

Long Term Plan 2018-28

Service Plan for Flood Protection & Control Works

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Approvals		
Role	Name	Signature and date of sign-off
Finance Manager	Peter Langbein	Approved February 2018
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What does the overall Group of Activities do and why do we do it?

Christchurch City Council builds, owns, operates and maintains water supply, wastewater, stormwater and solid waste networks to provide to support healthy communities and a prosperous economy.

These services are core business for the Council, required by the Local Government Act 2002, and governed by a number of other acts and legislation.

Council implements these services for the community through planning, day to day operations, planned and reactive maintenance, repair and renewal of damaged infrastructure, building new infrastructure and implementing improvements to the system and measures its performance in terms of safety, quality and reliability.

1. What does this activity deliver?

The flood protection and control works activity delivers floodplain and stormwater management plan objectives to reduce the harm from flooding to our community and to improve the quality of ground and surface water.

The activity includes construction of new flood protection infrastructure and management of existing infrastructure including:

- pump stations and water flow control devices and structures such as valve stations
- stopbanks,
- water quality treatment devices such as basins, wetlands, tree pits, raingardens and filtration devices
- hydrometric monitoring devices, measuring rainfall along with surface water, sea and groundwater levels

Basins and wetlands serve a dual purpose of providing stormwater detention for reducing flood risk as well as providing water quality treatment.

Approximately half of this activity is delivered through the Land Drainage Recovery Programme (LDRP) and the majority of the remainder relates to construction of community facilities to improve water quality and service growth.

Around 30% of Christchurch residents live in areas at risk of flooding or coastal inundation. The key objective of this activity is to limit the effect of flooding on homes and Council infrastructure and allow emergency responses. If this activity were not conducted then flooding could be expected to dramatically worsen across the city from ongoing wear and tear on existing networks, earthquake damage effects and climate change. Significant social harm and degradation could occur without flood protection and control works. There are thousands of homes and properties at risk of current and future flooding and coastal inundation across our low lying city. The ongoing health and wellbeing of our residents is supported by this activity. This activity is typically delivered concurrently with the Stormwater Drainage Activity by using informed and proactive approaches to natural hazard risks.

Example – The Avon Stopbank network and Dudley Creek Diversion reduce the risks of flooding to large parts of the city. These assets will need maintenance, renewal and enhancement in order to cope with a changing climate and to address the effects of the earthquakes.

Healthy waterways are an important part of a healthy environment. Growth and land use intensification can negatively impact on the water quality and the ecological health of our natural waterways. For water quality in our waterways, wetlands and estuaries to improve over time good stormwater management practice is required by everyone in the community. This activity is fundamental to achieving the community outcome of healthy waterways and the strategic objective of improved waterways.

Council is developing and implementing Stormwater Management Plans (SMPs) across Christchurch City and Banks Peninsula where the Council has stormwater infrastructure. The SMPs aim to maintain and improve the six values for waterways. The SMP technical documents support and define how Council will comply with rules in stormwater discharge consents it has with Environment Canterbury.

Example – The construction of stormwater ponds across the Upper Heathcote Catchment, like Wigram Basin, improve water quality in our waterways. More of these assets will be delivered across the city to achieve community outcomes and deliver to existing consents.

In delivering this service the Council provides a balanced mix of maintenance and renewals to preserve the levels of service as well as capital investment to respond to increasing demands for growth (both greenfield and infill) and improved stormwater discharge quality to address waterway degradation.

This activity is linked to the Stormwater Drainage activity.

2. Why do we deliver this activity?

This activity delivers to a wide range of Council's Strategic Priorities. Flood Protection and Control Works are a key part of providing:

- *Climate Change Leadership:* Management of our floodplains through this activity will promote safe and healthy communities and deliver to Council's priority for a modern and robust city infrastructure
- *Informed and proactive approaches to natural hazard risks:* Delivery of an all-hazards approach within this activity will provide for a more resilient community that is well informed. Climate change adaptation is a key driver when considering existing and future policy and investment. This activity is at the core of the LDRP, the implementation of which is a strategic priority for Council
- *Safe and Sustainable water supply and waterways:* Improvements in the ecological health of our waterways will be delivered with this activity in conjunction with the Stormwater Drainage activity through improved stormwater management practices and new infrastructure

Effective floodplain management reduces the risk of flooding and the negative environmental and cultural impacts on the receiving environment.

