

## **CRC160056 A Comprehensive Resource Consent to Discharge Stormwater from within Christchurch City onto or into Land, into Water and into Coastal Environments**

*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 (SWIM Group) in any enforcement matters.*

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 equalled 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.

**CSNDC** means the Christchurch City Council Comprehensive Stormwater Network Discharge Consent.

**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 this resource consent as Schedule 2.

**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 CCC 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 percent annual exceedance probability design storm event.

**facility** means a (usually large) constructed means of holding or attenuating stormwater 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 previously undeveloped for urban purposes (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.

**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.

**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 percent annual exceedance probability design storm event.

**QMCI** means Quantitative Macroinvertebrate Community Index.

**re-development site** means a change to a developed site or a site activity that results in a stormwater discharge that is not the same in scale, intensity or character to the discharge that existed prior to the commencement of this consent.

**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 from rainfall that has been collected, channelled, diverted, intensified or accelerated by human modification of the land surface or runoff from the external surface of any structure as a

result of precipitation and may contain contaminants. This definition excludes discharges of spilled or deliberately released hazardous substances and/or washdown activities.

**stormwater network** means waterways identified in a SMP and also includes the reticulated piped network, kerb and channel, sumps, pipes, manholes, rapid soakage chambers and any stormwater conveyance and mitigation system for which Christchurch City Council are responsible for operation and maintenance.

**surface water** means water in waterways, lakes, wetlands, springs, or coastal waters, but excludes groundwater and atmospheric water.

**SWIM** means the Joint Stormwater Management Issues Working Group, or its successor. The SWIM 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 “Stormwater Management Protocol<sup>1</sup>.”

**TSS** means Total Suspended Solids.

## **ACTIVITY**

### **Purpose and Location**

- 1.** This consent permits the discharge onto or into land or into surface water of stormwater which:
  - a.** is generated from existing sites, greenfield development sites and re-development sites within the territorial boundaries of the Christchurch City Council, and is discharged into the Christchurch City Council stormwater network, but excludes those areas outside of Banks Peninsula settlement areas; or
  - b.** enters the Christchurch City Council stormwater network from outside of the City boundary; or
  - c.** is generated from roofs of individual existing sites, greenfield development sites and re-developments sites and is discharged onto or into land within the site; or
  - d.** is generated from hard-standing areas of individual existing residential sites, greenfield development and re-development sites and is discharged onto or into land within the site.

## **Exclusions**

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<sup>1</sup> A Joint Christchurch City Council and Environment Canterbury Stormwater Management Protocol (March 2006, Revised September 2008 and November 2010)

2. There shall be no discharge to land or surface water from the following unless expressly authorised by Canterbury Regional Council and Christchurch City Council:
  - a. Any site or development area on the Canterbury Regional Council's Listed Land Use Register that is considered by Christchurch City Council to pose an unacceptably high risk of surface water or groundwater contamination;
  - b. Any stage of development with a total area of disturbance exceeding 5 hectares on flat land or 1 hectare on hill land; and
  - c. Any site listed on the attached Schedule 1 'Sites excluded from the Christchurch City Council Comprehensive Stormwater Network Discharge Consent'.
  
3. Discharge from the sites excluded by Condition 2 will be within the scope of this consent on 1 January 2025, or when current discharge permits expire for those sites, whichever is the latest.

*Advice note: Discharge into the Christchurch City Council stormwater network will still require approval from Christchurch City Council, as owner and operator of the stormwater network, at the 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 papatipu rūnanga and the Christchurch-West Melton and Banks Peninsula Zone Committees (or successor organisations), develop, and as necessary update Stormwater Management Plans (SMPs) in accordance with the programme set out in Table 1.

