set out in Condition 3(b) it is determined that the discharge poses an unacceptably high risk of surface water or groundwater contamination then that discharge will remain excluded from this consent and listed on the attached Schedule 1;
- (e) the Consent Holder shall ensure that all other sites referred to in Condition 3(a) are, from the date on which the discharges are authorised under this resource consent, subject to standards that result in the same or better environmental outcomes for the quality and quantity of the discharge as those that were in the relevant site specific resource consent issued by the Canterbury Regional Council.

*Advice note: Discharge into the stormwater network will still require approval from Christchurch City Council, as owner and operator of the stormwater network, following the surrender or expiry of discharge permits for the sites noted above, or from 1 January 2025, whichever is the latest.*

### **Stormwater Management Plans**

4. The Consent Holder shall, in consultation with:

- (i) Papatipu Rūnanga;
- (ii) The relevant Zone Committee(s) (or successor organisation);
- (iii) The relevant Community Board(s) (or successor organisation);
- (iv) The Department of Conservation; and
- (v) The CRC Regional Engineer and any relevant Rating District Liaison Committee; and

develop, and as necessary update, Stormwater Management Plans (SMPs) in accordance with the programme set out in Table 1 and submit each SMP to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance for certification that it contains the matters required by Condition 7 and is consistent with the purpose of SMPs in Condition 6.

5. SMPs shall be reviewed and submitted for certification to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance every 10 years from the date of the certification of the SMP, except that:
  - (a) the Styx SMP shall be reviewed and submitted by 30 June 2023, and then 10 yearly after its certification; and
  - (b) the Halswell SMP shall be reviewed and submitted by 30 June 2021, and then 10 yearly after its certification.

**Table 1: SMP Programme**

<b>SMP Area</b>	<b>Date SMP Operative</b>	<b>Date Submitted to Canterbury Regional Council</b>
Ōtakaro/ Avon River Area Christchurch		Within 36 months of the commencement of this consent
Pūharakekenui/ Styx River Area Christchurch	30 June 2014	
Huritini / Halswell River Area Christchurch	30 June 2016	
Ōpāwaho/ Heathcote River Area Christchurch		Within 18 months of the commencement of this consent
Estuary and Coastal Area Christchurch		Within 24 months of the commencement of this consent
Outer Area Christchurch		Within 30 months of the commencement of this consent
Te Pātaka o Rākaihautū / Banks Peninsula Settlements		Within 36 months of the commencement of this consent

6. The purpose of the SMPs is to:
  - (a) Contribute to meeting the overall contaminant load reduction standards set in Condition 19 and 20;
  - (b) Set a contaminant load reduction target(s) for each catchment in that SMP area in order to demonstrate the commitment of the Consent Holder to the improvement of stormwater discharge quality over time;
  - (c) Demonstrate the means by which:
    - (i) the quality of stormwater discharges will be progressively improved towards meeting the Receiving Environment Objectives and Attribute Target Levels for waterways, coastal waters, groundwater and springs set out in the conditions of this consent and in Schedules 7 to 9; and
    - (ii) the Receiving Environment Objective and Attribute Target Levels for water quantity in Schedule 10 will be met;
  - (d) Provide for discharge of stormwater to land infiltration systems where reasonably practicable as the means to demonstrate that stormwater

contribution to groundwater and spring-fed stream flows will be maintained;

- (e) Demonstrate the means by which Christchurch City Council stormwater infiltration facilities constructed by, or on behalf of, the Consent Holder, after the commencement of this consent will be designed, located and operated to avoid, remedy or mitigate adverse effects of groundwater mounding on other land in anything more frequent than the critical 2% AEP Event;
  - (f) Plan the works required to mitigate the effects of stormwater discharges to the extent required by this resource consent;
  - (g) Implement the conditions of this consent as they apply to each catchment, including the best practicable option for weed management in the Pūharakekenui/Styx River as determined under Schedule 4(x).
7. SMPs submitted to Canterbury Regional Council after the commencement of this resource consent shall include but not be limited to the information set out in Schedule 2.
8. Prior to submitting a SMP or any reviewed SMP or any amendment to a SMP to the Canterbury Regional Council, other than an amendment agreed with Canterbury Regional Council as making minor changes and corrections, the Consent Holder shall:
- (a) In early development stages for a possible SMP, provide a briefing to and invite comments from the parties listed in Condition 4.
  - (b) Following completion of a draft SMP, provide a draft copy to the parties listed in Condition 4, inviting feedback within a timeframe of not less than 40 working days:
  - (c) Give public notice of the draft SMP and invite written feedback within a timeframe of not less than 40 working days.
  - (d) Have regard to the feedback in clauses (b) and (c).
  - (e) Prepare a summary of feedback received, and a brief explanation of whether and how comments have been incorporated into the SMP.
9. The Consent Holder shall amend the SMPs as it considers necessary to respond to:
- (a) the results of the Christchurch Contaminant Load Model (C-CLM) and contaminant load reduction targets set within the SMPs, or any revisions thereof;
  - (b) The results of monitoring, including any investigations or outcomes in relation to the responses to modelling and monitoring under Conditions 56-59;
  - (c) Outcomes of investigations and trials carried out under Conditions 39 and 40 and Schedules 3 and 4;
  - (d) Any changes to relevant national, and/or regional planning documents including those that result from the LWRP sub-regional chapter development process;

- (e) The use of new technologies, new opportunities for additional mitigation (such as for infill areas or retro-fit) or new constraints on the implementation of mitigation due to changes in developer plans; and
  - (f) New environmental data and research including updated international and national best practice technologies.
10. Any amendments to SMPs, other than those agreed with Canterbury Regional Council as making minor changes and corrections, shall not replace the previous version until the amendments have been certified by the Canterbury Regional Council as containing the matters required by Condition 7 and as being consistent with the purpose of SMPs in Condition 6. For the avoidance of doubt, any amendments shall not reduce the likelihood of meeting the Receiving Environment Objectives and Attribute Target Levels.

### **Implementation Plan**

11. The purpose of an Implementation Plan is to give effect to certified SMPs and to include the matters set out in Condition 12. An Implementation Plan shall be:
- (a) Prepared by the Consent Holder, through engagement with Papatipu Rūnanga under Condition 13(a), and with the Department of Conservation, within 18 months after the commencement of this resource consent;
  - (b) Updated to give effect to new, reviewed or amended SMPs within 12 months of SMPs being certified;
  - (c) Reviewed by the Consent Holder every 3 years, with reference to the Christchurch City Council Long Term Plan; and
  - (d) Made available to Canterbury Regional Council and Papatipu Rūnanga on request.
12. The Implementation Plan shall include but not be limited to:
- (a) A list and map of proposed stormwater mitigation methods and devices;
  - (b) A programme of stormwater works for Christchurch City Council and anticipated private development;
  - (c) A plan for regulatory, investigative, educational and preventative activities or programmes relating to stormwater discharges, including activities undertaken under Conditions 39 and 40 and Schedules 3 and 4;
  - (d) Details of budgets for capital works or resourcing that is linked to the Christchurch City Council Long Term Plan.

### **Engagement with Papatipu Rūnanga**

13. The Consent Holder shall engage with Papatipu Rūnanga:
- (a) In the development and review of the SMPs required under Conditions 4 and 8, and other amendment to SMPs, and the development of the Implementation

Plan required under Conditions 11 and 12;

- (b) At concept design stage for the installation of stormwater treatment facilities and devices with regard to wāhi tapu and taonga;
- (c) By providing quarterly reports to Mahaanui Kurataiao Ltd on stormwater developments, projects and monitoring under this resource consent;
- (d) By the engagement required by Conditions 56 to 58 on responses to modelling;
- (e) By providing the investigation report required by Condition 59 on responses to monitoring; and
- (f) By holding an annual meeting with Mahaanui Kurataiao Ltd to discuss stormwater works under this resource consent, and Papatipu Rūnanga input predicted for the next 12 month period.

*Advice Note: The Christchurch City Council is committed to working in partnership with Papatipu Rūnanga through the implementation of the resource consent. This is aimed at achieving the goals of the resource consent and providing for the ongoing involvement of mana whenua as well as identifying and reflecting mana whenua values and interests in the management of stormwater. While the partnership approach needs to be confirmed with Papatipu Rūnanga, it may involve the establishment and resourcing of a joint CCC/Papatipu Rūnanga Stormwater Working Party along with relevant technical support involving Mahaanui Kurataiao Ltd as well as Te Rūnanga o Ngāi Tahu. It is envisioned that the working party would meet not less than annually and provide a forum for advising on resource consent implementation.*

#### **Stormwater Technical Peer Review Panel**

14. The Consent Holder shall establish, at its own cost, the Stormwater Technical Peer Review Panel (**Stormwater TPRP**), for the purpose of providing scientific and technical review of:

- (a) The draft risk matrix required by Condition 3(b) of this resource consent and any subsequent amendments of the risk matrix; and
- (b) Each Draft SMP, including those being reviewed as required under Condition 4 and 5 of this resource consent or being amended under Condition 9, and provide technical advice to the Consent Holder as to whether it is fit for purpose and meets the requirements of Conditions 6 and 7 of this resource consent; and
- (c) The scope of the feasibility studies and investigations required by Condition 39 and Schedule 3 (actions a - h) and Condition 40 and Schedule 4 (actions d, e, j, k, r and s) of this resource consent; and
- (d) The scope of assessments and investigations required by Condition 57 of this resource consent; and
- (e) The outcomes of the feasibility studies and investigations to ensure that actions arising from them incorporate best practicable options.

15. The Consent Holder shall:

- (a) Obtain a review of the draft risk matrix from the Stormwater TPRP, and

attach a copy of the review to the draft risk matrix provided to the Canterbury Regional Council; and

- (b) Obtain a review of the draft SMP from the Stormwater TPRP, attach a copy of the review to the draft SMP, and provide a description within the SMP of the Consent Holder's response to that review; and
- (c) Obtain a review of the relevant feasibility study or investigation from the Stormwater TPRP, and attach a copy of the review to the relevant feasibility study or investigation provided to Canterbury Regional Council.

*Advice Note: The technical reviews under Condition 14 shall be provided by the relevant experts from the Stormwater TPRP and not the whole panel.*

16. The Consent Holder shall appoint independent Stormwater TPRP members with expertise which could include but not be limited to the following:
  - (i) Stormwater engineering and hydrological/flood modelling;
  - (ii) Freshwater and coastal water quality and ecology;
  - (iii) Hydrogeology;
  - (iv) Contaminated site/land management;
  - (v) Erosion and sediment control; and
  - (vi) Mātauranga Māori and mahinga kai.
17. If the Stormwater TPRP does not have expertise in any of the areas which it is required to advise the Consent Holder on, it shall inform the Consent Holder who may engage the services of a suitably qualified and independent expert to advise it on the matter.
18. The Consent Holder shall provide any administrative support necessary for the Stormwater TPRP to carry out its functions.

*Advice Note: The Christchurch City Council intend for development of the SMPs to be a collaborative process with input from key stakeholders. During development of SMPs, Papatipu Rūnanga, CWMS Zone Committees and Canterbury Regional Council technical staff will be invited to all technical presentations and will have opportunity to review and comment on draft SMP documents. Presentations will be made at public meetings of both the Banks Peninsula and Christchurch-West Melton Zone Committees. Once all documented feedback has been considered and addressed, the finalised SMP documentation will be submitted to the Canterbury Regional Council.*

## **STANDARDS AND RESTRICTIONS**

### **Stormwater Contaminant Load Modelling**

19. The Consent Holder shall install stormwater mitigation facilities and devices that achieve the contaminant load reduction standards specified in Table 2 below as derived by the *Golder Associates (NZ) Limited 2018 Christchurch Contaminant Load*

*Model (C-CLM) report which is attached to these conditions as Schedule 5.*

20. The Consent Holder shall use best practicable options to achieve the contaminant load reduction targets specified in the SMPs derived from the C-CLM or subsequent improved modelling methods and best available information.

**Table 2: Reductions in stormwater contaminant load**

	<b>Contaminant load compared to no treatment as at 2018</b>	<b>5 years from 2018 compared to no treatment (as at 2023)</b>	<b>10 years from 2018 compared to no treatment (as at 2028)</b>	<b>25 years from 2018 compared to no treatment (as at 2043)</b>
<b>TSS</b>	12 %	21 %	25 %	27 %
<b>Total Zinc</b>	10 %	15 %	18 %	20 %
<b>Total Copper</b>	16 %	23 %	28 %	30 %

21. The Consent Holder shall provide a report to the Canterbury Regional Council, Attention: Regional Leader: Monitoring and Compliance at five yearly intervals from commencement of this resource consent on whether the contaminant load reduction standards under Condition 19 and targets developed through the SMPs are being met.

*Advice note: The C-CLM is the primary means of assessing the City-wide standards for the relative reduction in contaminant loads for copper, zinc and TSS which would enter the receiving environment as a result of the structural measures used by the Council.*

### **Water Quality and Quantity Standards**

22. For any development or redevelopment within a catchment which does not have a certified SMP, stormwater quality and quantity mitigation shall meet the General City conditions as specified in Schedule 6.
23. The Consent Holder shall use best practicable options to mitigate the effects of the discharge of stormwater on:
  - (a) surface water quality, instream sediment quality, aquatic ecology health and mana whenua values. The extent of mitigation of effects shall be measured by the Receiving Environment Objectives and Attribute Target Levels monitoring described in Schedules 7 and 8;
  - (b) groundwater and spring water quality. The extent of mitigation of effects shall be measured by the Receiving Environment Objectives and Attribute Target Levels monitoring described in Schedule 9; and
  - (c) water quantity. The mitigation of effects shall be measured against achievement of the Receiving Environment Objective and Attribute Target Levels monitoring described in Schedule 10.
24. The Consent Holder shall use all reasonably practicable measures to ensure that operational phase stormwater quality and quantity mitigation is implemented for all development and re- development (where required) prior to issuing certification under the relevant legislation.



25. The Consent Holder shall provide retrofit water quality and quantity mitigation for existing development where practicable.
26. Until the commencement of the targeted trial required by Schedule 4(w), when the dry weather base flow water level in the Pūharakekenui/Styx River is at or above Reduced Level 10.1m Christchurch Drainage Datum, as measured at the Lower Pūharakekenui /Styx water level gauge, the Consent Holder shall ensure that the Pūharakekenui /Styx River is the next river from which weed is harvested and that this will commence no later than 40 days following the measurement date.