The Council is committed to a six values approach to Flood Protection and Control Works (Drainage, Ecology, Recreation, Culture, Heritage, Landscape).

Council is currently leading the way with a number of projects and programmes that focus on floodplain management, environmental benefits and delivery to an all-hazards approach.

Delivery of this activity meets Council's legislative requirements under the:

- Local Government Act 2002
- Health and Safety at Work Act 2015
- Building Act 2004
- Christchurch District Drainage Act 1951
- Christchurch Replacement District Plan
- Civil Defence and Emergency Act
- Water Supply, Wastewater and Stormwater Bylaw 2014
- National Policy Statement (NPS) on Urban Development Capacity 2016
- Soil Conservation and River Control Act 1941
- Resource Management Act 2017: "The management of significant risks from natural hazards" is a new matter of national importance in section 6 of the Resource Management Act 1991 (RMA). The amendments emphasise a risk-based approach to managing natural hazards planning and decision-making under the RMA" (<http://www.mfe.govt.nz/sites/default/files/media/Fact%20Sheet%202%20-%20Revised%20functions%20for%20RMA%20decision%20makers.pdf>)

In addition to the above, there are legislative requirements to be met for water quality. These include:

- The NPS on Freshwater Management. It has objectives and policies for freshwater quality that are to be implemented in Regional Plans and to which there must be regard when there is a resource consent application for a discharge;
- The policy in the Canterbury Land and Water Regional Plan (LWRP), and in particular its application to the Comprehensive Stormwater Network Discharge Consent (CSNDC) which Christchurch City Council (CCC) has applied-for to the Canterbury Regional Council. A likely key factor relevant to the final consent conditions will be the degree to which the Council is committed to progressively improve the quality of its discharges to meet specified water quality targets.
- The requirements of any applicable existing discharge consents from Environment Canterbury

Further, Flood Protection & Control Works service is critical for achieving and supporting Council's Strategic Priorities, including:

- Safe and sustainable supply water supply and improved waterways including:
 - Water quality and ecological health in our waterways continues to improve over time toward agreed environmental target levels
 - The proportion of our waterways that are safe for contact recreation and that can support mahinga kai is increasing
- Informed and proactive approaches to natural hazard risks:
 - The primary drainage network reduces the risk of surface water flooding and habitable floor flooding

- Christchurch is well prepared for the impacts and consequences of natural hazards and can respond and recover quickly
- Council infrastructure is able to function following expected natural hazard events
- Maximising opportunities to develop a vibrant, prosperous and sustainable 21st Century city
 - Flood Protection & Control Works are core infrastructure to ensure the city functions well and supports prosperity

The Community Outcomes that relate most directly to the Flood Protection & Control Works activity are:

- Strong Communities - Safe & Healthy Communities
- Healthy Environment - Healthy waterways
- Healthy Environment - Sustainable use of resources
- Healthy Environment - Unique landscapes and indigenous biodiversity are valued
- Prosperous Economy - Modern and robust city infrastructure and facilities network
- Prosperous Economy - Great place for people, business and investment

3. Specify Levels of Service

The Levels of Service, Performance Measures and Performance Targets for Flood Protection & Control Works activity are provided below. Shaded rows are the levels of service and performance measures to be included in the Long Term Plan. Non-shaded rows are non-LTP management level measures.

Performance Standards/ Levels of Service (we provide)	Results Community outcomes and strategic priorities supported	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmark s	Future Performance (targets)			Future Performance (targets) 2021/28	
					Year 1	Year 2	Year 3		
					2018/19	2019/20	2020/21		
Maintaining the natural waterways and associated structures and systems									
14.1.6.1			14.1.6.1	14.1.6.1		14.1.6.1	14.1.6.1	14.1.6.1	14.1.6.1
14.1.1	Reduce risk of flooding to property and dwellings during extreme rain events	Community Outcome: Safe and healthy communities	Flood Models	New level of service – no current performance		Target 1 Annual reduction in the modelled number of properties predicted to be at risk of habitable floor level flooding of the primary dwelling in a 2% AEP Design Rainfall Event of duration greater than 1.5 hours excluding flooding that arises solely from private drainage: 50 properties	Target 1 Annual reduction in the modelled number of properties predicted to be at risk of habitable floor level flooding of the primary dwelling in a 2% AEP Design Rainfall Event of duration greater than 1.5 hours excluding flooding that arises solely from private drainage: 50 properties	Target 1 Annual reduction in the modelled number of properties predicted to be at risk of habitable floor level flooding of the primary dwelling in a 2% AEP Design Rainfall Event of duration greater than 1.5 hours excluding flooding that arises solely from private drainage: 50 properties	Target 1 Annual reduction in the modelled number of properties predicted to be at risk of habitable floor level flooding of the primary dwelling in a 2% AEP Design Rainfall Event of duration greater than 1.5 hours excluding flooding that arises solely from private drainage: 50 properties