**Table 1: SMP Programme**

Catchment	Date SMP Operative	Date Submitted to Canterbury Regional Council	Date for 10 Year Review
Ōtākaro/ Avon River Area Christchurch		30 June 2015	30 June 2025
Pūharakekenui/ Styx River Area Christchurch	30 June 2014		30 June 2024
Huritini/ Halswell River Area	30 June 2016		30 June 2026

Christchurch			
Ōpāwaho/ Heathcote River Area Christchurch		30 June 2019	30 June 2029
Estuary and Coastal Area Christchurch		20 December 2019	20 December 2029
Outer Area Christchurch		30 June 2020	30 June 2030
Te Pātaka o Pākaihautū/ Banks Peninsula Settlements		20 December 2020	20 December 2030

**5. The purpose of the SMPs is to:**

- a. Demonstrate the means by which 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, and water quantity, set out in the conditions of this consent and in Schedules 4 to 7;
- b. Demonstrate the means by which the stormwater contribution to groundwater and spring-fed stream flows will continue by discharge of stormwater to land infiltration systems where reasonably practicable;
- c. 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 percent Annual Exceedance Probability Event.
- d. Plan the works authorised by this consent;
- e. Implement the conditions of this consent as they apply to each catchment.

**6. SMPs submitted to Canterbury Regional Council after the operative date of this consent shall include but not be limited to the following information:**

- a. Specific guidelines for implementation of stormwater management within the catchment to achieve the purpose of SMPs;

- b.** A definition of the extent of the stormwater infrastructure, including any portions of waterways, that forms the stormwater network within the catchment for the purposes of this consent;
- c.** A description of statutory and non-statutory planning mechanisms to achieve compliance with the conditions of this consent including the requirement to improve discharge water quality. These mechanisms will include (but are not limited to):
  - i. Relevant objectives, policies, standards and rules in the Christchurch District Plan;
  - ii. Relevant bylaws;
  - iii. Relevant strategies, codes, standards and guidelines;
- d.** Mitigation methods to achieve compliance with the conditions of this consent including the requirement to improve discharge water quality. These methods may include (but are not limited to):
  - 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 and/or in areas with high contaminant loads;
- e.** Locations and identification of Christchurch City Council water quality and water quantity mitigation facilities and devices;
- f.** Identification of areas reserved for future development;
- g.** Identification of areas subject to known flood hazards;
- h.** An interpretation of environmental & cultural monitoring and how this information has been used to develop water quality mitigation methods and practices;
- i.** Results from and interpretation of water quantity and quality modelling;
- j.** Consideration of any effects of the diversion and discharge of stormwater on baseflow in streams and springs;
- k.** A cultural impact assessment;
- l.** A summary of outcomes resulting from any collaboration with papatipu rūnanga on SMP development;
- m.** 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; and

- n.** A summary of feedback obtained in accordance with Condition 7 and if / how that feedback has been incorporated into the SMP.
- 7.** Prior to submitting a SMP or any amendment to a SMP to the Canterbury Regional Council, the consent holder shall provide a draft copy to the following parties inviting feedback within a timeframe of not less than 40 working days:
  - a.** papatipu rūnanga;
  - b.** The relevant Zone Committee(s) (or successor organisation); and
  - c.** The relevant Community Board(s) (or successor organisation)

*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.*

- 8.** The consent holder shall review the content of the SMPs to assess whether changes to the SMPs will better achieve their purpose. The programme for that review is as set out in Table 1 above.
- 9.** The consent holder shall amend the SMPs as it considers necessary including the use of any new technologies, new opportunities for additional treatment (such as for infill areas or retro-fit) or new constraints on treatment due to changed developer plans, new regulatory tools and processes or updated industry best practice for stormwater treatment, including the type, size and location of treatment facilities, and their timing for implementation.
- 10.** The consent holder shall amend the SMPs as it considers necessary to respond to the results of the Christchurch Contaminant Load Model (C-CLM), or results of monitoring, including any investigations or outcomes in relation to the responses to modelling and monitoring under Conditions 49 - 51.
- 11.** Any amendments to SMPs may not replace the previous version until the amendments have been certified by the RMA Compliance and Enforcement Manager of the Canterbury Regional Council as achieving the purposes of the SMP, as set out in Condition 5.

## **Implementation Plan**

- 12.** An Implementation Plan shall be prepared by the consent holder, after 12 months but no more than 18 months after this consent commences, to give effect to the SMPs and made available to Canterbury Regional Council and papatipu rūnanga on request. This



plan shall be reviewed by the consent holder every 3 years, with reference to the Christchurch City Council Long Term Plan.