### **Design of Facilities and Devices**

27. Water quality and quantity mitigation facilities and devices shall be designed in general accordance with:
  - (a) *The Christchurch City Council's Waterways, Wetlands and Drainage Guide, Infrastructure Design Standard, Construction Standard Specifications, Christchurch Rain Garden Design Criteria, Christchurch Stormwater Tree Pit Design Criteria and Stormfilter™ Design Rainfall Intensity Criterion Report* or their respective successor document(s); and
  - (b) Other national and international best practice design criteria adopted by the Christchurch City Council over the duration of this resource consent.
28. To ensure the risk of bird strike is minimised, the following design requirements shall apply to facilities within 3 kilometres of Christchurch International Airport:
  - (i) Stormwater infiltration basins shall fully drain within 48 hours of the cessation of a 2% AEP stormwater event;
  - (ii) Sufficient rapid soakage overflow capacity shall be provided to minimise the ponding of stormwater outside of the infiltration area(s); and
  - (iii) Landscape design shall limit attractiveness to birds through the use of suitable non-bird attracting species.
29. The Consent Holder shall ensure that all stormwater quality mitigation facilities and devices servicing greenfield development after commencement of this resource consent are designed to treat the first flush.
30. For all water quality mitigation facilities and devices constructed after commencement of this resource consent to service re-development, or retrofit water quality mitigation facilities for existing development, the Consent Holder shall design facilities to treat as much of the first flush as reasonably practicable.
31. All stormwater mitigation facilities and devices constructed after commencement of this consent shall meet any other specific requirements as specified within the Implementation Plan when prepared in accordance with Condition 11.
32. Christchurch City Council stormwater infiltration facilities constructed after the commencement of the resource consent shall be located to maintain the following separation distances from domestic and community drinking water supply wells that exist prior to the construction of the infiltration facility:

- (a) Infiltration devices that only discharge roof water from a single building or that discharge stormwater generated from an impervious area less than 2,000 square metres (including roof area), shall maintain a separation distance from any domestic and community drinking water supply well equivalent to the protection areas specified in Table S1A of Schedule 1 of the LWRP, unless, in the case of private drinking water bores, the Consent Holder has made a reticulated water supply available to the property.
  - (b) Infiltration devices for larger discharges than those described in (a) above shall maintain a separation distance of 2,000 metres when located up-gradient of domestic and community drinking water supply wells, and a separation distance of 500 metres when located down-gradient or cross-gradient of domestic and community drinking water supply wells, unless, in the case of private drinking water bores, the Consent Holder has made a reticulated water supply available to the property.
  - (c) Or as an alternative to (a) and (b), a shorter separation distance may be utilised based on an assessment of site specific information undertaken by the Consent Holder and certified by the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance that it will have a less than minor adverse effect on domestic and community drinking water supply wells;
  - (d) Within 24 months of this resource consent commencing, a site-specific assessment of contamination risk and appropriate mitigation shall also be undertaken for any existing stormwater infiltration basins that do not comply with the separation distances defined in (b) above. This assessment shall be provided to the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance.
33. Christchurch City Council stormwater mitigation facilities constructed after the commencement of this resource consent shall have secondary flow paths to the downstream stormwater network.
34. Christchurch City Council stormwater mitigation facilities constructed after commencement of this resource consent shall include best practice features designed to capture and contain as much as reasonably practicable any spills of contaminants entering the stormwater facility.
35. Design of stormwater mitigation facilities serving sub-catchments greater than 20 hectares shall include computer modelling for detailed hydraulic analysis. The outlet hydrograph for the 2% AEP critical duration design storm generated by modelling of the final design for these facilities shall then be used in the water quantity model for the corresponding river catchment to demonstrate consistency with water quantity objectives in the SMP.
36. All Christchurch City Council stormwater mitigation facilities and devices constructed after commencement of this resource consent shall have an Operations and Maintenance Manual which shall be made available on request.

### **Stormwater Quality Investigations**

37. The Consent Holder shall investigate and implement methods to improve the management of stormwater quality and assess and reduce stormwater effects on the receiving environment (Stormwater Quality Investigation Programme).

38. The purpose of the Stormwater Quality Investigation Programme is to:
- (a) Monitor the performance of selected stormwater treatment facilities and devices;
  - (b) Assess the potential for the application of new technologies and management strategies; and
  - (c) Investigate using various models and techniques of water quality improvement strategies and options.
39. The Consent Holder shall undertake the actions set out in Schedule 3 for the investigation required by Condition 37.

#### **Other Actions**

40. The Consent Holder shall undertake the actions set out in Schedule 4 for the purposes of improved stormwater management through: source control methods; communication, education and awareness; and Pūharakekenui/Styx River channel weed management.

#### **Erosion and Sediment Control**

41. The Consent Holder shall use reasonably practicable measures to ensure that a site specific Erosion and Sediment Control Plan (**ESCP**) be prepared and implemented for development sites that discharge to the Council's network. The ESCP is to be prepared by a suitably qualified and experienced professional prior to commencement of stripping of vegetation or earthworks. The ESCP is to be prepared in accordance with the *Erosion and Sediment Control Toolbox for Canterbury* (or successor document) and is to adopt a Best Practicable Option approach.
42. Copies of ESCPs submitted to or prepared by/for the Consent Holder shall be made available to the Canterbury Regional Council on request.
43. The Consent Holder shall develop a Sediment Discharge Management Plan (**SDMP**) and present it to the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance within twelve months of the operative date of this resource consent, for certification that it is consistent with the purpose and required content of the SDMP.
44. The purpose of the SDMP is to set out the processes and practices to be implemented to manage the discharges of stormwater from development sites into the stormwater network such that the adverse effects of discharges from the stormwater network on the receiving environment's water clarity and aquatic biota are minimised. The processes and practices will represent the best practicable option for achieving the fine sediment and TSS Attribute Target Levels for waterways and coastal areas within Schedules 7 and 8.
45. The required content of the SDMP shall include, but not be limited to, the following means to achieve the purpose:
- (a) A risk assessment to determine the TSS concentration\_trigger levels for the discharge of stormwater into the stormwater network from development sites. The risk assessment will include factors of slope, soil type, whether the discharge will be treated downstream by a Council treatment facility

prior to reaching the receiving environment, and the sensitivity of the receiving environment;

- (b) In the event of a trigger level exceedance, a feedback process to identify and implement any changes to the erosion and sediment control practices in place on the development site. These may include reducing the area exposed to erosion by stabilisation or improving the efficiency of sediment laden water treatment.
  - (c) A description of the process for how TSS concentration trigger levels will be included in authorisations by the Christchurch City Council for discharges into the network from individual sites;
  - (d) *A process for the monitoring the erosion and sediment control management and sediment discharges from development sites.*
  - (e) Determination of a rainfall intensity which will trigger monitoring of sediment discharges from development sites into the Council's network.
  - (f) Details of how records will be kept (such as site TSS concentration trigger level exceedance, compliance monitoring and enforcement action), with records made available to the Canterbury Regional Council on request.
46. The Consent Holder may review and amend the SDMP so as to better achieve the purpose of the SDMP and in response to any updates to the relevant Attribute Target Levels. Any amendments to the SDMP shall not replace the previous version until the plan has been certified by the RMA Compliance and Enforcement Manager of the Canterbury Regional Council as being consistent with the purpose and required content of the SDMP.

### **Industrial Site Management**

47. The Consent Holder shall, in collaboration with the Canterbury Regional Council:
- (a) Maintain a desktop-based identification of industrial sites, that ranks sites for risk relative to stormwater discharge and identifies the industrial sites that pose the highest risk;
  - (b) Audit at least 15 sites per year, of which at least 10 are sites agreed with the Canterbury Regional Council;
  - (c) Vary the annual number of site audits in Condition 47(b) if agreed by the Canterbury Regional Council under Schedule 4(l);
  - (d) Inform the site owner and operator and notify the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance if the audit process and monitoring of a site determines that the site presents an unacceptably high risk to the receiving environment.
48. If the Consent Holder considers, following further engagement with the site operator and the Canterbury Regional Council, that the site is not appropriately mitigating that unacceptably high risk, the Consent Holder may, upon agreement with Canterbury Regional Council, add the site to Schedule 1.

## MONITORING AND REPORTING

### Environmental Monitoring Programme

49. The Consent Holder shall implement the EMP attached to this consent, with the purpose of monitoring whether the Receiving Environment Objectives and Attribute Target Levels are being met.
50. The Consent Holder may review and amend the EMP for the purposes of improved monitoring and / or to better determine whether the Receiving Environment Objectives and Attribute Target Levels are being met.
51. Any amendments to the EMP shall not replace the previous version until the EMP has been certified by the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance as complying with the requirements of Condition 49.
52.
  - (a) The Attribute Target Levels in Schedule 7 for hardness modified copper, lead and zinc concentrations in Banks Peninsula surface water shall be calculated for each monitored waterway following the collection of one year of monitoring data.
  - (b) Hardness modified values for copper, lead and zinc for all surface water monitoring sites (including Banks Peninsula sites) within the EMP shall be reviewed every five years, with the first review being undertaken within 2 years of the commencement of this resource consent.
  - (c) Hardness modified values shall be calculated using the *ANZECC (2000)* methodology outlined in the EMP. Should a new method of modifying metal concentrations become appropriate, this new methodology and any subsequent change in Attribute Target Levels shall be applied. Updated values shall be incorporated into the certified EMP as an amendment, in accordance with Condition 50.
53. The Attribute Target Levels in Schedules 7 to 8 are taken from relevant regional and national guideline levels. Should these guideline levels be updated, upper limit concentrations in the Attribute Target Levels shall be updated to reflect this. Updated values shall be incorporated into the certified EMP as an amendment, in accordance with Condition 50.
54. The Attribute Target Levels in Schedules 7 and 8 for the Waterway Cultural Health Index, Marine Cultural Health Index and State of Takiwā scores, as well as the associated mana whenua values monitoring sites and methodology in the EMP, shall be developed in collaboration with Papatipu Rūnanga. Updated information shall be incorporated into the certified EMP as an amendment, in accordance with Condition 50, within 24 months of the commencement of this resource consent. Once these scores, sites and monitoring methods are confirmed, monitoring of mana whenua values shall commence.
55. The water quantity/flood model(s) for the Pūharakekenui/ Styx, Ōtākaro/ Avon, Ōpāwaho/ Heathcote and Huriitini / Halswell Rivers shall be updated as necessary to reflect changes in development patterns or modelling parameters at least every 5 years following the commencement of this resource consent. The results of model updates and a description of how they demonstrate compliance with Schedule 10 shall be included in the annual report required under Condition 61 on a 5-yearly basis following commencement of this resource consent.

## **Responses to Contaminant Load Modelling**

56. Where the modelling results reported in accordance with Condition 21 show that the percentage contaminant reductions required by the standards in Table 2 in Condition 19, and/or by the targets derived under each catchment-specific SMP are not met, the Consent Holder shall undertake the following:
- (a) Investigate the reasons for not achieving the modelled contaminant load reductions and describe what measures will be implemented (if necessary) to improve stormwater discharge quality;
  - (b) Assess whether best practicable options to mitigate the adverse effects of stormwater have been carried out;
  - (c) If the assessment in (b) determines that best practicable options have not been carried out, assess options for correction / remediation to mitigate any adverse effects, and provide a timeline for the implementation of correction / remediation options (if necessary); and
  - (d) Submit a report to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance and Papatipu Rūnanga (via Mahaanui Kurataiao Ltd), detailing the matters set out in (a) to (c) above.

## **Responses to Flood Modelling**

57. Where the flood modelling results show that the attribute target levels in Schedule 10 are not met, the Consent Holder shall:
- (a) Investigate the reasons for not achieving the attribute target levels within Schedule 10 and describe what measures will be implemented (if necessary) to meet the attribute target levels within Schedule 10. The investigation will include, but not be limited to, whether the state of waterways, including changes to channels, obstructions and sedimentation, is causing or contributing to the non-achievement;
  - (b) Assess whether best practicable options to avoid or mitigate the adverse effects of flooding have been carried out.
  - (c) If the assessment in (b) determines that best practicable options have not been carried out, assess options for correction / remediation to mitigate any adverse effects, and provide a timeline for the implementation of correction / remediation options (if necessary). The options to be assessed will include waterway maintenance and remediation; and
  - (d) Submit a report to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance, and Papatipu Rūnanga (via Mahaanui Kurataiao Ltd), detailing the matters set out in (a) to (c) above.
58. If, upon submittal of the report, where required by Condition 56 or 57, agreement between Christchurch City Council and Canterbury Regional Council cannot be reached regarding any aspects, the Consent Holder shall consult with the WIM group, or successor group, in accordance with the Joint Christchurch City Council and Canterbury Regional Council Stormwater Management Protocol or subsequent revisions to the Protocol, and in accordance with any agreements entered into between the Consent Holder and Papatipu Rūnanga; and implement any actions or changes identified as necessary by the WIM group, or successor group, through the

consultation.

*Advice note: Discussions should be undertaken with the Canterbury Regional Council prior to and following investigations, to try to establish agreed approaches prior to submitting the report.*

## **Responses to Monitoring**

59. If the monitoring results identify that the TSS, copper, lead and zinc Attribute Target Levels in surface water, as set out in Schedules 7 and 8, and Escherichia coli, copper, lead and zinc in groundwater, as set out in Schedule 9, are not being met, the Consent Holder shall:

- (a) Engage with the Canterbury Regional Council about conducting an investigation into whether this is due to the effects of stormwater discharges authorised under this resource consent, with site investigations prioritised for areas with high levels of contaminants, or with sensitive or high value receiving environments;
- (b) Carry out an investigation if required under Condition 59(a) and compile the results of such an investigation into a report to be submitted to the Canterbury Regional Council and Papatipu Rūnanga (via Mahaanui Kurataiao Ltd);
- (c) Include in the report, at a minimum:
  - (i) An evaluation of whether the monitoring results are due to stormwater discharges authorised under this resource consent or not;
  - (ii) An assessment of options for correction/remediation if effects are likely due to stormwater discharges authorised under this resource consent;
  - (iii) A timeline of implementation of corrective action/remediation if effects are a result of discharges authorised under this resource consent;
- (d) If, upon submittal of the above report, agreement between Christchurch City Council and Canterbury Regional Council cannot be reached regarding any aspects of the report referenced in (c) above, the Consent Holder shall consult with the WIM group, or successor group, in accordance with the Joint Christchurch City Council and Canterbury Regional Council Stormwater Management Protocol or subsequent revisions to the Protocol, and in accordance with any agreements entered into between the Consent Holder and Papatipu Rūnanga and implement any actions or changes identified as necessary by the WIM group, or successor group, through the consultation;
- (e) The sites triggering an investigation for a given monitoring year shall be identified in the annual report referred to in Condition 61, and the subsequent investigation report shall be provided with the following annual monitoring report twelve months later; and
- (f) Implement any actions or changes identified as necessary by the WIM group, or successor group, through the consultation under (d) above.

*Advice note: Discussions should be undertaken with the Canterbury Regional Council prior to and following investigations, to try to establish agreed approaches prior to submitting the report.*

## **Reporting**

60. The Consent Holder shall maintain relevant records including, but not limited to, detailed design drawings and reports, details of site-specific assessments undertaken, maps and any engineering design and construction certificates issued for any water quality or quantity mitigation facilities constructed. These records are to be made available to Canterbury Regional Council on request.
61. The Consent Holder shall provide an annual report to the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance, Banks Peninsula and Christchurch-West Melton Zone Committees, and Papatipu Rūnanga (via Mahaanui Kurataiao Ltd) by 30 June each year following the calendar year reported on. The first annual report shall cover the calendar year following the commencement of this resource consent. This report shall also be made available on the Christchurch City Council website and shall include, where appropriate:
  - (a) A summary of the outcomes of monitoring, investigations and other actions, in accordance with Conditions 23, 39, 40, 49, 54, and the 5-yearly report required under Condition 55. This summary shall be presented in such a way as to assess compliance with the resource consent conditions and trigger the responses required;
  - (b) A summary of the C-CLM results and contaminant load reduction targets set within SMPs, including any amendments to the model and consequential changes to expected contaminant load reductions;
  - (c) A summary of any discussions, consultation or responses carried out under Conditions 56 - 59;
  - (d) A summary of Canterbury Regional Council records of consent compliance and where any non-compliances of this resource consent occurred;
  - (e) A summary of flood modelling results (if applicable) for development in greenfield areas;
  - (f) Any updates to Schedule 1;
  - (g) An update on the timetable for construction and activation of Christchurch City Council stormwater mitigation systems for each SMP area, and/or any changes to the implementation of SMP requirements;
  - (h) Records of developments authorised under this consent;
  - (i) Report on any collaboration with Papatipu Rūnanga and any activities relating to the protection or enhancement of mana whenua values;
  - (j) A summary of the stormwater quality investigations undertaken during the year;



- (k) A summary of any additional monitoring or investigations undertaken beyond those specified in the EMP, including those undertaken on industrial sites in accordance with Condition 47, that have been initiated to inform the Consent Holder on stormwater management effectiveness;
- (l) Reporting of the alignment of the consent with the Christchurch-West Melton sub-regional section of the Canterbury LWRP;
- (m) Any changes to the regulatory framework that may warrant changes to the SMPs; and
- (n) Any complaints or observations received by the Consent Holder regarding spring flow and/or quality.