Performance Standards/ Levels of Service (we provide)		Results Community outcomes and strategic priorities supported	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmark s	Future Performance (targets)			Future Performance (targets) 2021/28
						Year 1	Year 2	Year 3	
						2018/19	2019/20	2020/21	
14.1.6.2			14.1.6.2	14.1.6.2		14.1.6.2	14.1.6.2	14.1.6.2	14.1.6.2
14.1.1 Cont'd	Reduce risk of flooding to property and dwellings during extreme rain events	Community Outcome: Safe and healthy communities	GIS and Model	New level of service – no current performance		Target 2 Catchment models represent the current network (measured as a percentage of network): 90% of operational network greater than 300mm diameter or greater is included in model	Target 2 Catchment models represent the current network (measured as a percentage of network): 95% of operational network greater than 300mm diameter or greater is included in model	Target 2 Catchment models represent the current network (measured as a percentage of network): 99% of operational network greater than 300mm diameter or greater is included in model	Target 2 Catchment models represent the current network (measured as a percentage of network): 99% of network current
14.1.6.3			14.1.6.3	14.1.6.3		14.1.6.3	14.1.6.3	14.1.6.3	14.1.6.3
14.1.1 Cont'd	Reduce risk of flooding to property and dwellings during extreme rain events	Community Outcome: Safe and healthy communities	Contract Reporting and GIS	67 (number of sites)		Target 3 Number of monitoring sites (flow, level, rainfall): +2 (69)	Target 3 Number of monitoring sites (flow, level, rainfall): +2 (71)	Target 3 Number of monitoring sites (flow, level, rainfall): +2 (73)	Target 3 Number of monitoring sites (flow, level, rainfall): +7 (80)
Major flood protection and control works are maintained, repaired and renewed to key standards									
14.1.3.2			14.1.3.2	14.1.3.2		14.1.3.2	14.1.3.2	14.1.3.2	14.1.3.2
14.1.2	Major flood protection and control works are maintained, repaired and renewed to key standards	Community Outcome: Modern and robust city infrastructure and facilities network.	Annual LIDAR Survey <i>Department of Internal Affairs, Flood Protection & Control non-financial performance measure number 1</i>	2015/16: Achieved		Target 1 Stopbank crest surveys are carried out at required intervals: Annually	Target 1 Stopbank crest surveys are carried out at required intervals: Annually	Target 1 Stopbank crest surveys are carried out at required intervals: Annually	Target 1 Stopbank crest surveys are carried out at required intervals: Annually

Performance Standards/ Levels of Service (we provide)		Results Community outcomes and strategic priorities supported	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmark s	Future Performance (targets)			Future Performance (targets) 2021/28
						Year 1	Year 2	Year 3	
						2018/19	2019/20	2020/21	
14.1.3.1			14.1.3.1	14.1.3.1		14.1.3.1	14.1.3.1	14.1.3.1	14.1.3.1
14.1.2	Major flood protection and control works are maintained, repaired and renewed to key standards	Community Outcome: Modern and robust city infrastructure and facilities network.	14.1.3.1 5 year survey verification <i>Department of Internal Affairs, Flood Protection & Control non-financial performance measure number 1</i>	2015/16: Achieved		14.1.3.1 Target 2 Cross sectional surveys of selective waterways are carried out at required intervals: 2-5 yearly or as required	14.1.3.1 Target 2 Cross sectional surveys of selective waterways are carried out at required intervals: 2-5 yearly or as required	14.1.3.1 Target 2 Cross sectional surveys of selective waterways are carried out at required intervals: 2-5 yearly or as required	14.1.3.1 Target 2 Cross sectional surveys of selective waterways are carried out at required intervals: 2-5 yearly or as required
14.1.3.3			14.1.3.3	14.1.3.3		14.1.3.3	14.1.3.3	14.1.3.3	14.1.3.3
14.1.2 Cont'd	Major flood protection and control works are maintained, repaired and renewed to key standards	Community Outcome: Modern and robust city infrastructure and facilities network.	14.1.3.3 Bi-annual LIDAR survey of critical stopbanks. <i>Department of Internal Affairs, Flood Protection & Control non-financial performance measure number 1</i>	New level of service – no current performance		14.1.3.3 Target 3 Stopbanks identified as being below their original design standard are repaired within 9 months. Measured as proportion of stop bank length identified as not meeting standard that is repaired within required timescale: 70%	14.1.3.3 Target 3 Stopbanks identified as being below their original design standard are repaired within 9 months. Measured as proportion of stop bank length identified as not meeting standard that is repaired within required timescale: 70%	14.1.3.3 Target 3 Stopbanks identified as being below their original design standard are repaired within 9 months. Measured as proportion of stop bank length identified as not meeting standard that is repaired within required timescale: 75%	14.1.3.3 Target 3 Stopbanks identified as being below their original design standard are repaired within 9 months. Measured as proportion of stop bank length identified as not meeting standard that is repaired within required timescale: 85%