**13.** The Implementation Plan shall include but not be limited to:

- a. A list of proposed stormwater mitigation methods and devices;
- b. A programme of stormwater works for Christchurch City Council and private development;
- c. A plan for regulatory, investigative, educational and preventative activities or programmes relating to stormwater discharges;
- d. Details of budgets for capital works or resourcing that is linked to the Christchurch City Council Long Term Plan; and
- e. Reporting on any testing or water quality monitoring undertaken that is used to check the performance of facilities or to inform prioritisation of areas for mitigation.

**14.** The Implementation Plan may also include details of maximum stormwater contaminant concentrations that Christchurch City Council, as owner and operator of the stormwater network, will accept into the Christchurch City Council network.

## **Engagement with Papatipu Rūnanga**

**15.** The consent holder shall engage with papatipu rūnanga:

- a. In the development and review of the SMPs required under Conditions 4 and 8 to 110, and the development of the Implementation Plan required under Conditions 12, 13 and 14;
- 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 holding an annual meeting with Mahaanui Kurataiao Ltd to discuss stormwater works under this 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 CSNDC. This is aimed at achieving the goals of the 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 CSNDC implementation.

## STANDARDS AND RESTRICTIONS

### Stormwater Contaminant Load Modelling

16. The consent holder will install stormwater mitigation facilities and devices that achieve the reductions in contaminant load specified in Table 2 below as measured by the Golder Associates (NZ) Ltd 2018 Christchurch Contaminant Load Model (C-CLM) report which is attached to this resource consent as Schedule 2:

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

	Contaminant load compared to no treatment as at 2018	5 years from 2018 compared to no treatment (as at 2023)	10 years from 2018 compared to no treatment (as at 2028)	25 years from 2018 compared to no treatment (as at 2043)	35 years from 2018 compared to no treatment (as at 2053)
<b>TSS</b>	12 %	21 %	25 %	27 %	29 %
<b>Total Zinc</b>	10 %	15 %	18 %	20 %	21 %
<b>Total Copper</b>	16 %	23 %	28 %	30 %	31 %

17. The base case against which reductions are to be assessed is the modelled untreated contaminant load.
18. The C-CLM will be run at five yearly intervals starting in 2023 for comparison with the targets set in Table 2 above and reported to Canterbury Regional Council in the annual report for those years.

*Advice note:*

*The C-CLM is the primary means of assessing 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.*

*A range of alternative contaminant modelling technologies may be used for research purposes or to assist with stormwater management and contaminant load reductions. These could include (but are not limited to) event-based models and methods of assessing predicted improvement in receiving environment water quality, if or when such tools become available.*

### Water Quality and Quantity Standards

19. 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 3.

20. The consent holder shall use reasonable endeavours to mitigate the effects of the discharge of stormwater on 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 4 and 5.
21. The consent holder shall use reasonable endeavours to mitigate the effects of the discharge of stormwater on 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 6.
22. The consent holder shall use 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.
23. The consent holder shall use reasonable endeavours to ensure that construction phase stormwater quality mitigation is implemented for all development sites prior to commencement of stripping of vegetation or earthworks on the site.
24. The consent holder shall use reasonable endeavours 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.

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

26. Water quality and quantity mitigation facilities and devices shall be designed in general accordance with the Christchurch City Council's Waterways and Wetlands 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).
27. The consent holder shall ensure that all stormwater quality mitigation facilities and devices servicing greenfield development after commencement of this consent are designed to treat the first flush.
28. For all water quality mitigation facilities and devices constructed after commencement of this consent to service re-development, or retrofit water quality mitigation facilities for existing development, reasonable endeavours shall be taken to design facilities that treat the first flush.

- 29.** All stormwater mitigation facilities and devices constructed after commencement of this consent shall meet any other specific requirements as specified within the Implementation Plan.
- 30.** Christchurch City Council stormwater infiltration facilities constructed after the commencement of the consent shall be located to maintain the following separation distances from domestic drinking water supply wells that exist prior to the construction of the infiltration facility:
- a. Infiltration devices shall maintain a separation distance of 2000 m when located up-gradient of domestic drinking water supply wells; and
  - b. Infiltration devices shall maintain a separation distance of 500 m when located down-gradient or cross-gradient of domestic drinking water supply wells;
  - 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 that it will not have an adverse effect on a domestic drinking water supply well by the Canterbury Regional Council, RMA Monitoring and Compliance Manager.
- 31.** Christchurch City Council stormwater mitigation facilities constructed after the commencement of this consent shall have secondary flow paths to the downstream stormwater network.
- 32.** Christchurch City Council stormwater mitigation facilities constructed after commencement of this consent shall include best practice features designed to capture and contain as much as reasonably practicable any spills of contaminants entering the stormwater facility.
- 33.** 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 two percent 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.
- 34.** All Christchurch City Council stormwater mitigation facilities and devices constructed after commencement of this consent shall have an Operations and Maintenance Manual which shall be made available on request.