## ADMINISTRATION

- 62. The Consent Holder shall engage with Papatipu Rūnanga to collaboratively consider the conditions of this consent on a 5-yearly basis from the date of granting of this resource consent.
- 63. The Canterbury Regional Council may, on any of the last five days of March or September each year, serve notice of its intention to review the conditions of this resource consent for the purposes of:
  - (a) Dealing with any adverse effect on the environment which may arise from the exercise of this resource consent;
  - (b) Complying with the requirements of a relevant rule in an operative regional plan;
  - (c) Achieving consistency of this resource consent in regard to catchment management planning and stormwater management with the provisions of the Christchurch--West Melton Sub-regional Section of the Canterbury LWRP within five years of the notification of the sub-regional section;
  - (d) Providing alternative Receiving Environment Attribute Target Levels for water quantity;
  - (e) Ensuring that improvements of the quality of the stormwater discharge occur over the duration of this resource consent to reduce any adverse effect on the environment;
  - (f) To provide alternative standards for the expected city-wide percentage contaminant load reductions in Condition 19, or targets for the contaminant load reductions set within SMPs that become apparent through the C-CLM or alternative methods developed by the Consent Holder.
- 64. Prior to the exercise of this resource consent, the following resource consents shall be surrendered:
  - (a) CRC120223
  - (b) CRC131249.
- 65. If this resource consent is not given effect to before 30 June 2024, then it shall lapse in

accordance with Section 125 of the Resource Management Act 1991.

## **ATTACHMENTS**

**Schedule 1: Sites excluded from the Christchurch City Council Comprehensive Discharge Consent**

**Schedule 2: Condition 7 - Matters to be included within SMPs**

**Schedule 3: Stormwater Quality Investigation Programme**

**Schedule 4: Other Actions by Consent Holder**

**Schedule 5: Christchurch Contaminant Load Model**

**Schedule 6: General City Conditions – Water Quality and Quantity**

**Schedule 7: Receiving Environment Objectives and Attribute Target Levels for Waterways**

**Schedule 8: Receiving Environment Objectives and Attribute Target Levels for Coastal Waters**

**Schedule 9: Receiving Environment Objectives and Attribute Target Levels for Groundwater and Springs**

**Schedule 10: Receiving Environment Objectives and Attribute Target Levels for Water Quantity**

## Schedule 1: Sites Excluded from the Comprehensive Stormwater Network Discharge Consent

### Sites excluded from the South West SMP Area

Street Address	Street Number	Legal Description	CCC Prupi
Alloy Street	2	Lot 2 DP 64248	704537
Ballarat Way	2	Lot 1 DP 466471	618251
Ballarat Way	10	Lot 2 DP 466471	618252
Blenheim Road	412	Part Lot 3 DP 15178	466207
Blenheim Road	4/455	Lot 1 DP 489573	923053
Branston Street	96	Lot 2 DP 352288	587825
Canterbury Street	7	Lot 10 DP 2899, Lot 9 DP 2899, Lot 11 DP 2899, Lot 12 DP 2899, Lot 1 DP 21916	716119
Carmen Road	106G	Lot 3 DP 338441	582584
Chappie Place	17	Lot 1 DP 443257	908779
Halswell Junction Road	515	Lot 2 DP 358423, Lot 3 DP 358423	587860, 587861
Hayton Road	115	Lot 3 DP 353897	585855
Hayton Road	137	Lot 2 DP 343321	584430
Hayton Road	79 & 79A	Lot 1 DP 481286, Lot 2 DP 481286	924341, 924342
Main South Road	222	Lot 1 DP 14716, Lot 1 DP 51993	750576
Main South Road	243 & 245	Pt Lot 2 DP 6604, RS 39034, Lot 1 DP 78344, Lot 2 DP 78344	516213, 520964, 408547, 510731
McAlpine Street	18	Lot 8 DP 36831	429004
McAlpine Street	67	Lot 9 DP 30936	428578
Parkhouse Road	59	Lot 1 DP 25818	485608
Springs Road	254	Lot 1 DP 358423	587859
Waterloo Road	60	Lot 1 DP 80063	407540
Wigram Close	15	Lot 1 DP 51889, Lot 2 DP 324467	504628, 579847
Wigram Road	120	Lot 2 DP 493335	625647
Wigram Road	122	Lot 4 DP 475888	621028
Wigram Road	120A	Lot 1 DP 493335	625646
Wilmers Road	10	Lot 4 DP 20669	817675
Wilmers Road	50	Lot 5 DP 447519	615860
<b>Partial Site Exclusions</b>			
Street Address	Street Number	Legal Description	CCC Prupi
Carmen Road	112	Section 27 SO 459717	629404
Halswell Junction Road	600	Lot 7 DP 404845	609872
Harvard Avenue	45	Lot 1 DP 81480	565026
Main South Road	282	Lot 10 DP 1391	750597

## Sites excluded from the Pūharakekenui/Styx SMP Area

Street Address	Street Number	Legal Description	CCC Prupi
Barnes Road	79-87	Lot 1 DP 346683	586324
Belfast Road	30	Lot 2 DP 37063	425217
Broughs Road	6	LOT 15 DP 36871	814749
Broughs Road	7	LOT 2 DP 36871	714473
Broughs Road	15	LOT 3 DP 36871	804901
Broughs Road	23	LOT 4 DP 36871	874832
Cavendish Road	150	Lot 2 DP 401108	609557
Cavendish Road	158	Lot 1 DP 360822	587685
Dickeys Road	13	Pt Lot 1 DP 23890, Lot 1 DP 25116	437651, 438723
Export Avenue	1	LOT 6 DP 83863	861839
Export Avenue	2	LOT 2 DP 304904	861835
Export Avenue	3	LOT 5 DP 83863	861838
Export Avenue	6	LOT 3 DP 83863	861836
Export Avenue	8	LOT 4 DP 83863	861837
Johns Road	480	Sec 62 SO 460822	620075
Johns Road	530	PT LOT 1 DP 51000	870081
Johns Road	544	PT LOT 1 DP 23615	857821
Johns Road	550	Sec 8 SO 494743, Sec 21 SO 494743	628638, 628647
Johns Road	568	LOT 2 DP 51000	832492
Johns Road	600	PT RS 40862	870083
Logistic Drive	10	LOT 10 DP 375764	891559
Logistic Drive	11	LOT 9 DP 375764	891558
Logistic Drive	12	LOT 1 DP 412022	900821
Logistic Drive	14	LOT 12 DP 375764, LOT 2	900822
Logistic Drive	15	LOT 8 DP 375764	891557
Logistic Drive	16	LOT 13 DP 375764	891562
Logistic Drive	17	LOT 7 DP 375764	891556
Logistic Drive	18	LOT 100 DP 412877	900774
Logistic Drive	19	LOT 6 DP 375764	891555
Logistic Drive	20	LOT 101 DP 412877	900775
Logistic Drive	21	LOT 5 DP 375764	891554
Logistic Drive	23	LOT 4 DP 375764	891553
Logistic Drive	24	LOT 102 DP 412877	900776
Logistic Drive	25	LOT 3 DP 375764	891552
Logistic Drive	26	LOT 103 DP 412877	900777
Logistic Drive	27	LOT 2 DP 375764	891551
Logistic Drive	28	LOT 104 DP 412877	900778
Logistic Drive	29	LOT 1 DP 375764	891550
Logistic Drive	31	LOT 17 DP 375764	891566
Logistic Drive	15L	LOT 19 DP 375764	891573
Logistic Drive	29L	LOT 20 DP 375764	891574
Lower Styx Road	361	Lot 1 DP 508689	629529
Mcleans Island Road	2	LOT 16 DP 375764	891565
Mcleans Island Road	12	LOT 15 DP 375764	891564
Mcleans Island Road	14	LOT 1 DP 304904	865337

McLeans Island Road	16	LOT 2 DP 79639	754142
Nathan Place	1	PT LOT 2 DP 55072	870082
Nathan Place	7	LOT 3 DP 55072	864585
Nathan Place	11	LOT 1 DP 70619	864584
Radcliffe Road	301	Lot 4 DP 313448	584569
Sawyers Arms Road	527	LOT 1 DP 55072	836526
Sawyers Arms Road	530	PT LOT 1 DP 51000	870081
Sawyers Arms Road	533	LOT 1 DP 45800	858525
Sawyers Arms Road	540	LOT 1 DP 36870	817420
Sawyers Arms Road	565	LOT 2 DP 64781	771301
Sawyers Arms Road	575	LOT 1 DP 64781	771302
Spencerville Road	25	Lot 2 DP 53987	419068
Turners Road	50	Lot 3 DP 83312	568085
Wairakei Road	656	Lot 1 DP 6411	414964

## **Schedule 2: Condition 7 - Matters to be included within SMPs**

- (a) Specific guidelines for implementation of stormwater management to achieve the purpose of SMPs;
- (b) A definition of the extent of the stormwater infrastructure, that forms the stormwater network within the SMP area for the purposes of this consent;
- (c) A contaminant load reduction target(s) for each catchment within that SMP area and a description of the process and considerations used in setting the contaminant load reduction target(s) required by Condition 6(b) using the best reasonably practicable model or method and input data;
- (d) A description of statutory and non-statutory planning mechanisms being used by the Consent Holder to achieve compliance with the conditions of this consent including the requirement to improve discharge water quality. These mechanisms shall include:
  - (i) Relevant objectives, policies, standards and rules in the Christchurch District Plan;
  - (ii) Relevant bylaws; and
  - (iii) Relevant strategies, codes, standards and guidelines;
- (e) Mitigation methods to achieve compliance with the conditions of this resource consent including the requirement to improve discharge water quality under Condition 23, and to meet the contaminant load reduction targets for each catchment as determined through the SMPs and the standards for the whole of Christchurch set in Condition 19. These methods shall include:
  - (i) Stormwater mitigation facilities and devices;
  - (ii) Erosion and sediment control guidelines;
  - (iii) Education and awareness initiatives on source control systems and site management programmes;
  - (iv) Support for third party initiatives on source control reduction methods;
  - (v) Prioritising stormwater treatment in catchments: that discharge in proximity to areas of high ecological or cultural value, such as habitat for threatened species or Areas of Significant Natural Value under the Regional Coastal Environment Plan (Canterbury Regional Council, 2012); and areas with high contaminant loads;
- (f) Locations and identification of Christchurch City Council water quality and water quantity mitigation facilities and devices; including a description and justification for separation distances between mitigation facilities or devices and any contaminated land;
- (g) Identification of areas planned for future development and a description of the Consent Holder's consideration to retrofit water quality and quantity mitigation for existing catchments through these developments where reasonably practicable;

- (h) Identification of areas subject to known flood hazards;
- (i) A description of how environmental monitoring and assessment of tangata whenua values have been used to develop water quality mitigation methods and practices;
- (j) Results from and interpretation of water quantity and quality modelling, including identification of sub-catchments with high levels of contaminants;
- (k) Mapping of existing information from Canterbury Regional Council and the Consent Holder showing locations where discrete spring vents occur;
- (l) Consideration of any effects of the diversion and discharge of stormwater on baseflow in waterways and springs and details of monitoring that will be undertaken of any waterways and springs that could be affected by stormwater management changes anticipated within the life of the SMP;
- (m) A cultural impact assessment;
- (n) A summary of outcomes resulting from any collaboration with Papatipu Rūnanga on SMP development;
- (o) An assessment of the effectiveness of water quality or quantity mitigation methods established under previous SMPs and identification of any changes in methods or designs resulting from the assessment;
- (p) Assessment and description of any additional or new modelling, monitoring and mitigation methods being implemented by the Consent Holder;
- (q) A summary of feedback obtained in accordance with Condition 8 and if / how that feedback has been incorporated into the SMP;
- (r) If the Consent Holder intends to use land not owned or managed by the Consent Holder for stormwater management, a description of the specific consultation undertaken with the affected land owner;
- (s) Identification of key locations in addition to those identified in Schedule 10 where modelled assessments of water levels and/or volumes shall be made for the critical 2% AEP event and any other relevant return interval. For each additional key location, appropriate water level reductions or tolerances for increases shall be set according to the SMP objectives and shall be reported with the model update results required under Condition 55;

*Advice Note: For the avoidance of doubt, changes to the Receiving Environment Objective and Attribute Target Levels set out in Schedule 10 can only be made through an application to change the conditions of consent pursuant to s127 of the Resource Management Act 1991.*

- (t) Procedures, to be developed in consultation with Christchurch International Airport Limited, for the management of the risk of bird strike for any facility owned or managed by the Christchurch City Council within 3 kilometres of the airport;
- (u) A description of any relevant options assessments undertaken to



identify the drivers behind mitigation measures selected; and

- (v) An assessment of the potential change to the overall water balance for the SMP area arising from the change in pervious area and the stormwater management systems proposed.

### Schedule 3 - Stormwater Quality Investigation Programme

<b><u>Stormwater Quality Investigation Actions</u></b>	<b>Action Start Date</b>	<b>Action Completion Date</b>
<p>a. Investigate the feasibility of developing an instream contaminant concentration model.</p> <p>Consideration shall be given to:</p> <p>(i) How applicable the model will be to -</p> <ul style="list-style-type: none"> <li>• Water quality management generally</li> <li>• The resource consent specifically</li> </ul> <p>(ii) Timelines</p> <p>(iii) Costs</p> <p>(iv) What data CCC would need to collect</p>	Within 6 months of the commencement of the resource consent	Within 18 months of the commencement of the resource consent
<p>b. Develop instream contaminant concentration model if the Consent Holder feasibility study in (a) provides sufficient merit.</p>	Within 2 years of the commencement of the resource consent	Within 3 years of the commencement of the resource consent
<p>c. If the instream contaminant concentration model is developed, carry out investigations and monitoring to validate and refine assumptions within the model, to improve the accuracy of model predictions.</p>	Within 4 years of the commencement of the resource consent	Ongoing
<p>d. Conduct a feasibility study to establish the existing knowledge base and investigate the feasibility of robustly predicting the responses of the receiving environment to changes in network contaminant loads and resulting in-stream concentrations.</p> <p>Consideration shall be given to how and when the receiving environment might respond to changes in contaminant concentrations, how much work would be involved to predict results, what sort of models are possible, how would monitoring to obtain real world results be carried out, how long would it take the biological community to respond (i.e. lag effects), and gaps of knowledge.</p>	Within 12 months of the commencement of the resource consent	Within 3 years of the commencement of the resource consent
<p>e. If the Consent Holder considers that the feasibility study under (d) shows sufficient merit, and the Council considers it warranted, instigate a programme of research, monitoring and/or modelling to quantify expected responses in the receiving environment. For example: Undertake selected monitoring of discharges at “end of pipe”,</p>	Within 3 years of the commencement of the resource consent	Ongoing

into the receiving environment to assist model development and calibration.		
f. Investigate the impacts of applying alternative modelling tools (including 'deterministic' models) to characterise the relationship between contaminant loads, concentrations and the receiving environment, and the processes which influence that relationship. Such tools may include the MEDUSA and MUSIC modelling tools.	Within 1 year of the commencement of the resource consent	Ongoing
g. Investigate the feasibility of techniques for remediating adverse effects of stormwater sediment discharges on receiving environments. This shall include consideration of sediment cover of the bed, and copper, lead, zinc and PAHs contamination.	Within 1 year of the commencement of the resource consent	Within 3 years of the commencement of the resource consent
h. If the Consent Holder determines that it is feasible, instigate an instream sediment remediation programme.	Within 3 years of the commencement of the resource consent	Ongoing
i. Monitor the actual TSS, zinc and copper reduction performance of selected stormwater treatment facilities and devices in order to improve certainty of performance values relating to TSS, zinc and copper in contaminant load modelling. Report findings and outcomes in annual report to CRC.	Within 6 months of the commencement of the resource consent	Ongoing
j. Apply the monitoring output, along with other stormwater modelling and monitoring data being gathered, to inform the planning and design of stormwater systems and facilities, including in the development of Implementation Plans and reviews of SMPs, IDS and WWDG.		
k. Carry out targeted wet weather monitoring of surface water in selected receiving environments, to improve knowledge of the state of the receiving environment, contaminant inputs and treatment efficiency, and to inform mitigation options under the SMPs. Selected areas may include new stormwater developments and retrofits and known existing hotspots of contaminants. Sampling shall focus on detailed methods to characterise inputs, such as the use of auto-sampling, rather than grab sampling.	Within 6 months of the commencement of the resource consent	Ongoing