#### **Other Actions by the Consent Holder**

- 35.** The consent holder shall investigate and implement methods to improve the management of stormwater quality and reduce stormwater effects on the receiving environment (stormwater quality investigation).
- 36.** The purpose of the stormwater quality investigation 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;
- c. Investigate using various models and techniques of water quality improvement strategies and options.

**37.** The consent holder shall undertake the actions set out in Table 3 below for the investigation required by condition 35 above:

**Table 3: Stormwater Quality Investigation**

<b><u>Stormwater Quality Investigation Actions</u></b>	<b>Action Start Date</b>	<b>Action Completion Date</b>
<p>1. Conduct a study to investigate the feasibility of developing an instream contaminant concentration model.</p> <p>Consideration to be given to:</p> <ul style="list-style-type: none"> <li>- How applicable the model will be to -</li> <li>(a) Water quality management generally</li> <li>(b) CSNDC specifically</li> <li>- Timelines</li> <li>- Costs</li> <li>- What data CCC would need to collect</li> </ul>	Dec - 18	Oct-19
2. Develop instream contaminant concentration model if the consent holder considers that the feasibility study in 1. provides sufficient merit.	Nov-19	Nov-21
3. 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.	Feb-22	Ongoing
<p>4. 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 to 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>	Dec - 18	Jun -20
5. If the consent holder considers that the feasibility study under 4. 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", into the receiving environment to assist model development and calibration	Jul-20	Ongoing
6. Investigate the impacts of applying alternative modelling tools (including	Mar-19	Jun-22

'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.		
7. Conduct a study to investigate the feasibility and techniques for addressing adverse effects of stormwater sediment discharges on receiving environments. This will include consideration of sediment cover of the bed, and copper, lead, zinc and PAHs contamination.	Sep-18	Oct-19
8. Instigate a remediation programme if the consent holder considers that the stormwater sediment discharge investigation in item 7. indicates sufficient merit.	Nov-19	Ongoing
9. Conduct a monitoring programme for assessing the actual contaminant-reduction performance of selected stormwater treatment facilities and devices. Apply the results of the study in determining the feasibility and selection of proposed treatment facilities and devices, and to improve the level of certainty of performance values relating to TSS, zinc and copper in contaminant load modelling. Report findings and outcomes in annual report to CRC.	Sep-18	Ongoing

**38.** The consent holder shall also undertake the actions set out in Table 4 below:

**Table 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>		
1. 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.	Feb-19	Dec-19
2. Prepare and submit for Council approval a cost/benefit analysis of options with recommendations 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 for AP2021).	Sep -18	Dec-19
3. Carry out trials for increased targeted/selective street sweeping and sump cleaning if Council resolves to do so under 2 above.	Jul-20	Jun-22
4. Prepare and submit for Council approval a cost/benefit analysis of issues and options of alternate methods of stormwater treatment and discharge with recommendations for carrying out trials. Including consideration of Managed Aquifer Recharge/Discharge (For consideration as part of Council Annual Planning process for AP2021).	Dec-18	Oct-19
5. Carry out trials for alternate methods of stormwater treatment and discharge if Council resolves to do so under 4 above.	Nov-19	Jun-22
6. If the consent holder considers it warranted as a result of the trials in item 3, increased frequency of street sweeping of selected areas.	Jul-19	Ongoing

7. If the consent holder considers it warranted as a result of the trials in item 5, increased frequency of sump cleaning at selected locations.	Jul-20	Ongoing
8. 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 commencing and throughout the construction process.	Jul-19	Ongoing
9. Operational inspection of a sample of stormwater treatment and/or retention devices on non-industrial sites.	Jul-20	Ongoing
<p><b>Communication, Education and Awareness</b></p> <p>Make reasonable endeavours to establish a community water engagement programme involving Council, Canterbury Regional Council, Ngai Tahu, DoC, MfE, Universities, and Community Groups with the objective of encouraging awareness and community actions to reduce stormwater contaminant discharges and improve waterways through source control and behaviour change.</p> <p>Possible initiatives of the community water engagement programme are:</p> <ul style="list-style-type: none"> <li>• 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).</li> <li>• Implement a sustainable behaviour change programme. Actions aimed at stopping contaminants getting into the stormwater network, such as: sediment, litter, bacterial contaminants.</li> <li>• Undertaking a wider educational programme for schools.</li> </ul>	Jul-19	Ongoing

## Erosion and Sediment Control

**39.** An Erosion and Sediment Control Plan (ESCP) shall be prepared and implemented for the construction phase stormwater discharge from any development area in general accordance with Canterbury Regional Council's *Erosion and Sediment Control Guidelines for the Canterbury Region, 2007 (Report R06/23 or successor document)*.

**40.** Copies of ESCPs submitted to or prepared by/for the consent holder shall be made available on request.

## Industrial Site Management

**41.** The consent holder shall, in collaboration with the Canterbury Regional Council:

- Undertake a desktop based identification of industrial sites, ranking sites for risk relative to stormwater discharge and identify the industrial sites that pose the highest risk;
- Audit a rolling list of at least 10 of the highest risk sites in the city and report progress on an annual basis;

- c. Identify any industrial sites that pose an unacceptably high risk and add them to Schedule 1 of this consent. The consent holder cannot add any more sites to Schedule 1 of this consent after 1 January 2025.

## **MONITORING AND REPORTING**

### **Environmental Monitoring Programme**

42. 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.
43. The consent holder may review and amend the EMP for the purposes of better monitoring and to determine whether the Receiving Environment Objectives and Attribute Target Levels are being met.
44. Any amendments to the EMP may not replace the previous version until the EMP has been certified by the RMA Compliance and Enforcement Manager of the Canterbury Regional Council as complying with the requirements of Condition 43.
45. The Attribute Target Levels in Schedule 3 for hardness modified copper, lead and zinc in Banks Peninsula surface water shall be calculated for each monitored waterway following the collection of one year of monitoring data. Hardness modified values for copper, lead and zinc for all sites within the EMP shall also be reviewed every five years, with the first review being undertaken in 2023. Hardness modified values shall be calculated using the ANZECC (2000) methodology, as outlined in the EMP. Should a new method of modifying metals become appropriate, this new methodology and any subsequent change in Attribute Target Levels shall be applied. Updated values will be incorporated into the EMP as an amendment, in accordance with Condition 43.
46. The Attribute Target Levels in Schedules 3 to 5 are from relevant regional and national guideline levels. Should these guideline levels be updated, the Attribute Target Levels shall be updated to reflect this. Updated values will be incorporated into the EMP as an amendment, certified in accordance with Condition 43.
47. The Attribute Target Levels in Schedules 3 and 4 for the Waterway Cultural Health Index, Marine Cultural Health Index and State of Takiwā scores, as well as the associated mana whenua monitoring sites and methodology in the EMP, shall be developed in collaboration with papatipu rūnanga. Once these scores, sites and monitoring methods are confirmed, monitoring for these mana whenua objectives shall commence. Updated information will be incorporated into the EMP as an amendment, in accordance with Condition 43.
48. The water quantity/flood model(s) for the Pūharakekenui/ Styx, Ōtakaro/ Avon, Ōpāwaho/ Heathcote River and Huritini/ Halswell Rivers shall be updated as necessary to reflect changes in development



patterns or modelling parameters every 5 years starting with the 2019 annual report. The results of model updates and a description of how they demonstrate compliance with Schedule 7 shall be included in the annual report required under Condition 53.