## Schedule 4: Other Actions by Consent Holder

<b><u>Other Actions</u></b>	<b>Activity Start Date</b>	<b>Activity Completion Date</b>
<b>Source Control</b>		
a. Lodge a submission to central government seeking national measures and industry standards to reduce the discharge of contaminants including zinc and copper from metal roofs, car tyres and brake linings.	Within 6 months of the commencement of the resource consent	Within 1 year of the commencement of the resource consent
b. Conduct a cost/benefit analysis of options for carrying out a targeted trial for contaminant reduction from increased level of selective street sweeping and sump cleaning (For consideration as part of Council Annual Planning process).	Within 6 months of the commencement of the resource consent	Within 1 year of the commencement of the resource consent
c. If the Consent Holder Determines that the cost/benefit analysis under Item (b) shows that it is warranted, carry out trials for increased targeted/selective street sweeping and sump cleaning.	Within 1 year of the commencement of the resource consent	Within 3 years of the commencement of the resource consent
d. Conduct a cost/benefit analysis of options of alternate methods of stormwater treatment and discharge including consideration of redirection to sewer and Managed Aquifer Recharge/Discharge (For consideration as part of Council Annual Planning process).	Within 6 months of the commencement of the resource consent	Within 18 months of the commencement of the resource consent
e. If the Consent Holder determines that the cost/benefit analysis under Item (d) shows that it is warranted, carry out trials for alternate methods of stormwater treatment and discharge.	Within 2 years of the commencement of the resource consent	Within 4 years of the commencement of the resource consent
f. Apply the results of trials on street sweeping, sump cleaning and alternate methods of stormwater treatment (actions b and c above), along with results from other stormwater modelling and monitoring data being gathered, to the planning and design of stormwater systems and facilities, including in the development and review of SMPs, IDS and WWDG.		
g. If the Consent Holder determines it warranted as a result of the trials in Item (c) above, increased frequency of street sweeping of selected areas.	Within 2 years of the commencement of the resource consent	Ongoing
h. If the Consent Holder determines it warranted as a result of the trials in Item (c) above, increased frequency of sump cleaning at selected locations.	Within 2 years of the commencement of the resource	Ongoing
i. Instigate, in the building consent approval and inspection process, a requirement for and process for approval and inspection of erosion and sediment control measures prior to site clearances	Within 6 months of the commencement of	Ongoing

commencing and throughout the construction process.	the resource consent	
j. Develop a programme for operational inspection of a sample of private stormwater treatment and/or retention devices on non-industrial sites for the purposes of ensuring proper function and maintenance.	Within 2 years of the commencement of the resource consent	Ongoing
k. Conduct a cost/benefit analysis of options to further improve source control that considers: (i) allocation of staff/resources to undertake industrial site audits; (ii) expected contamination risk and possible risk reduction of industrial sites; and (iii) other source control measures in Schedule 3 as required by Condition 39.	Within 6 months of the commencement of the resource consent	Within 18 months of the commencement of the resource consent
l. Apply, through agreement between the Consent Holder and Canterbury Regional Council, the results of the cost/benefit analysis under Item (k) above to prioritise source control measures in SMPs and the Implementation Plan and to determine the number of audits conducted under Condition 47(b).	Within 2 years of the commencement of the resource consent	Ongoing
<b>Communication, Education and Awareness</b>		
m. Make reasonable endeavours to establish a community water engagement programme involving Council, Canterbury Regional Council, Ngai Tahu, DoC, MfE, Universities, industry representatives and Community Groups with the objective of encouraging awareness and community actions to reduce stormwater contaminant discharges and improve waterways through source control and behavior change.  Possible initiatives of the community water engagement programme are:  (i) Providing information for property owners on quick actions that they can undertake around the home to stop contaminants from entering stormwater (based on 2017 Community Waterway Survey findings conducted by Christchurch City Council). (ii) Implement a sustainable behavior change programme. Actions aimed at stopping contaminants getting into the stormwater network, such as: sediment, litter, bacterial contaminants. (iii) Undertaking a wider educational programme for schools. (iv) Educating dog owners about effects of fecal matter. (v) Seeking industry behavior change.	Within 6 months of the commencement of the resource consent	Ongoing
n. The Consent Holder shall convene the River Care Liaison Group meeting at least once annually. At	Within 1 year of the	Ongoing

<p>each meeting the Consent Holder shall update the River Care Liaison Group and receive feedback on matters relating to the exercise of this resource consent, including but not limited to:</p> <ul style="list-style-type: none"> <li>(i) Relevant capital and maintenance works completed in the past year and currently programmed by the Consent Holder;</li> <li>(ii) Development and refinement of the C-CLM and flood modelling;</li> <li>(iii) Any new technologies in stormwater contaminant reduction or preventative measures; and</li> <li>(iv) Compliance and monitoring results as reported under Condition 61.</li> </ul>	commencement of the resource consent	
<p>o. Minutes of the River Care Liaison Group Meeting shall be circulated by the Consent Holder to the River Care Liaison Group within four weeks of the meeting.</p>		
<p>p. The Consent Holder shall convene the Industry Liaison Group meeting at least once annually. At each meeting the Consent Holder shall update the Industry Liaison Group and receive feedback on matters relating to the exercise of this resource consent, including but not limited to:</p> <ul style="list-style-type: none"> <li>(i) development of the risk matrix required under Condition 3(b) (ii);</li> <li>(ii) implementation of the industrial site audit process under Condition 47;</li> <li>(iii) any new technologies in stormwater contaminant reduction or preventative measures; and</li> <li>(iv) Compliance and monitoring results as reported under Condition 61.</li> </ul>	Within 1 year of the commencement of the resource consent	Ongoing
<p>q. Minutes of the Industry Liaison Group Meeting shall be circulated by the Consent Holder to the Industry Liaison Group within four weeks of the meeting.</p>		
<b>Puharakekenui/Styx River Weed Management</b>		
<p>r. Investigate the degree to which various options in river channel weed (macrophyte) management practices mitigate flood effects on the Puharakekenui/Styx River under a range of river flow scenarios. Factors to be considered shall include:</p> <ul style="list-style-type: none"> <li>(i) International weed management practices in similar settings; and</li> <li>(ii) the factors which promote or suppress growth of the specific prolific weed species in the Puharakekenui/Styx River, including sediments, dry weather flows, stormwater discharges covered by the resource consent, other discharges, shading and climatic factors.</li> </ul>	Within 6 months of the commencement of the resource consent	Within 18 months of the commencement of the resource consent
<p>s. Based on the results of the investigation under Condition 39(r), and through engagement with Canterbury Regional Council, the Consent Holder</p>	Within 2 years of the commencement of	Within 3 years of the commencement of

<p>shall identify the best practicable options for mitigating flooding through river channel weed management. Factors to be considered shall include:</p> <ul style="list-style-type: none"> <li>(i) A range of river flow scenarios including dry weather (spring-fed) flows and storm flows where operational/maintenance management will be beneficial;</li> <li>(ii) A range of river channel operational/maintenance management scenarios;</li> <li>(iii) Flooding effects including level, extent and duration;</li> <li>(iv) Available technical knowledge;</li> <li>(v) Potential for practical implementation of options;</li> <li>(vi) Costs for implementing options;</li> <li>(vii) Available regulatory mechanisms;</li> <li>(viii) Consideration of ecological effects; and</li> <li>(ix) Consideration of overlapping powers and responsibilities between Canterbury Regional Council and Christchurch City Council under other legislation.</li> </ul>	the resource consent	the resource consent
t. Conduct a cost/benefit analysis of the identified best practicable options for carrying out a targeted trial for achieving reduced flooding from changes in the weed management of the Pūharakekenui/Styx River.	Within 3 years of the commencement of the resource consent	Within 4 years of the commencement of the resource consent
u. Determine the best approach to incorporating the variable weed condition within the Pūharakekenui/Styx River hydraulic model and resulting design flood scenarios.	Within 3 years of the commencement of the resource consent	Within 4 years of the commencement of the resource consent
v. Test the Pūharakekenui/Styx River model calibration against other storm events, as they arise, to calibrate/validate model sensitivity to varying weed conditions.	Within 3 years of the commencement of the resource consent	Within 4 years of the commencement of the resource consent
w. Apply, through engagement with the Canterbury Regional Council, the results of the cost/benefit analysis in a targeted trial for the selected best practicable options for weed management of the Pūharakekenui/Styx River river channel.	Within 4 years of the commencement of the resource consent	Within 5 years of the commencement of the resource consent
x. If the Consent Holder determines it warranted as a result of the trials in Item 39(u) above, implement the selected best practicable option within the Pūharakekenui/Styx River Area SMP.	Within 5.5 years of the commencement of the resource consent	ongoing

## Schedule 5: Christchurch Contaminant Load Model Report



### REPORT

## Assessment of Current and Future Stormwater Contaminant Load for Christchurch

*CLM Modelling Report - Best Practice Infrastructure*

Submitted to:

**Christchurch City Council**

53 Hereford Street  
Christchurch 8013

Submitted by:

**Golder Associates (NZ) Limited**

Level 1, 214 Durham Street Christchurch 8011 New Zealand

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1378107576-7403-024-R-Rev0

July 2018



C-CLM Modelling  
Report 2018 - Best  
Practice  
Infrastructure



## Schedule 6: General City Conditions – Water Quality and Quantity

This table indicates minimum requirements to enable discharges under this consent from greenfield developments and re-developments in areas not yet covered by a Stormwater Management Plan. Until 1 January 2025, for any development where the Christchurch City Council (CCC) considers there are factors that require Canterbury Regional Council input it can choose to not accept a proposed discharge to its network, and therefore a consent from the Regional Council would be required. The CCC may also require a higher standard than is represented in the table below in order to mitigate effects on the network or if any special conditions exist.

Source of Stormwater Discharge(s)	<b>SMALL SITES</b> Total area of disturbance does not exceed 1,000m <sup>2</sup>	<b>LARGE SITES</b> Total area of disturbance equals, or is greater than 1,000m <sup>2</sup>
From/during land disturbance activities	Erosion and Sediment Control Plan is required	Erosion and Sediment Control Plan is required
From new / re-development <b>residential</b> roof and hardstand areas	<p>No discharge onto or into land where average site slope exceeds 5 degrees</p> <p>Sumps collecting runoff from new hardstand areas shall be fitted with submerged or trapped outlets wherever practicable</p> <p>An assessment of water quantity effects and provision of on-site stormwater storage or network upgrade may be required for sites in the flat**</p> <p>On-site rain water storage is required for new and redevelopment sites on the hills</p>	<p>No discharge onto or into land where average site slope exceeds 5 degrees</p> <p>First flush treatment is required for stormwater runoff from new hardstand areas in excess of 150m<sup>2</sup> and buildings with copper or uncoated galvanised metal roofs or guttering/spouting*</p> <p>An assessment of water quantity effects and provision of on-site stormwater storage or network upgrade may be required for sites in the flat**</p> <p>On-site rain water storage is required for new and redevelopment sites on the hills</p>
From new / re-development <b>non-residential</b> roof and hardstand areas	<p>No discharge onto or into land where average site slope exceeds 5 degrees</p> <p>First flush treatment is required for stormwater runoff from new hardstand areas in excess of 150m<sup>2</sup>, buildings with copper or uncoated galvanised roofs or guttering/spouting and high-use sites</p> <p>An assessment of water quantity effects and provision of on-site stormwater storage or network upgrade may be required**</p> <p>Site management and spill procedures required for sites that engage in hazardous activities***</p>	<p>No discharge onto or into land where average site slope exceeds 5 degrees</p> <p>First flush treatment is required for stormwater runoff from new hardstand areas in excess of 150m<sup>2</sup>, buildings with copper or uncoated galvanised roofs or guttering/spouting and high-use sites</p> <p>An assessment of water quantity effects and provision of on-site stormwater storage or network upgrade may be required**</p> <p>Site management and spill procedures required for sites that engage in hazardous activities***</p>

\* CCC has discretion to waive the requirement for first flush treatment of hardstand areas on large residential sites where the amount of pollution-generating hardstand being added is considered to have less than minor effect. "Uncoated" means without a painted or enameled coating.

\*\* Quantity assessment and mitigation - The effects of the discharge on the stormwater network capacity and/or the extent or duration of flooding on downstream properties are to be assessed. Where CCC considers an increase (including cumulative increases) has a more than minor effect, onsite stormwater attenuation or stormwater network upgrade shall be provided. The details of storage volume and peak discharges or network capacity required to mitigate effects on flooding or network capacity constraints shall be determined by the Christchurch City Council Planning Engineer.

\*\*\* Site management and spill procedures – Procedures are to be implemented to prevent the discharge of hazardous substances or spilled contaminants discharging into any land or surface waters via any conveyance path.

## Schedule 7: Receiving Environment Objectives and Attribute Target Levels for Waterways

- The EMP outlines the methodology for the monitoring of Attributes and how these will be compared against Attribute Target Levels.
- TBC-A = To Be Confirmed once a full year of monitoring allows hardness modified values to be calculated, in accordance with Condition 51.
- TBC-B = To Be Confirmed following engagement with Papatipu Rūnanga, through an update to the EMP, in accordance with Condition 53.

Objective	Attribute	Attribute Target Level	Basis for Target
Adverse effects on ecological values do not occur due to stormwater inputs	QMCI	Lower limit QMCI scores: <ul style="list-style-type: none"> <li>• Spring-fed – plains – urban waterways: 3.5</li> <li>• Spring-fed – plains waterways: 5</li> <li>• Banks Peninsula waterways: 5</li> </ul>	QMCI is an indicator of aquatic ecological health, with higher numbers indicative of better quality habitats, due to a higher abundance of more sensitive species. QMCI scores are taken from the guidelines in Table 1a of the LWRP (Canterbury Regional Council, 2018). This metric is designed for wade able sites and should therefore be used with caution for non-wade able sites. These targets can be achieved through reducing contaminant loads and waterway restoration.
Adverse effects on water clarity and aquatic biota do not occur due to sediment inputs	Fine sediment (<2 mm diameter) percent cover of stream bed  TSS concentrations in surface water	Upper limit fine sediment percent cover of stream bed: <ul style="list-style-type: none"> <li>• Spring-fed – plains – urban waterways: 30%</li> <li>• Spring-fed – plains waterways: 20%</li> <li>• Banks Peninsula waterways: 20%</li> </ul> Upper limit concentration of TSS in surface water: 25 mg/L  No statistically significant increase in TSS concentrations in surface water	Sediment (particularly from construction) can decrease the clarity of the water, and can negatively affect the photosynthesis of plants and therefore primary productivity within streams, interfere with feeding through the smothering of food supply, and can clog suitable habitat for species. The sediment cover Target Levels are taken from the standards for the original Styx and South-West Stormwater Management Plan consents, and are based on Table 1a of the LWRP (Canterbury Regional Council, 2018). These targets should be used with caution at sites that likely naturally have soft-bottom channels. These targets can be achieved through reducing contaminant loads (particularly using erosion and sediment control) and instream sediment removal.
Adverse effects on aquatic biota do not occur due to copper, lead and zinc inputs in surface water	Zinc, copper and lead concentrations in surface water	Upper limit concentration of dissolved zinc: <ul style="list-style-type: none"> <li>• Ōtakaro/ Avon River catchment: 0.0297 mg/L</li> <li>• Ōpāwaho/ Heathcote River catchment: 0.04526 mg/L</li> <li>• Cashmere Stream: 0.00724 mg/L</li> <li>• Huritini / Halswell River catchment: 0.01919 mg/L</li> <li>• Pūharakekenui/ Styx River catchment: 0.01214 mg/L</li> <li>• Ōtūkaikino River catchment: 0.00868 mg/L</li> <li>• Linwood Canal: 0.146 mg/L</li> <li>• Banks Peninsula catchments: TBC-A</li> </ul>	These metals can be toxic to aquatic organisms, negatively affecting such things as fecundity, maturation, respiration, physical structure and behavior. The CCC has developed these hardness modified trigger values in accordance with the methodology in the 'Australian and New Zealand Environment and Conservation Council, and Agriculture and Resource Management Council of Australia and New Zealand' (ANZECC, 2000) guidelines, and the species protection level relevant to each waterway in the LWRP (Canterbury Regional Council, 2017). This calculation document can be provided on request. These targets can be achieved primarily through reducing contaminant loads.