## **Responses to Modelling**

- 49.** Where the C-CLM results show that the percentage contaminant reductions required by Table 2 in Condition 16 are not met, the consent holder will be in breach of this consent, and will 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 reasonable endeavours to mitigate the adverse effects of stormwater have been carried out;
  - c. If the assessment in (b) determines that reasonable endeavours have not been carried out, assess options for correction / remediation to mitigate any adverse effects, and provide a timeline for the correction / remediation (if necessary);
  - d. Prepare a report, provided to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, detailing the matters set out in (a) to (c) above.
- 50.** If, upon submittal of the report, where required by Condition 49, agreement between Christchurch City Council and Canterbury Regional Council cannot be reached regarding any aspects, the consent holder shall consult with the SWIM 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 SWIM 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 and establish agreed approaches prior to submitting the report.*

## **Responses to Monitoring**

- 51.** If the monitoring results identify that the following Attribute Target Levels are not being met:
- a. TSS, copper, lead and zinc in surface water, as set out in Schedules 4 and 5;
  - b. copper, lead and zinc in groundwater, as set out in Schedule 6;

the consent holder shall:

- c. Perform an investigation to identify whether this is due to the effects of stormwater network discharges;
- d. Compile the results of such an investigation into a report to be submitted to the Canterbury Regional Council.
- e. The report shall include, at a minimum:
  - i. An evaluation of whether the monitoring results are due to stormwater network discharges or not;
  - ii. An assessment of options for correction/remediation (if effects are likely due to stormwater network discharges);
  - iii. A timeline of implementation of corrective action/remediation (if necessary).
- f. 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 Condition (e) above, the consent holder shall consult with the SWIM 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
- g. Implement any actions or changes identified as necessary by the SWIM group, or successor group, through the consultation under Condition 51(f) above.

## **Reporting**

- 52.** 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.
- 53.** The consent holder shall provide an annual report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, Banks Peninsula and Christchurch-West Melton Zone Committees, and papatipu rūnanga (via Mahaanui Kurataiao Ltd) by 30 June each year. This report will also be made available on the Christchurch City Council website. The report shall include, where appropriate:
  - a. A summary of the outcomes of monitoring, in accordance with Conditions 20, 21, 22, 37 and 42;
  - b. A summary of the C-CLM and results;

- e. A summary of any discussions, consultation or responses carried out under Conditions 49 - 51;
- f. A summary of Canterbury Regional Council records of consent compliance and where any non-compliances of this consent occurred;
- g. A summary of flood modelling results (if applicable) for development in greenfield areas;
- h. The supply of updates to Schedule 1 where required;
- i. 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;
- j. Records of developments authorised under this consent;
- k. Report on any collaboration with papatipu rūnanga and any activities relating to the protection or enhancement of cultural values;
- l. A summary of the stormwater quality investigations undertaken during the year;
- m. A summary of any additional monitoring or investigations undertaken beyond those specified in the EMP, including those undertaken on industrial sites, that have been initiated to inform the consent holder on stormwater management effectiveness.

## **ADMINISTRATION AND DURATION**

- 54.** The consent holder shall engage with papatipu rūnanga to collaboratively consider the Conditions on a 5-yearly basis from the date of granting of this consent.
- 55.** 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 consent for the purposes of:
  - a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent;
  - b. Complying with the requirements of a relevant rule in an operative regional plan.
- 56.** The duration of the consent is 25 years.

## **Attachments**

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

Schedule 2: Christchurch Contaminant Load Model

Schedule 3: General City Conditions – Water Quality and Quantity

**Schedule 4: Receiving Environment Objectives and Attribute  
Target Levels for Waterways**

**Schedule 5: Receiving Environment Objectives and Attribute  
Target Levels for Coastal Waters**

**Schedule 6: Receiving Environment Objectives and Attribute  
Target Levels for Groundwater and Springs**

Schedule 7: 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**

<b>Street Address</b>	<b>Street Number</b>	<b>Legal Description</b>	<b>CCC Prupi</b>
Barnes Road	79-87	Lot 1 DP 346683	586324
Belfast Road	30	Lot 2 DP 37063	425217
Brouchs Road	6	LOT 15 DP 36871	814749
Brouchs Road	7	LOT 2 DP 36871	714473
Brouchs Road	15	LOT 3 DP 36871	804901
Brouchs 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	12	LOT 15 DP 375764	891564



Road			
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: Christchurch Contaminant Load Model Report**

## Schedule 3: 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)	SMALL SITES Total area of disturbance does not exceed 1,000m <sup>2</sup>	LARGE SITES 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 enamelled coating.