Objective	Attribute	Attribute Target Level	Basis for Target
		<p>Upper limit concentration of dissolved copper:</p> <ul style="list-style-type: none"> <li>• Ōtākaro/ Avon River catchment: 0.00356 mg/L</li> <li>• Ōpāwaho/ Heathcote River catchment: 0.00543 mg/L</li> <li>• Cashmere Stream: 0.00302 mg/L</li> <li>• Huritini / Halswell River catchment: 0.00336 mg/L</li> <li>• Pūharakekenui/ Styx River catchment: 0.00212 mg/L</li> <li>• Ōtūkaikino River catchment: 0.00152 mg/L</li> <li>• Linwood Canal: 0.0175 mg/L</li> <li>• Banks Peninsula catchments: TBC-A</li> </ul> <p>Upper limit concentration of dissolved lead:</p> <ul style="list-style-type: none"> <li>• Ōtākaro/ Avon River catchment: 0.01554 mg/L</li> <li>• Ōpāwaho/ Heathcote River catchment: 0.02916 mg/L</li> <li>• Cashmere Stream: 0.00521 mg/L</li> <li>• Huritini / Halswell River catchment: 0.01257 mg/L</li> <li>• Pūharakekenui/ Styx River catchment: 0.00634 mg/L</li> <li>• Ōtūkaikino River catchment: 0.00384 mg/L</li> <li>• Linwood Canal: 0.167 mg/L</li> <li>• Banks Peninsula catchments: TBC-A</li> </ul> <p>No statistically significant increase in copper, lead and zinc concentrations</p>	
Excessive growth of macrophytes and filamentous algae does not occur due to nutrient inputs	Total macrophyte and filamentous algae (>20 mm length) cover of stream bed	<p>Upper limit total macrophyte cover of the stream bed:</p> <ul style="list-style-type: none"> <li>• Spring-fed – plains – urban waterways: 60%</li> <li>• Spring-fed – plains waterways: 50%</li> <li>• Banks Peninsula waterways: 30%</li> </ul> <p>Upper limit filamentous algae cover of the stream bed:</p>	Macrophyte and algae cover are indicators of the quality of aquatic habitat. Targets are taken from Table 1a of the LWRP (Canterbury Regional Council, 2018). Improvement towards these targets can be achieved by reduction in nutrient concentrations and riparian planting to shade the waterways.

Objective	Attribute	Attribute Target Level	Basis for Target
		<ul style="list-style-type: none"> <li>Spring-fed – plains – urban waterways: 30%</li> <li>Spring-fed – plains waterways: 30%</li> <li>Banks Peninsula waterways: 20%</li> </ul>	
Adverse effects on aquatic biota do not occur due to zinc, copper, lead and PAHs in instream sediment	Zinc, copper, lead and PAHs concentrations in instream sediment	<p>Upper limit concentration of total recoverable metals for all classifications:</p> <ul style="list-style-type: none"> <li>Copper = 65 mg/kg dry weight</li> <li>Lead = 50 mg/kg dry weight</li> <li>Zinc = 200 mg/kg dry weight</li> <li>Total PAHs = 4 10 mg/kg dry weight</li> </ul> <p>No statistically significant increase in copper, lead, zinc and Total PAHs</p>	Meta Metals can bind to sediment and remain in waterways, potentially negatively affecting biota. These trigger values are based on the ANZECC guidelines (ANZECC, 2018). These targets can be achieved through reducing contaminant loads and instream sediment removal.
Adverse effects on Mana Whenua values do not occur due to stormwater inputs	Waterway Cultural Health Index and State of Takiwā scores	<p>Lower limit averaged Waterway Cultural Health Index and State of Takiwā scores for all classifications:</p> <ul style="list-style-type: none"> <li>Spring-fed – plains – urban waterways: TBC-B</li> <li>Spring-fed – plains waterways: TBC-B</li> <li>Banks Peninsula waterways: TBC-B</li> </ul>	The Waterway Cultural Health Index assesses cultural values and indicators of environmental health, such as mahinga kai (food gathering). These indices are on a scale of 1 - 5, with higher scores indicative of greater cultural values. No guidelines are available currently for the different types of waterways, so these targets will be developed specifically for this consent, with higher targets for waterways with higher values. These targets can be achieved through reducing contaminant loads and habitat restoration.

## Schedule 8: Receiving Environment Objectives and Attribute Target Levels for Coastal Waters

- The EMP outlines the methodology for the monitoring of Attributes and how these will be compared against Attribute Target Levels.
- TBC-B = To Be Confirmed following consultation with Papatipu Rūnanga, through an update to the EMP, in accordance with Condition 53.

Objective	Attribute	Attribute Target Level	Basis for Target
Adverse effects on water clarity and aquatic biota do not occur due to sediment inputs	TSS concentrations in surface water	No statistically significant increase in TSS concentrations	Elevated levels of TSS in the water column decrease the clarity of the water and can adversely affect aquatic plants, invertebrates and fish. For example, sediment can affect photosynthesis of plants and therefore primary productivity, interfere with feeding through the smothering of food supply, and can clog suitable habitat for species. There is no guideline available for this parameter, so no change in concentrations is proposed to be conservative. The target will be achieved by reducing contaminant loads (particularly using erosion and sediment control measures).
Adverse effects on aquatic biota do not occur due to copper, lead and zinc inputs in surface water	Copper, lead and zinc concentrations in surface water	Maximum dissolved metal concentrations for all classes (with the exception of the Operational Area of the Port of Lyttelton): <ul style="list-style-type: none"> <li>• Copper: 0.0013 mg/L</li> <li>• Lead: 0.0044 mg/L</li> <li>• Zinc: 0.015 mg/L</li> </ul> No statistically significant increase in copper, lead and zinc concentrations	Metals, in particular, copper, lead and zinc, can be toxic to aquatic organisms, negatively affecting such things as fecundity, maturation, respiration, physical structure and behavior (Harding, 2005). These targets are taken from the ANZECC (2000) guidelines for the protection of 95% of species. The Operational Area of the Port of Lyttelton is affected by direct discharges from boats that will make monitoring of the effects of stormwater difficult, therefore the targets are not applicable to this area. These targets will be achieved by reducing contaminant loads.
Adverse effects on Mana Whenua values do not occur due to stormwater inputs	Marine Cultural Health Index and State of Takiwā scores	Minimum averaged Marine Cultural Health Index and State of Takiwā scores for all classes: <ul style="list-style-type: none"> <li>• TBC-B</li> </ul>	The Marine Cultural Health Index and State of Takiwā scores assesses cultural values and indicators of environmental health, such as mahinga kai (food gathering). These indices are on a scale of 1 - 5, with higher scores indicative of greater cultural values. No guidelines are available currently for coastal areas, so this target will be developed specifically for this consent. These targets can be achieved through reducing contaminant loads.

## Schedule 9: Receiving Environment Objectives and Attribute Target Levels for Groundwater and Springs

- The EMP outlines the methodology for the monitoring of Attributes and how these will be compared against Attribute Target Levels

Objective	Attribute	Attribute Target Level	Basis for Target
Protect drinking water quality	Copper, lead, zinc and <i>Escherichia coli</i> concentrations in drinking water	<p>Concentration to not exceed:</p> <ul style="list-style-type: none"> <li>Dissolved Copper: 0.5 mg/L</li> <li>Dissolved Lead: 0.0025 mg/L</li> <li>Dissolved Zinc: 0.375 mg/L</li> </ul> <p>No statistically significant increase in the concentration of <i>Escherichia coli</i> at drinking water supply wells</p>	The most important use of Christchurch groundwater is the supply of the urban reticulated drinking water supply. Contaminants in stormwater that infiltrate into the ground could impact on the quality of water supply wells and/or springs. The compliance criteria for a potable and wholesome water supply are specified in the Drinking Water Standards for New Zealand 2005 (Revised 2008). Metals and <i>E.coli</i> were chosen for these targets, as these are contaminants present in stormwater. The target values for copper and lead are a quarter of the Maximum Acceptable Value (MAV) or Guideline Value (GV) taken from the Drinking Water Standards for New Zealand 2005 (revised 2008). This is to ensure investigations occur before the water quality limits in the LWRP are exceeded, which are that concentrations are not to exceed 50% of the MAV. An equivalent criteria has also been applied to the zinc target, which is not included in the LWRP water quality limits, but has a guideline in the drinking water standards.
Avoid widespread adverse effects on shallow groundwater quality	Electrical conductivity in groundwater	<ul style="list-style-type: none"> <li>No statistically significant increase in electrical conductivity</li> </ul>	Contaminants in stormwater that infiltrate into the ground could impact on groundwater quality. Long term groundwater quality at monitoring wells is undertaken by Canterbury Regional Council. Those monitoring points that occur within the urban area could be impacted by CCC stormwater management activities. Electrical conductivity is to be used as an indicator for identifying any general changes in groundwater quality related to recharge.

## Schedule 10: Receiving Environment Attribute Target Levels for Water Quantity

MODELLED CATCHMENTS				
Objective for the management of stormwater quantity:				
<p><i>Stormwater run-off volumes and peak flows are managed so that they do not cause or exacerbate the risk of inundation, erosion or damage to property or infrastructure downstream or risks to human safety <u>above an acceptable level, determined by the attribute target level(s) for each catchment.</u></i></p>				
<p>Attribute Target Level: Modelled flood levels for the relevant AEP for the assessment year critical duration event shall not increase more than the Maximum Increase listed below when compared to the same modelled AEP for the baseline year impervious scenario critical duration, as determined using CCC flood models. The baseline year scenario and assessment year scenario shall be identical except for changes to the impervious area, mitigation measures and the inclusion of any new network(s) that has arisen between the dates of the two scenarios and within the city limits. All non-variant scenario parameters shall be as at the assessment year scenario. The critical duration shall be assessed at the monitoring location of the attribute target level. Non-variant scenario parameters include, but are not limited to, channel cross-sections, roughness and floodplain shape. Prior to undertaking the assessment, the appropriateness of the non-variant scenario parameters shall be assessed and updated if necessary.</p> <p>Additional Attribute Target Level for the Pūharakekenui/ Styx River: Modelled flood levels for the 2% AEP for the assessment year critical duration event shall not result in any increase in above floor level flooding in any residential dwelling existing at the date of commencement of this consent, as determined using CCC flood models.</p>				
Receiving Environment	Monitoring Location	Baseline Year	Annual Exceedance Probability	Maximum Increase (mm)
Ōtākaro/ Avon River	Gloucester Street Bridge	2014	2%	50
Pūharakekenui/ Styx River	Harbour Road Bridge	2012	2%	100
Pūharakekenui/ Styx River	Harbour Road Bridge	2012	10%	0
Ōpāwaho/ Heathcote River	Ferniehurst Street	1991	2%	30
Huritini/ Halswell River	Minsons Drain confluence*	2016	2%	0
NON-MODELLED CATCHMENTS				
Receiving Environment	Attribute Target Level	Basis for Target		Notes

Ōtūkaikino River	Discharges from all new greenfield development into the Christchurch City Council network are mitigated using the "Partial Detention" strategy outlined in the Pūharakekenui/ Styx SMP until such time as a monitoring location can be set during review of the SMP	As measured through the CCC discharge authorisation compliance process for Resource and Building Consents until such time as an Baseline Year can be set during review of the SMP	CCC has just begun monitoring the Ōtūkaikino at Dickeys Road Bridge. Council does not currently model flooding in the Ōtūkaikino River. Flooding occurs primarily due to backwater effects in the Waimakariri River. Therefore, a best practice approach to mitigation of development will be implemented until such time as Maximum Increase can be set during review of the SMP.
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Banks Peninsula (Various)	Discharges from all new greenfield development within settlement areas of Te Pātaka o Rākaihautū/ Banks Peninsula into the Christchurch City Council Network are mitigated using the "Extra-Over Detention" strategy	As measured through the CCC discharge authorisation compliance process for Resource and Building Consents	Receiving environments within Te Pātaka o Rākaihautū/ Banks Peninsula Settlements are primarily coastal. The strategy behind "Extra-Over Detention" is to mitigate peak flows from development sites back to pre-development flow rates in order to mitigate effects of flooding and waterway channel erosion. Therefore, a best practice approach to mitigation of development will be implemented.
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\* The Minsons Drain confluence with the Huritini/Halswell River represents the southerly extent of inputs from Christchurch City catchments, but also contains discharges from Selwyn District. Inputs from catchments outside of the city shall be isolated in the CCC stormwater model for compliance assessment purposes.

## Definitions

For the purpose of this consent the following definitions and abbreviations apply to all conditions:

**Annual Exceedance Probability (AEP)** is the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 40 cubic metres per second has an AEP of 2%, it means there is a 2% chance (i.e. one-in-fifty) of a peak flood discharge of 40 cubic metres a second or larger being equaled or exceeded in any year. AEP is the inverse of return period expressed as a percentage.

**area of disturbance** means an area where site clearance or earthworks are actively taking place and where the land has not been stabilised.

**Banks Peninsula** means the area within Banks Peninsula as defined by the operative Christchurch District Plan (or successor).

**Best Practicable Option** is as defined under the Resource Management Act 1991.

**Christchurch Contaminant Load Model (C-CLM)** means the Golder Associates (NZ) Ltd 2018 Christchurch Contaminant Load Model (C-CLM). The C-CLM report is attached to these conditions as Schedule 5.

**critical duration** means the time taken during a storm event for peak water levels to be reached in the receiving waters.

**design storm** is the theoretical rainfall event that an analysis is based on for a particular probability. The design storm is based on certain assumptions, including rainfall distribution and intensity, and the storm rainfall profile shape for the critical duration.

**development site** means any individual area within a site or sites that is undergoing construction and/or earthworks activities but excludes sealed pavement repair where base course is not exposed.

**device** means a street or property-scale installation for the purpose of removing contaminants from stormwater in a situation where storage capacity is limited. Examples include a rain garden or a proprietary treatment system.

**EMP** means Environmental Monitoring Programme.

**existing site** means any site that discharges its stormwater into the stormwater network at the date of commencement of this resource consent.

**Extra-Over Detention** means attenuating sufficient stormwater to control peak flow rates from a developed site back to pre-developed flow rates for storms up to and including the critical 2% AEP design storm event.

**facility** means a constructed method of holding or attenuating stormwater, at a larger scale than a device, for the purpose of reducing discharge rates or removing contaminants. Examples include a sedimentation basin, a constructed wetland, a wet pond, an attenuation basin and/or an infiltration basin.

**first flush** means either:

- (a) the stormwater runoff generated from the first 25 millimetres of rain falling on impervious areas of a site; or
- (b) the stormwater flow rate generated from up to 5mm/hr rainfall intensity on impervious

areas of a site; or

- (c) the stormwater runoff generated from the first 20 millimetres of rain falling on impervious areas of a site discharging to rain gardens or tree pits.

**flat land** means any land where the average slope across the site is 5 degrees or less.

**greenfield** means agricultural, forest or grass land that is to be used for urban purposes, for example construction of residential or industrial subdivision, buildings, roads and associated services.

**high-use** site means a site that:

- (a) has an expected average daily traffic (ADT) count equal to or greater than 250 vehicles per day; or
- (b) is used for petroleum storage or transfer in excess of 5,000 litres per year, not including delivered heating oil; or
- (c) is used for storage or maintenance of 10 or more heavy vehicles (trucks, buses, trains, heavy equipment, etc.).

**hill land** means any land where the average slope across the site exceeds 5 degrees.

**industrial site** means:

- (a) any premises used for the manufacturing, assembly, wholesaling or storage of products or the processing of raw materials and other ancillary activities; or
- (b) any premises used for the storage, transfer, treatment, or disposal of waste materials or for other waste-management purposes, or used for composting organic materials; or
- (c) any other premises from which a contaminant is discharged in connection with any industrial or trade process - but does not include any land under agricultural production.