\*\* Quantity assessment and mitigation - The effects of the discharge on CCC 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 4: Receiving Environment Objectives and Attribute Target Levels for Waterways

- TBC-A = To Be Confirmed once a full year of monitoring allows hardness modified values to be calculated, in accordance with Condition 43.
- TBC-B = To Be Confirmed following engagement with papatipu rūnanga, through an update to the EMP, in accordance with Condition 45.

Objective	Attribute	Attribute Target Level	Basis for Target
Enhance ecological values	QMCI	<p>Lower limit QMCI scores:</p> <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, 2017). This metric is designed for wadeable sites and should therefore be used with caution for non-wadeable sites. These targets can be achieved through reducing contaminant loads and waterway restoration.
Decrease sediment input to prevent adverse effects on water clarity and aquatic biota	<p>Fine sediment (&lt;2 mm diameter) percent cover of stream bed</p> <p>TSS concentrations in surface water</p>	<p>Upper limit fine sediment percent cover of stream bed:</p> <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> <p>Upper limit concentration of TSS in surface water: 25 mg/L during base flow, and 100 mg/L during wet weather</p> <p>No statistically significant increase in TSS concentrations</p>	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. These 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, 2017). 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.
Reduce copper, lead and zinc levels in surface water to prevent adverse effects on aquatic biota	Zinc, copper and lead concentrations in surface water	<p>Upper limit concentration of dissolved zinc:</p> <ul style="list-style-type: none"> <li>• Avon River catchment: 0.0297 mg/L</li> <li>• Heathcote River catchment: 0.04526 mg/L</li> <li>• Halswell River catchment: 0.01919 mg/L</li> <li>• Styx River catchment: 0.01214 mg/L</li> <li>• Otukaikino River catchment: 0.00868 mg/L</li> <li>• Linwood Canal: 0.146 mg/L</li> <li>• Banks Peninsula catchments: TBC-A</li> </ul> <p>Upper limit concentration of dissolved copper:</p> <ul style="list-style-type: none"> <li>• Avon River catchment: 0.00356 mg/L</li> <li>• Heathcote River catchment: 0.00543 mg/L</li> <li>• Halswell River catchment: 0.00336 mg/L</li> <li>• Styx River catchment: 0.00212 mg/L</li> </ul>	These metals can be toxic to aquatic organisms, negatively affecting such things as fecundity, maturation, respiration, physical structure and behaviour. 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
		<ul style="list-style-type: none"> <li>Otukaikino 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>Avon River catchment: 0.01554 mg/L</li> <li>Heathcote River catchment: 0.02916 mg/L</li> <li>Halswell River catchment: 0.01257 mg/L</li> <li>Styx River catchment: 0.00634 mg/L</li> <li>Otukaikino 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>	
Reduce nutrient levels to limit excessive growth of macrophytes and filamentous algae	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> <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>	Macrophyte and algae cover are indicators of the quality of aquatic habitat. Targets are taken from Table 1a of the LWRP (Canterbury Regional Council, 2017). Improvement towards these targets can be achieved by reduction in nutrient concentrations and riparian planting to shade the waterways.
Improve instream sediment quality to prevent adverse effects on aquatic biota	Zinc, copper and lead 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 mg/kg dry weight</li> </ul>	Metals can bind to sediment and remain in waterways, potentially negatively affecting biota. These trigger values are based on ISQG-low ANZECC (2000) guidelines. These targets can be achieved through reducing contaminant loads and instream sediment removal.
Enhance mana whenua freshwater values	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 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 5: Receiving Environment Objectives and Attribute Target Levels for Coastal Waters

- TBC-B = To Be Confirmed following consultation with papatipu rūnanga, through an update to the EMP, in accordance with Condition 45.