**Industry Liaison Group** means a group of representatives from various industries, which will include the Oil Industry Environmental Working Group, Lyttelton Port Company and Ravensdown Limited, invited by Christchurch City Council to attend an annual meeting to discuss stormwater discharges under this resource consent.

**LWRP** means Canterbury Land and Water Regional Plan.

**Papatipu Rūnanga** means the six Ngāi Tahu Papatipu Rūnanga within the Christchurch area, namely: Te Ngāi Tūāhuriri Rūnanga, Te Hapū o Ngāti Wheke/ Rāpaki Rūnanga, Te Rūnanga o Koukourārata, Ōnuku Rūnanga, Wairewa Rūnanga, and Te Taumutu Rūnanga, as represented by Mahaanui Kurataiao Ltd or its successor organisation.

**Partial Detention** means storage within first flush basins plus additional storage through flooding of wetland areas to an average depth of 500mm discharging over a minimum of 96 hours for the critical 2% AEP design storm event.

**QMCI** means Quantitative Macroinvertebrate Community Index.

**re-development** means a change to a developed site or a site activity that results in a stormwater discharge that has the potential to increase the scale, intensity or contaminant content of the discharge that existed prior to the commencement of this resource consent.

**River Care Liaison Group** means a group of representatives from organisations with a particular interest in the protection and restoration of the natural environment of the Christchurch rivers and

their tributaries including wetlands, and that are invited by Christchurch City Council to attend an annual meeting to discuss stormwater discharges under this resource consent.

**Settlement Areas of Banks Peninsula** means those areas within Banks Peninsula that are within the following zones, or equivalent zones if they are renamed, under the Christchurch District Plan:

- Residential Banks Peninsula
- Residential Small Settlement
- Residential Large Lot
- Commercial Banks Peninsula
- Open Space Metropolitan Facilities
- Specific Purpose (Lyttelton Port)
- Industrial General
- Specific Purpose (School)
- Specific Purpose (Cemetery)
- Open Space Community Parks.

**site** means an allotment title or other legally defined parcel of land held in a single certificate of title and any balance land or adjacent land with title(s) held by the same owner or ownership with an affiliated interest. In the case of greenfield and re-development, site means the area of land defined by the boundaries of proposed land disturbance.

**SMP** means Stormwater Management Plan.

**stabilised** means an area of land sufficiently covered by erosion-resistant material such as grass, mulch, weed matting, bark, sand/aggregate, or paving by asphalt, concrete, paver blocks, etc., in order to prevent erosion of the underlying soil.

**stage of development** means a part of a development area which is completed prior to any other stage of that development commencing. A stage of development is deemed to be finished following the completion of construction activities and when the development area has been stabilised.

**stormwater** means runoff water and entrained contaminants arising from precipitation on the external surface of any structure or any land modified by human action, and that has been channeled, diverted, intensified or accelerated by human intervention. Stormwater excludes discharges of groundwater, spilled or deliberately released hazardous substances and/or wash down activities.

**stormwater network** means a network owned or operated by the Christchurch City Council of pipes, swales, drains, kerbs and channels that collects stormwater, and includes any device or facility owned or operated by the Christchurch City Council for the treatment of stormwater, prior to a discharge to land, groundwater or surface water. Stormwater network excludes any system that has been constructed for the primary purpose of collection, conveyance or discharge of groundwater.

**Sub-catchment** means part of a catchment.

**surface water** means water in rivers, watercourses and artificial waterbodies, lakes, wetlands, springs, or coastal waters, but excludes groundwater and atmospheric water.

**TSS** means Total Suspended Solids.

**WIM** means the Water Issues Management Group, or its successor. The WIM is a forum of senior managers of Christchurch City Council and Canterbury Regional Council established to meet the outcome of on-going communication as detailed in the 'Joint Christchurch City Council and Environment Canterbury Stormwater Management Protocol (March 2006, Revised September 2008 and November 2010)'.

## References

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## APPENDIX 1

### SUMMARY

#### Applicant's Case

- 1 **Mr Brent Pizzey**, Counsel for the applicant, conducted the applicant's case. He provided us with written legal submissions and provided an amended set of proposed conditions, together with an amended EMP. He summarised the applicant's case, noting the discharge of stormwater to land and water is a critical service for the district that needs to continue. The applicant is planning for the growth of Christchurch urban areas in both greenfield and brownfield areas. Rain and growth will continue to happen regardless of the decision on this resource consent application. He submitted the application is not for a new activity as it consolidates existing resource consents into a single resource consent and introduces opportunities for retrofitting treatment where appropriate.
- 2 He submitted the quality of the city's waterways is already affected by 150 years of urbanisation and a real-world approach must be taken to identify the receiving environment. He submitted the stormwater discharge consent could not on its own achieve holistic aims for urban stormwater improvement; such would require societal change. By setting the contaminant load model targets, and monitoring, he submitted the applicant is bound to reduce the load of those contaminants in the stormwater discharge.
- 3 He explained that the CLM was not intended to model actual results but it provides a fixed, certain and enforceable way for a consent authority to hold the applicant to account if the applicant's stormwater treatment facilities are not built so as to achieve the predicted contaminant load reductions. He submitted that the core to the applicant's obligations were in proposed Conditions 20-24, where the applicant now proposes the obligation to use reasonably practicable measures, rather than reasonable endeavours, to mitigate the effects of its activity. The extent of the mitigation will be measured against the attribute target levels in the schedules attached to the consent conditions and everything else in the conditions is a tool to plan, implement, monitor, evaluate, review, respond or adapt in seeking to achieve those aims. This, he submitted, is an adaptive management framework.
- 4 Mr Pizzey identified the "key" remaining issues from the submissions and the S42A Report, introduced the witnesses and provided further detail of the application. He addressed the scope of the application, excluded sites, SMPs, source control, "other actions" and collaboration between the Councils, before discussing the adaptive management approach, the existing environment and the statutory tests.
- 5 **David Page Adamson**, General Manager City Services, provided an overview of the application and addressed the current situation for stormwater management, recording that the applicant recognises the community wants improved waterways and the importance of the adoption of a holistic approach to catchment management, including the move to an

integrated approach across the City being applied to many management practices as opposed to individual catchment practices.

- 6 He discussed the applicant's current LTP budgets and the applicant's view of stormwater and waterways. He noted the applicant's strategic directions underpinning the LTP being the focus for improvement over the next three years and beyond. He addressed the key high level stormwater outcomes, objectives and deliverables that the applicant wants to achieve in the consent before addressing the key components of the application.
- 7 He also addressed the "balancing" of desired outcomes with resources and funding, the "collaborative" approach to the preparation of SMPs and associated documents, the collaboration and engagement with CRC, the consultation and engagement with Ngāi Tahu and the "compromise" shortage and consent of 25 years.
- 8 **Helen Mary Beaumont**, Programme Director for Water Supply Improvement, provided evidence outlining the strategic framework as adopted through the Long Term Plan 2018-28. She addressed the seeking of "good outcomes", across the four wellbeings – environmental, social, cultural and economic – and specifically that it references healthy waterways and the importance of surface water quality to people and the environment. She addressed the six values approach to waterways being: drainage; ecology; cultural; heritage; recreation; and landscape. Her evidence was that this approach continued to be implemented as illustrated in the river catchment vision and values documents of the Avon, Styx, Halswell and Heathcote catchments. Ms Beaumont provided a number of documents.
- 9 **Mr Graham James Harrington**, Senior Surface Water Planner with the applicant, provided evidence of a background to the application, an overview of the application, engagement, flood modelling, particular issues with the Styx catchment, responses to submitters, responses to the S42A Report and provided a number of documents. Mr Harrington provided rebuttal evidence and a brief of further evidence. Mr Harrington's evidence will be addressed throughout this decision.
- 10 **Mr Robert Brian Norton**, Senior Stormwater Planning Engineer with the applicant, provided evidence in chief and rebuttal. He provided a description of the applicant's stormwater network which, as he initially proposed, included pipes, drains, streams and rivers, but excluded the CMA, drainage water as defined in the Canterbury Land & Water Regional Plan, and waterway and network systems outside of Banks Peninsula settlement zones. He noted that when it rains the stormwater network collects surface water generated from sealed and unsealed surfaces and conveys it to the river and the coast, or infiltrates it to ground. It also collects and conveys contaminants that build up on these surfaces, including sediment, metals and other organic and inorganic materials, which can have adverse effects on water quality and the environment.
- 11 He discussed the variety of measures that the applicant proposes to reduce the load of contaminants in stormwater in order to improve the quality of the stormwater discharge. He

noted that the specific measures for each catchment are laid out in SMPs, some of which have been written and others which are still to be developed. His evidence was that the SMPs demonstrate the means by which the quality of stormwater discharges will be progressively improved and meet the receiving environment objectives and targets, primarily through the delivery of engineered mitigation facilities. He noted that if only new greenfield developments were mitigated, the load of contaminants discharges from the stormwater networks would increase slowly with new development. He described retrofitting treatment of existing development areas and control of contaminants at source, by various means, to achieve the overall stormwater quality improvements sought by the applicant.

- 12 He addressed the applicant's proposals in relation to source control, providing examples of the phasing out of copper in brake linings, restricting the use of copper roofing and spouting materials, replacement or painting of older zinc treated roofing and sweeping of streets. He recognised the uncertainty of success with source controls, given many were outside the applicant's immediate control, and confirmed that source control measures have not been included in the contaminant load model and were not reflected in the contaminant reduction targets listed in Table 2 of the Consent. He also addressed flooding issues and levels and provided commentary on conditions.
- 13 **Dr Belinda Isobel Margetts**, a Waterways Ecologist employed by the applicant, provided evidence on the effects on surface water quality and ecology of the waterways and coastal areas from the proposed stormwater discharges. Overall, she considered that effects on surface water quality and ecology of the waterways and coastal areas would be minor, given the current state of the receiving environment and the "mitigation toolbox" proposed, which she considered would result in an overall improvement in contaminant loads for stormwater discharges. Dr Margetts' evidence addressed matters raised in submissions and the S42A Report and recommended changes to the conditions in the EMP.
- 14 **Mr Peter Francis Callander**, Technical Director of Water Resource with Pattel Delamore Partners Limited, provided evidence on the effects on the groundwater resource from the management of stormwater within the Christchurch City urban area. He provided an overview of the groundwater setting, the effects of the proposed stormwater management system on groundwater quality, the proposed monitoring programme and responded to points raised in submissions and the S42A Report. He noted that urban development changes the natural pattern of rainfall infiltration and the way that stormwater is managed will influence the long term effects of urban development on the groundwater resource and the spring fed headwaters of the urban streams. He considered the catchment-based approach promoted to be consistent with best practice with regard to groundwater effects, provided the conditions of consent are appropriately framed. He considered the proposed approach to stormwater management would help to minimise the impacts of urban development on the underlying groundwater system. He concluded the groundwater balance and groundwater levels on a major widespread basis were unlikely to change. He did note that on a localised scale



changes can be expected to occur in both the timing and magnitude of groundwater level fluctuations due to changes in infiltration patterns.

- 15 Overall he considered that, provided the infiltration facilities were appropriately sited, designed and monitored, it is expected that the stormwater management measures described would maintain the recharge to the Christchurch groundwater system as far as practicable.
- 16 As to effects on groundwater quality, overall he expected a stormwater infiltration discharge described in the application would not be expected to cause any breach of the Schedule 8 region-wide water quality limits. This was with the exception of e.coli. He considered the impact from e.coli or any other contaminants on groundwater quality would be localised and would not be expected to affect any public water supply bores. Overall, he concluded that the proposed consent conditions, the applicant's Infrastructure Design Standard and the approval process by the applicant's engineers, creates a situation where effects on groundwater can be expected to be no more than a minor scale.
- 17 **Dr Julia Marie Valigore**, a Specialist Adviser in the applicant's Technical Services Team, provided evidence on the applicant's ISA process. Her evidence was that the ISA team had engaged over 60 businesses to reduce risks to waterways since June 2017 and that risk mitigation compliance had been achieved through businesses implementing action lists. These have included staff education initiatives; adoption of good management practices; capital works; and establishment of trade waste areas for high risk activities. Overall she considered that these strategies have improved point source stormwater quality discharges and mitigated risks to the waterways. In terms of the existing ISA process, her evidence was that the applicant's current requirements under the consents are to do at least 10 audits / year under CRC090292 and to audit all high risk sites under CRC131249 and CRC120223 by 2023. She provided the ISA audit methodology documentation, which includes a risk assessment matrix. Dr Valigore also addressed issues raised in the evidence of Mr Hay and Ms Wilkes for Ravensdown, and Mr Purves for LPC.
- 18 **Mr Mark James Pinner**, the applicant's Transport City Streets Maintenance Manager, provided evidence in relation to street sweeping and the applicant's current practices. He addressed the purpose of sweeping and the benefits of the same.
- 19 **Mr Dale Andrew McEntee**, a Resource Consent Compliance Co-Ordinator with the applicant, provided evidence in relation to the applicant's consent compliance management and compliance under the current stormwater discharge consents held. He addressed historic non-compliance and steps taken to address the same.
- 20 **Mr Mark James Tipper**, a Senior Environmental Adviser employed by the applicant, provided evidence on the applicant's current methods for managing erosion and sediment control on the applicant's projects and sites authorised by the applicant, the measures being undertaken to improve the applicant's processes with regard to managing erosion and sediment control, and responded to matters raised in the S42A Report. He addressed issues in relation to

unconsented sites, and consented activities and focused on improvements to the applicant's processes for erosion and sediment control. His evidence focused on improvements going forward. He suggested a condition be imposed on total suspended solids limit not exceeding 100g/m<sup>3</sup> and all approvals to discharge construction phased discharges into the applicant's stormwater network unless there was a high risk to the receiving environment when a more restrictive limit may be imposed. Mr Tipper also provided rebuttal evidence responding to the evidence of Trent Sunich and Mark Laurenson on behalf of the oil companies. His rebuttal also addressed Mr Norton's evidence for the the applicant in relation to the proposal to develop a matrix to determine an appropriate TSS limit based on a range of contributory factors.

- 21 **Mr Thomas Geoffrey Parsons**, a Technical Director of Innovate Consulting, who has been contracted to the applicant in dual roles of Senior Surface Water Engineer and Technical Manager of the LDRP, provided evidence in chief and in rebuttal. He addressed primarily the applicant's current investment in water quantity infrastructure and the impacts of this on other planning processes. He addressed the SMPs and proposed modifications to Schedule 7; the best practice infrastructure (BPI) scenario; water quality targets and other scenarios developed for comparison to the BPI scenario; changes regarding the development of the Ōtākaro Avon River SMP water quality mitigation scenarios since the 2015 application; the process for and challenges with retrofitting stormwater quality mitigation devices and reducing water quality impacts; and flood model development.
- 22 He identified a number of challenges for the development of SMPs as the applicant was investing heavily in stormwater quantity mitigation infrastructure through the LDRP and developing new tools for assessing flood risk and progressing new investigations into flood management across larges areas of the city. He noted some of the fundamental decisions for flood management within the city were not entirely within the applicant's control and identified, specifically the Ōtākaro Avon River Regeneration Plan. Nevertheless, he considered the adaptive management approach proposed by the conditions was appropriate. He considered that this would enable future revisions of the SMPs to provide a greater level of detail of the applicant's proposed method for addressing water quantity issues and considered the SMPs were the appropriate location to define additional water quantity attribute target level locations. He considered the proposed attribute target levels within Schedule 7 were likely to be achievable. In terms of water quality, he considered some flexibility in consent conditions was necessary to respond to opportunities as they arise, noting it was in relation to infrastructure response, not contaminant reduction percentages.
- 23 He addressed the challenges with approval and installation of water quality devices in existing urban areas and considered it was not practicable to retrofit water quality devices across the entire city in a cost-effective way. He identified that models undergo cyclic review and enhancement in response to technological advances or large storm events and provided an illustration of this in the Styx River catchment where recent testing of the June 2013 rainfall

event identified some under-prediction of water levels. He noted the model update is currently on hold because of budgetary constraints, but may be available for the first review of the Styx River SMP.

24 In rebuttal, he addressed the evidence of Ms Hess, focusing on SUDS.

25 **Mr Eric Rowland van Nieuwkerk**, a Senior Hydro Geologist at Golder Associates (NZ) Limited, provided evidence in relation to the CLM and its use to model a BPI scenario. He addressed the expected reduction in contaminant loads from the implementation of currently planned treatment systems and compared the BPI scenario with source control treatment CLM scenarios. He considered the CLM provided sufficient information to identify further likely trends, but noted such were only indicative for the relevant changes in the future contaminant loads. He supported proposals for ongoing monitoring and mitigation and responded to some criticisms of the CLM. He considered the treatment efficiencies used in the CLM were appropriate, with the treatment efficiencies assuming what can be realistically achieved with well maintained and appropriately designed systems.

26 **Mr Paul Cameron Kennedy**, a principal Environmental Consultant with Kennedy Environmental Limited, provided evidence in relation to the CLM, noting it is mathematically quite simple but used in a complex environment in terms of contaminant sources and how they are treated. He reviewed the CLM use and responded to criticisms raised. Overall, he considered the CLM would provide valuable strategic information for the development of the SMPs and the predictions provided a reduction benchmark for catchments that can be monitored through the proposed EMP.

27 **Mr Simon Richard Harris**, a Consultant Economist and director of LWP Limited, provided evidence on the economic implications of different options for water quality treatment in Christchurch City. He explained the methodology used and in particular the costs of four treatment scenarios in total and by reference to the increases in rates and impact on section costs.

28 **Mr Clint Cantrell**, a Sector Director for Water with Tonkin & Taylor, who has over 29 years of national and international experience with stormwater and wastewater programmes, provided evidence focusing on the technical aspects of the applicant's application, with a particular emphasis on how that compared to national and international best practice. He noted the complexity of the relationship between urban stormwater pollution sources and waterway effects. He considered the most important issue to determine was which stormwater contaminant sources are dominant at locations where effects are observed and not compliant with guidelines, standards and/or consent conditions. Those that play a dominant role can vary widely and may require local site investigations. He considered the proposed stormwater quality investigations actions, the EMP, and high risk monitoring conditions provided an adequate means of conducting such investigations. He considered the application proposed was consistent with an adaptive management approach.

- 29 **Mr Craig Aaron Pauling**, a Kaiarataki Te Hīhiri (Strategic Advisor Maori), provided evidence in relation to cultural values. Mr Pauling addressed his involvement in the application, including consultation, and his involvement in assisting with the development of the Cultural Values Overview, the analysis of the Mahaanui Iwi Management Plan and the summary of effects in the application. He assisted the applicant in liaising with the Rūnanga CIA writers and discussed the agreement reached between the applicant, Rūnanga and Mahaanui.
- 30 **Ms Jane Susan West**, the Director and Senior Planner of J West Limited, provided planning evidence. Ms West had been involved in the preparation of the application and discussions with CRC staff. She considered the application and proposed consent conditions demonstrate the commitment of the applicant to progressively improve the quality of stormwater discharge over time as required by key LWRP Policy 4.16. Ms West provided an overview of the proposal and assessed it against the relevant planning documents and statutory matters.

#### Submitters

- 31 We heard from a number of submitters who spoke to their submissions and a number provided substantial evidence and submissions. We thank the submitters who appeared before us. Their participation is important. We confirm that we have considered all of the submissions lodged. The following is a summary of the evidence and submissions of those who appeared. Again, this is very much a summary.
- 32 We heard from **Annabelle Hasselman**, supported by **Elizabeth Bertolett**, on behalf of the Opāwaho Heathcote Network Inc. The evidence outlined the vision and purpose of the network and discussed the network's involvement in a range of projects as a community catchment group in accordance with its strategic plan. A helpful series of slides was provided and spoken to. The network's presentation was clear and addressed concerns in relation to the "urban stream syndrome" and the poor water quality in the Opāwaho River in particular. It sought a very significant reduction in contaminants being discharged from the city stormwater system. The network noted that it was pleased to see the applicant had developed a model of commitment to progressive improvement of stormwater discharges and acknowledged the substantial commitment of resources, staff and time achieving that would require. It had concerns with definitions, certainty (and expressed concern in relation to the phrase "reasonably practicable measures"), high risk sites and enforcement; access to reports being created; communication, education and awareness including the development and implementation of a community water partnership; incentives for non-infrastructure measures and sought consultation on SMP on an early and ongoing basis.
- 33 We heard from **Evan Smith** and **Kyle Sutherland** on behalf of the Avon-Ōtākaro Network (Avon). Avon has a vision for a multi-purpose river park from city to sea that meets a diverse range of community needs, and the maximum possible restoration of native ecosystems to enhance water quality, biodiversity, mahinga kai value and resilience to natural hazards.

Avon did not accept that the overall potential adverse effects on the receiving environment would be minor. This was based on a submission that the reference point for any test of adverse effects must be its indigenous state, not its current. Again they sought recognition of the water care groups as key stakeholders and commented on issues relating to the accuracy of the CLM. They endorsed non-infrastructural measures, but raised concerns as to how that can be assessed and expressed a wish to be involved in the process. A duration of 10 years was sought. Mr Smith advised that the groups work well with the Zone Committee, but they would like to be considered as stakeholders and would like to have direct input into the SMPs and other documents.

- 34 We then heard from **Tania Didham** for Joint Avon: Greening Red Zone / Forest Park / Travis Wetland. Ms Didham advised the opposition was for two principal reasons: they did not believe the consent would improve river health, which is a significant issue; and, there was a lack of attention to the river corridor and the red zoning opportunities. Ms Didham discussed wetlands and their role and the desire for a greater commitment to the Waitakere (Horseshoe Lake) and would like mahinga kai sites along to the Ōtākaro. Overall, while the groups were supportive of the SMP, there are concerns about prioritisation and they wish to see a “real commitment” to enforceable conditions.
- 35 We then heard from **Evan Smith**, who was joined by **Kit Doudney**, on behalf of the Combined River Care Groups. The combined groups and the community would like to see a rapid change / improvement in the return to swimmable waterways and was seeking a commitment from the applicant to change. They discussed a desire to be involved in the process.
- 36 We then heard from **Bill Simpson** and **Islay Marsden** on behalf of the Avon Heathcote Estuary Ihutai Trust (**Trust**). The Trust had filed a submission in opposition. It identified what it considered to be the negative points in the application, being a lack of commitment generally; the lack of commitment to non-structural methods, which should be planned, scheduled strategy and budgeted; and ,no clear retrofitting programme for older areas of the city. It also addressed what it viewed as the positives, including the reduction in the duration to 25 years, the setting of targets and the programme for reducing heavy metals. The evidence addressed the issues with the estuary, including what was described as the retention problems, particularly following the reduction in tidal volumes following the earthquake sequence. Evidence expressed concerns in relation to nutrient levels and addressed the greening from the sea lettuce. The evidence addressed the wetlands adjacent to the estuary and their importance and supported the improvement of water quality. The evidence expressed some concerns in relation to the objectives and would like to see the estuary enhanced ecologically and more monitoring sites. They noted a considerable improvement in water quality following the waste water treatment component being removed and saw the main source of nutrients as the stormwater. They advised that they worked co-operatively with the applicant and other agencies.

- 37 We then heard from the submitters **Kerrie** and **Antonio Rodrigues**. Ms Rodrigues provided a written Brief of Evidence. This summarised a statement which was filed with the submission. This identified the key issues as the Canterbury earthquake sequence damaging their land so that it is now a basin. She noted that they are affected by overflowing of the Styx River when at full capacity. She raised concerns and provided a plan showing flooding and filling around 5 Earlham Street. She expressed concerns in relation to works undertaken with rebuilding and noted that the Brooklands Lagoon was now entering Earlham Street following the 2016 Kaikoura quakes. She raised what she considered to be a failure by the applicant not providing a mitigation strategy. She provided evidence in relation to “regular flooding events”, consequential ponding under their home and properties, with effects causing access issues, mould and damp, vermin, blow flies, mosquitos and personal health effects. Her evidence was the stormwater discharges proposed by the applications will increase the frequency and severity of occasions that the Styx River over-tops its banks and larger areas of their property would be affected and for longer periods. They sought the application be declined insofar as it relates to the discharge of stormwater into the Styx River, or alternatively be granted on terms and conditions that comprehensively address the issues regarding flooding and ponding on and around their property.
- 38 **Mr Robert Potts**, an Environmental Engineer with significant experience in stormwater and flood plain assessments, provided expert evidence. Mr Potts identified that flooding is a serious issue at the site as it remains there for long periods, thus destroying soil / plant health by not allowing air into soil voids. Mr Potts also addressed Policy 4.17 of the Canterbury Land & Water Regional Plan and comments on the AEE, the application, conditions and further information. He noted that the whole of Brooklands had not been abandoned and that any increase in areas already seeing inundation for prolonged periods is significant to residents living in those parts. He noted the absence of reporting on the differences in flood levels between full retention and partial retention and addressed evidence filed by the applicant. He considered and commented on the evidence of Mr Harrington in particular. In his opinion, flood nuisance is not just inundation of dwelling floors. Long term inundation that is occurred following events in the Styx causes many other issues impacting on housing, quality of life and occupant health. Mr Potts also discussed mitigation measures.
- 39 We received legal submissions from **Susan Newell** on behalf of the Director-General of Conservation. Ms Newell noted the Director-General of Conservation had submitted in support of the application but sought minor changes to the conditions. She submitted that DOC has a particular interest in the effects of the activity on natural values and environments and sought inclusion of conditions to ensure DOC would be consulted in the development of stormwater management and implementation plans. Ms Newell noted the importance of the consultation with DOC to enable issues to be resolved at the planning stage, rather than having to deal with them when works have been carried out. Ms Newell addressed the adaptive management approach and the uncertainty that created. Again, that reinforced the

desire for consultation. Ms Newell identified the Supreme Court discussion of the use of adaptive management.<sup>1</sup> She submitted that a requirement to consult with DOC in the preparation of SMPs and implementation plans would add a measure of confidence that some of the effects which might arise can be identified early, triggering remedial action. Such an approach would help ensure damaging effects can be avoided, or when identified early they can be remedied before they become irreversible.

- 40 **Linda Elizabeth Kirk**, an employee of DOC who provides planning advice and assistance in relation to resource consent applications and planning matters, provided expert evidence. She identified concerns with granting consent on the basis that SMPs are to be formulated in the future and which are based on a general intention to achieve results without knowing or understanding how such results will be achieved or understanding the effects of the implementation of the methods use. The absence of consultation with DOC raised concerns regarding effects on indigenous biodiversity.
- 41 We then heard from **Mr Jim Macartney**, the Chairman of the Halswell River Rating Liaison Committee, and **Mr Ross McFarlane**, a Committee member. Mr Macartney and Mr McFarlane spoke to the lodged submission, explained the Halswell drainage scheme, commented on investigations and provided a number of illustrative photographs. We were also taken through a brief video of the opening of the Te Waihora / Lake Ellesmere. They discussed the impacts of increasing urbanisation and provided a number of photographs illustrating concerns relating to maintenance of the drainage system and issues being experienced in the catchment.
- 42 **Ms Adriana Hess** spoke to her submission. Ms Hess holds a qualification of Master of Urban Resilience and Renewal and circulated a Brief of Evidence in accordance with our directions. Ms Hess agreed to comply with the Environment Court's Code of Conduct for Expert Witnesses. She set out her qualifications before addressing SUDS. She provided an overview of pervious concrete and pervious asphalt, identifying its benefits and limitations. She provided an overview of rain gardens and again identified the benefits and shortcomings of the same. Ms Hess identified a number of recommended changes to existing conditions, including the addition of a further objective to read:
- "Prioritise neighbourhood-scale extra-over detention Sustainable Drainage System methods, including permeable concrete, permeable asphalt and rain gardens."*
- 43 We then heard from **Kathryn Leigh Snook**, a submitter in her own right and on behalf of the Snook Family Trust. Ms Snook identified the main concerns, including the impact of river stormwater causing additional flooding at Brooklands, lack of flood mitigation, conveyancing capacity of the Styx River and its ability to cope with additional discharge, validity of the city flood models used and proposed applicant monitoring processes. Ms Snook addressed the nature of their property, the impact of the earthquake and red zoning on Brooklands and

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<sup>1</sup> Sustain Our Sounds Incorporated v The New Zealand King Salmon Company Limited [2014] NZSC 40

provided a number of photographs relating to the river flooding event at Brooklands on 17 June 2013. She requested that consent be withheld until the applicant had identified areas subject to flood hazards that will cause risk to human safety or inundation and provide mitigation. If granted, Ms Snook wanted recommendations for monitoring and modelling provided by Mr Laws to be undertaken.

- 44 **Mr Raymond John McGuigan and Ms Pauline Fay McGuigan** spoke to their submission. They own a lifestyle property zoned Rural Urban Fringe in Lower Styx Road. They have lived at that address since 1992 and provided evidence as to the history of the development in that area. They addressed the community involvement over the years arising from concerns in the Lower Styx communities as to what were observed as higher water levels, particularly post-earthquake and after minor rain events. They addressed the process whereby the applicant appointed a facilitator to assist the community with their concerns and the formation of the Styx working party. They expressed disappointment with that process, particularly a failure to answer 11 questions that had been tabled by the facilitator. They also expressed concern in relation to their inability to be involved in the development of the SMP. They provided a number of photographs, references from reports and a clear statement of the outcomes they sought. These included: a maintenance programme for both river and stormwater infrastructure associated with developments; formal responses to how river levels have dropped in recent months; new monitoring sites downstream of the Kaputone Stream and Prestons Development but upstream of the Spencerville community; consent conditions to include substantive clauses to address maintenance programmes for the Styx River and existing and new wetlands, together with the dredging programme for the lower reaches of the Styx River.
- 45 **Mr Peter William Hay**, the Works Manager of the Christchurch Works for Ravensdown Limited, provided an introduction of Ravensdown's operations and current stormwater management system. He listed the stormwater management improvements which have been undertaken to date and the monitoring undertaken. Mr Hay also identified a number of stormwater management challenges, including the nature of the site and the activities occurring on it, the age of the infrastructure and the need to keep the site operating in a safe and efficient manner while stormwater infrastructure works occur. He outlined Ravensdown's commitment to improving stormwater discharge quality and the works that had been undertaken in that regard. He concluded that Ravensdown supports the application for a comprehensive resource consent, subject to a number of amendments. It was seeking a clear line of accountability for its management of stormwater to assist the company making improvements and clarity of the expectations.
- 46 **Ms Anna Mary Wilkes** is employed by Ravensdown as its Environmental Policy Specialist. She summarised the description of the site, noting that it was listed in Environment Canterbury's LLUR. She described the manufacturing side has two sub-catchments, with stormwater from the highest risk areas being captured and reused on site or discharged to



trade waste. Stormwater from the remaining roof and hardstand areas is discharged into the Christchurch City network. Ms Wilkes summarised the main premise of Ravensdown's submission as highlighting the regulatory challenges faced by Ravensdown and meeting the expectations of both the applicant and CRC in relation to stormwater discharges and the need for clear conditions that provide clear direction for both water quality and quantity targets and associated lines of accountability. Her evidence was that the "two pronged" approach to regulation of the same issue is challenging for industry. Ms Wilkes addressed the industrial site audits and commented on the framework. She considered that the follow up reporting process could be improved to allow discussion of the actions proposed and agreement on appropriate timeframes for implementation. Ms Wilkes commented on relevant evidence led on behalf of the applicant and the S42A Report. She also provided comment on a number of conditions.