Objective	Attribute	Attribute Target Level	Basis for Target
Reduce sediment input to prevent adverse effects on water clarity and aquatic biota	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 (Crowe & Hay, 2004; Ryan, 1991). 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 (Crowe & Hay, 2004; Ryan, 1991). The target will be achieved by reducing contaminant loads (particularly using erosion and sediment control measures).
Decrease copper, lead and zinc levels in water to prevent adverse effects on aquatic biota	Copper, lead and zinc concentrations in surface water	<p>Maximum dissolved metal concentrations for all classes (with the exception of the Operational Area of the Port of Lyttelton):</p> <ul style="list-style-type: none"> <li>• Copper: 0.005 mg/L</li> <li>• Lead: 0.005 mg/L</li> <li>• Zinc: 0.05 mg/L</li> </ul> <p>No statistically significant increase in copper, lead and zinc concentrations</p>	Metals, in particular, copper, lead and zinc, can be toxic to aquatic organisms, negatively affecting such things as fecundity, maturation, respiration, physical structure and behaviour (Harding, 2005). Site specific criteria are set out in the Regional Coastal Environment Plan for the Canterbury Region (Canterbury Regional Council, 2012). The plan specifically details that this guideline is not relevant for the Operational Area of the Port of Lyttelton. This area is affected by direct discharges from boats that will make monitoring of the effects of stormwater difficult. These targets will be achieved by reducing contaminant loads.
Enhance mana whenua coastal values	Marine Cultural Health Index and State of Takiwā scores	<p>Minimum averaged Marine Cultural Health Index and State of Takiwā scores for all classes:</p> <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 6: Receiving Environment Objectives and Attribute Target Levels for Groundwater and Springs

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 changes in metals (particularly copper, lead, zinc).

## Schedule 7: Receiving Environment Attribute Target Levels for Water Quantity

Receiving Environment	Attribute Target Level	Basis for Target	Notes
Otākaro/ Avon	Flood levels for the 2 percent annual exceedance probability critical duration event shall not increase more than 50 millimetres when compared to the March 2014 modelled 2 percent annual exceedance probability design flood level	As measured in the Otākaro/Avon at Gloucester Street Bridge using the CCC flood model	
Pūharakekenui/ Styx	Flood levels for the 2 percent annual exceedance probability critical duration event shall not increase more than 100 millimetres +20% tolerance when compared to with the 2012 impervious surface 2 percent annual exceedance probability design flood level	As measured in the Pūharakekenui/ Styx River at Harbour Road Bridge using the CCC flood model	
Ōpāwaho/ Heathcote	Flood levels for the 2 percent annual exceedance probability critical duration event shall not increase more than 30 millimetres when compared to the 1991 impervious surface 2 percent annual exceedance probability design flood level	As measured in the Ōpāwaho/ Heathcote River at Ferniehurst Street using the CCC flood model	
Huritini/ Halswell	Flood levels for the 2 percent annual exceedance probability critical duration event shall not increase when compared to the March 2016 modelled 2 percent annual exceedance probability design flood level.	As measured in the Huritini/ Halswell River at the Minsons Drain confluence using the CCC flood model	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 can be isolated in the CCC stormwater model for compliance assessment purposes.
Otukaikino	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	As measured through the CCC discharge authorisation compliance process for Resource and Building Consents	CCC does not monitor or model flooding in the Otukaikino River. Flooding occurs primarily due to backwater effects in the Waimakariri River. Therefore, a best practice approach to mitigation of development will be implemented.
Banks Peninsula (Various)	Discharges from all new greenfield development within settlement areas of Te Pātaka o Pākaihautū/ 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 Pākaihautū/ 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.



## References

ANZECC (Australian and New Zealand Environment and Conservation Council, ANZECC, and Agriculture and Resource Management Council of Australia and New Zealand, ARMCANZ), 2000. Australian and New Zealand guidelines for fresh and marine water quality. Volume 1: The guidelines. ANZECC & ARMCANZ, Artarmon, New South Wales.

Crowe, A. & Hay, J. 2004. Effects of fine sediment on river biota. Report No. 951, prepared for Motueka Integrated Catchment Management Programme. Cawthron Institute, Nelson.

Canterbury Regional Council (2012). Regional Coastal Environment Plan for the Canterbury Region – Volume 1 (amended 20 September 2012). Canterbury Regional Council.

Canterbury Regional Council (2017). Canterbury Land and Water Regional Plan - Volume 1 (August 2017). Canterbury Regional Council, Christchurch.

Harding, J.S., 2005. Impacts of metals and mining on stream communities, in *Metal Contaminants in New Zealand*, T.A. Moore, A. Black, J.A. Centeno, J.S. Harding & D.A. Trumm (Editors), p. 343-357. Resolutionz press, Christchurch.

Ryan, P.A., 1991. Environmental effects of sediment on New Zealand streams: a review. *New Zealand Journal of Marine and Freshwater Research* 25: 207-221.