- 47 We then heard from **Ms Jan Therese Burney**. Ms Burney was a submitter in her own right and also a joint submitter with **Mr Gary Sharlick**. Ms Burney has lived in the Brooklands area for approximately 30 years. She has been a member of the Joint Working Party with regard to the management of the Styx River. She expressed concerns about the effects of the statement that the area had been abandoned, which she stated is not correct. She supported the views of Mr Laws in the S42A Report in relation to modelling. While her property does not have river flooding issues at present, she is concerned it may be an issue in the next 50 year event. She discussed the post-quake topography and its importance, and addressed fill which had been undertaken in the Brooklands area.
- 48 **Ms Kim Kelleher**, the Environmental Manager for submitter Lyttelton Port Company, provided some brief evidence in relation to the range of techniques used to address the different catchments and various devices used.
- 49 **Mr Gareth Taylor**, a Consultant, also appeared.
- 50 **Mr Andrew Purves**, a Planning Consultant, provided evidence describing the Port's operation and its significance given that it is recognised regionally as significant infrastructure. Mr Purves supported the use of the adaptive management regime for the consent, while acknowledging this approach entails more complex conditions with monitoring and feedback loops. In his view it was important that the conditions should be able to be understood and implemented without having to have knowledge of the consents and the wider history that preceded them. He had found the reading of the proposed conditions both challenging and lacking sufficient clarity on how industrial sites are to be managed. Mr Purves provided constructive evidence on the conditions, offering a number of alternative draftings.
- 51 We then heard from **Mr Matthew Black**, the Head of Product & Innovation at New Zealand Steel Limited. Mr Black outlined the background of NZ Steel, described its product stewardship process and its work with a number of Councils around New Zealand in relation to its product. He raised a concern regarding uncertainty.

- 52 **Mr Marcus Cameron**, a Senior Aquatic Scientist at Tonkin & Taylor, addressed concerns with the accuracy and application of the contaminant load model, the lack of a clear link between sources of contaminants and the proposed management response. He was concerned that the seemingly narrow focus on copper, zinc and total suspended solids may render some management approaches ineffective. He noted that there are many sources of zinc in the environment. He then addressed the implications for NZ Steel and its relief sought.
- 53 **Ms Andrea Judith Rickard**, a Planner who holds the position of Senior Technical Director and Technical Fellow at BECA Limited, again addressed the background to the submission. She described that NZ Steel had been working closely with the Auckland Council on the topic of zinc and water quantity for some years. She discussed the range of approaches taken to planning provisions around the country and considered that it would be inequitable for specific building products to be targeted for control through a planning process. Ms Rickard then addressed the issues raised in the submission and expressed the concern that the general approach taken by the applicant had the potential to create uncertainty for users of the SMPs and for there to be limited recourse to challenge such if they contained information or processes that others may disagree with. She expressed the concern that the consent provided little certainty that ad hoc decisions would not be made under the consent and result in pressure on individual owners to use different materials to further reduce zinc loadings. In the event the application was granted, Ms Rickard sought an amendment to the conditions to require the involvement of NZ Steel in the development of SMPs.
- 54 **Mr Barry Robertson**, a submitter in opposition, provided evidence in relation to issues in the Styx catchment. Mr Robertson took us through a number of photographs of the catchment and described, in some detail, what he considered to be the decline in the state of the Styx River and its ability to deal with stormwater flows. He discussed developments that had occurred in the catchment, including the Prestons Development, and discussed the opening of the spring in the Kaputone catchment. He also discussed the present works being undertaken on the northern arterial motorway and the sediment produced from that. He considered there were solutions, but that in his observation every sub-division was producing more sediment and that is going into the Styx River. He considered that the sub-divisions needed to be controlled.
- 55 **Mr Rob Enright**, Barrister, provided legal submissions on behalf of the submitters Z Energy Limited, BP Oil NZ Limited and Mobil Oil NZ Limited (**Oil Companies**). Mr Enright addressed the MFE guidelines, which stated they were intended to remove regulatory uncertainty. He submitted the MFE national framework confirms that a bespoke approach to petroleum industry sites is appropriate under the comprehensive consent sought. He considered that industry specific treatment was justified for a range of reasons. Mr Enright addressed the matters raised in the applicant's rebuttal evidence. He addressed concerns in relation to proposed Conditions 2 and 3 and what he described as a "veto" approach. In his submission,

the consent condition wording is unorthodox as the parties would not know to what extent activities are covered or not covered by the consent, both pre and post 2025. He submitted they created arguable validity issues as well as merits.

- 56 We then heard from **Mr Mark Laurensen**, a Senior Planning and Policy Consultant at 4Sight Consulting Limited. Mr Laurensen's evidence focused on the proposal to exclude sites with a history of petroleum storage and use from discharging operational and constructional phase stormwater under the terms of the comprehensive stormwater network discharge consent prior to 2025 and addressed the "absence" of a clear pathway for high risk discharges from 2025. He considered the pre-2025 exclusion is disproportionate to risk and in his opinion this application presented an opportunity to better address some of the existing inefficiencies in the interaction between the LWRP, the comprehensive stormwater network discharge consent and the stormwater by-law. He noted the absence of permitted volume and area thresholds for site disturbance from perceived high risk sites and addressed treatment versus source control, with his view that source control should be subject to greater attention. He then provided rebuttal to the relevant evidence. Mr Laurensen provided comments and suggested changes to a number of conditions.
- 57 **Mr Trent David Sunich** also provided evidence on behalf of the Oil Companies. Mr Sunich is a Senior Environmental Consultant at 4Sight Consulting Limited. His evidence provided a brief description of the oil company asset base within Christchurch, addressed oil company site stormwater runoff and spill management and referenced the environmental guidelines for water discharges from petroleum industry sites in New Zealand (the MFE guideline). Mr Sunich also addressed the high risk sites and the relevance of compliance with the MFE guidelines. His evidence was that the oil companies are either following conventional and established methodology in the case of managing contaminated or potentially contaminated surface water runoff or would follow best practice in terms of erosion and sediment control where risks of the works encountering petroleum hydrocarbons is unlikely. Mr Sunich also addressed TSS limits and, in his opinion, a method based implementation of erosion and sediment control practices had benefits.
- 58 **Mr Robert Burch and Mr Robert Churcher** provided evidence on the issues affecting Little River.
- 59 **Mr Ben Williams** provided legal submissions on behalf of Christchurch International Airport Limited (**CIAL**) and outlined CIAL's concerns.
- 60 **Ms Felicity Blackmore**, the Compliance & Development Manager at CIAL, provided an overview of the operations of CIAL and its importance to the Christchurch economy. She addressed stormwater management at CIAL, noting that it was not connected to the applicant stormwater reticulation system as all stormwater discharges on the airport campus are managed through a CIAL owned and operated stormwater network. Stormwater discharges are currently authorised by at least 10 discharge consents, with many of them held by CIAL.

She provided a table of the core global consents. Ms Blackmore also addressed bird strike and the need to manage the risk of bird strike arising from water bodies, including poorly designed and managed stormwater facilities. Ms Blackmore provided proposed changes to the conditions.

- 61 **Ms Penny Hargreaves**, a submitter in the Styx catchment, provided detailed evidence, including photographs, addressing her concerns. She has owned her property in Lower Styx Road since 1992. Her evidence was that CRC and applicant decisions from 1998 onwards had magnified the flood and health risk by adopting what she described as a “do nothing” option. Her evidence was that the land had become increasingly flooded, even when there were no significant rainfall events, and the “obstructed” Styx flow was impeded. She discussed a number of meetings that had been attended and expressed her view that CRC and the applicant were continuing to fail to look at flood solutions, including maximising the Styx channel conveyance, increasing channel dredging programmes and reducing obstruction in the channel, and the construction of stop banks. She identified a number of what she described as failures by the authorities to address issues. Ms Hargreaves also asked a number of questions and those, where relevant, have been considered.

#### **S42A Report**

- 62 **Dr Leslie Bolton-Ritchie**, a Senior Scientist employed by CRC, addressed the definition of stormwater infrastructure and the prioritising of stormwater treatment. Dr Bolton-Ritchie remained concerned about cumulative effects, particularly for the estuary of the Heathcote and Avon Rivers / Ihutai. She considered the consenting processes to be put in place for stormwater discharges should ensure the concentrations of stormwater contaminants within estuary water and sediments are not going to get worse and they should improve in the future.
- 63 **Mr Michael Charles Law** summarised the key points of the S42A Report contributions and highlighted areas of agreement and disagreement. Mr Law is a Senior Associate – Water Resources at BECA Limited. He is a charter member of the Chartered Institute of Water & Environmental Management. Mr Law responded to the evidence of Mr Harrington and Mr Parsons, expressing his concerns in relation to the number of performance reporting locations, the use of a single design event and the allowable increase in water level in the baseline year. He considered that, while it is important to differentiate the causes of flooding and the roles and responsibilities regarding different aspects of flooding, residents of flood-prone properties experienced flooding as a combination of all factors and flood risk management relies on joint use of capital infrastructure and operational measures. He considered that both can be controlled and should both be accommodated within the water level targets. He addressed a number of matters raised in the evidence on behalf of the applicant. He raised concerns in relation to the environmental monitoring programme and the

“vague” response to targets not being met. He addressed issues in relation to the Halswell catchment and the Styx catchment and the appropriateness of limits on flood volume.

- 64 **Mr Zeb Ethridge** provided groundwater quality and quantity evidence. He addressed areas of agreement and areas of disagreement and addressed conditions. Overall, he considered the consent conditions and associated management regime provided means by which the risks to groundwater quality and quantity can be maintained at an appropriate low level.
- 65 **Mr Rowan Freeman** is a Principal Science Advisor with CRC and is a member of the CRC's Contaminated Science Team. He provided an explanation of the LLUR and its usefulness in gaining some understanding of locations and types of HAIL sites in the coverage area. He noted it was neither static nor complete. He noted that risk categories cannot be materially assigned to HAIL sites as they are dependent on a number of site-specific factors. He addressed the sampling infiltration basins and supported the applicant's willingness to collaborate with CRC in relation to industrial site management audits.
- 66 **Ms Michelle Stevenson**, a Senior Scientist – Surface Water Quality in Ecology with CRC, provided evidence addressing fresh water (surface water) receiving environment water quality and fresh water aquatic habitat and quality. In her full report, Ms Stevenson identified a key concern in relation to the lack of certainty around implementation and efficacy of mitigation measures and thus uncertainty around when outcomes might be achieved. She noted that the adaptive management approach would require a frequent review of SMPs in response to results in the EMPs and the investigations programme and potential changes to regional and national planning instruments to ensure there is a progressive improvement towards the outcomes of each catchment. She expressed concern in relation to the CLM and in relation to identification management and monitoring of high risk sites. When she appeared before us, Ms Stevenson advised that she was now in agreement with the applicant that all aspects of the EMP relating to surface quality and aquatic ecology, monitoring in the fresh water waterways and the two key areas of disagreement in relation to the potential stormwater technical advisory panel and uncertainty. She expressed a concern in relation to the high risk that many of the actions beyond feasibility studies proposed would not be progressed due to lack of applicant funding and staff resourcing unless there was some independent input into the decisionmaking for those investigations.
- 67 **Mr Nick Reuther**, the S42A Reporting Officer, appeared. He discussed the proposed adaptive management approach. He considered the application met the basic principles of adaptive management. He also addressed the definition of stormwater network, existing environment, the proposed “reasonably practicable measures” approach and the Christchurch contaminant load model. He then addressed the key areas of agreement in relation to the planning framework and discussed the issues relating to the potential exclusion of sites post-2025.

- 68 He made a number of recommendations, including an objective in relation to flood hazards and the role of a technical review advisory panel. Overall, he *“did not entirely disagree”* with Mr Pizzey’s statement that the applicant’s evidence demonstrated the proposed conditions and monitoring would ensure the effects on water quality are no more than minor. He considered the effects on the receiving water will likely decrease over time and the adaptive management approach is well placed to deal with effects arising from the discharges. He was of the opinion however that there was not sufficient certainty that the effects will reduce to a level that is minor across all catchments, particularly so in areas where retrofitting is not feasible or where high contaminant loads cannot be reduced to levels that are sustainable for receiving waterbodies. He also noted that reducing the effects of the stormwater discharges is tied to available funding secured through the Long Term Plan process.
- 69 Again in terms of cultural values, he was unable to conclude whether the effects on cultural values were minor, but was confident that the approach would enable ongoing collaboration and resolution. In terms of the s104D test, he confirmed his opinion that the proposal would not be contrary to the objectives and policies of the relevant plans. He advised that further discussions were continuing in relation to minor changes to proposed resource consent conditions.
- 70 **Ms Michelle Mehlhopt** provided legal submissions on behalf of CRC and primarily for the purpose of providing an overview of the key remaining issues. Ms Mehlhopt provided submissions on a number of matters where there was a difference of opinion between the applicant and the reporting officers. In relation to the ability to exclude high risk sites, Ms Mehlhopt referred to Policy 4.16A of the LWRP and submitted that the default position should be that all sites are included post-2025. She acknowledged there may be exceptional circumstances where it is appropriate for a site that poses an unacceptably high risk to be excluded so that the discharge is required to obtain a separate consent. Ms Mehlhopt commented on the limited enforcement powers the applicant has under its existing bylaw. Her submission was that where the applicant has exhausted all feasible options to address the adverse effects of the activity, it may be appropriate for the applicant to exclude the site.
- 71 Ms Mehlhopt provided useful submissions as to the different terminologies used by the applicant, including reasonable endeavours, all reasonably practicable measures, and the best practicable option. This responded to a number of questions we raised during the hearing. Ms Mehlhopt’s submissions in that regard were helpful.
- 72 Ms Mehlhopt addressed the existing environment. Ms Mehlhopt also addressed consent duration and its consistency or otherwise with the relevant LWRP policy.
- 73 **Dr Aisling O’Sullivan** and **Professor Tom Cochrane**, both of the University of Canterbury, provided evidence in relation to their peer review of the CLM. They summarised their concerns with the CLM model and answered a number of questions.

## Initial Reply

- 74 Mr Pizzey provided a brief oral reply addressing the “package” agreed with the Rūnanga. He noted there was no disagreement between the experts in relation to groundwater effects. In terms of water quality, he submitted there were almost no issues between experts other than in relation to wet weather monitoring sites.
- 75 In terms of water quantity matters, he submitted the key difference could be seen as one of process rather than merits, identifying Mr Law’s position in relation to the events to be taken into account, and the possible need for further addressing of water volumes.
- 76 In terms of the Brooklands and Styx catchment, he submitted the applicant had never said that there would be no adverse effects as a result of stormwater in the Styx. However, he says that it is minor in the context in which it is occurring. He noted the dropped land, high groundwater and sea level rise, which he described as “*the unfortunate reality*”. He noted that the modelling shows no more than a 100mm increase, assuming the 810 extra hectares were included. He described this as conservative. In terms of the relationship between operation and river management, he identified that the applicant considered this would benefit from further evidence.
- 77 He then addressed matters which the applicant would consider further, including in participation in the SMP process, annual meetings, industrial site audits and catchment level targets and addressed the CLM. He also responded to the issues raised by the Oil Companies, Ravensdown and NZ Steel in relation to certainty of process. He submitted that this was an LGA and RMA issue, but absolute certainty is not possible or advisable because the issues were site-specific. He submitted the exclusions were appropriate. He advised that the process is to work with CRC and addressed the possibility for further evidence.

## Further Hearing on 15 April 2019

- 78 As noted above, the hearing was reconvened on 15 April 2019 to enable the Commissioners to question the stormwater quantity experts, particularly in light of the two joint statements.
- 79 A number of submitters in the Styx catchment took the opportunity to attend that hearing and were invited, if they had any questions of clarification, to put those through the Chair. Several matters of clarification were raised.
- 80 Shortly before the commencement of the reconvened hearing, we received further submissions in reply from the applicant. They were received on 8 April 2019, together with a Second Joint Witness statement incorporating the requested mapping.
- 81 The hearing was then adjourned. We issued further directions in relation to requested further information in the form of mapping and any response from Mr Pizzey, limited to matters arising from the reconvened hearing. Following the receipt of that we provided an opportunity for submitters to respond and for a further limited right of reply.