Performance Standards/ Levels of Service (we provide)		Results Community outcomes and strategic priorities supported	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmark s	Future Performance (targets)			Future Performance (targets) 2021/28
						Year 1	Year 2	Year 3	
						2018/19	2019/20	2020/21	
14.1.5 14.1.3	Implement Land Drainage Recovery Programme works to reduce flooding	Community Outcome: Modern and robust city infrastructure and facilities network.	14.1.5 Council's capital reporting system	14.1.5 N/A as floodplain management plans not yet available		14.1.5 Target 1 Delivery of works to meet floodplain management plans and remaining high priority plans: Start delivery of works to meet Heathcote, Avon and Estuary floodplain management plan objectives	14.1.5 Target 1 Delivery of works to meet floodplain management plans and remaining high priority plans: Ongoing delivery to Heathcote Floodplain management plans	14.1.5 Target 1 Delivery of works to meet floodplain management plans and remaining high priority plans: Start delivery of Avon Floodplain management plan	14.1.5 Target 1 Delivery of works to meet floodplain management plans and remaining high priority plans: Implement future stages of the Land Drainage Recovery Plan, including Estuary Floodplain Management Plan, as approved through Annual Plan
14.1.7.1 14.1.4	Reduce pollution from discharge of urban contaminants to waterways	Community Outcome: Healthy waterways	14.1.7.1 Contaminant Load Modelling (CLM) supported by monthly water quality monitoring data in priority catchments.	14.1.7.1 New level of service – no current performance		14.1.7.1 Target 1 Average annual reduction in zinc measured through contaminant load modelling supported by water quality testing at priority catchments: >0%	14.1.7.1 Target 1 Average annual reduction in zinc measured through contaminant load modelling supported by water quality testing at priority catchments: >1%	14.1.7.1 Target 1 Average annual reduction in zinc measured through contaminant load modelling supported by water quality testing at priority catchments: >1%	14.1.7.1 Target 1 Average annual reduction in zinc measured through contaminant load modelling supported by water quality testing at priority catchments: >2%

Performance Standards/ Levels of Service (we provide)		Results Community outcomes and strategic priorities supported	Method of Measurement (We will know we are meeting the level of service if.....)	Current Performance	Benchmark s	Future Performance (targets)			Future Performance (targets) 2021/28
						Year 1	Year 2	Year 3	
						2018/19	2019/20	2020/21	
14.1.7.2 14.1.4 Cont'd	Reduce pollution from discharge of urban contaminants to waterways	Community Outcome: Healthy waterways	14.1.7.2 Contaminant Load Modelling (CLM) supported by monthly water quality monitoring data in priority catchments.	14.1.7.2 New level of service – no current performance		14.1.7.2 Target 2 Average annual reduction in sediment measured through contaminant load modelling supported by water quality testing at priority catchments:: >0%	14.1.7.2 Target 2 Average annual reduction in sediment measured through contaminant load modelling supported by water quality testing at priority catchments:: >1%	14.1.7.2 Target 2 Average annual reduction in sediment measured through contaminant load modelling supported by water quality testing at priority catchments:: >2%	14.1.7.2 Target 2 Average annual reduction in sediment measured through contaminant load modelling supported by water quality testing at priority catchments:: >3%
14.1.7.3 14.1.4 Cont'd	Reduce pollution from discharge of urban contaminants to waterways	Community Outcome: Healthy waterways	14.1.7.3 Contaminant Load Modelling (CLM) supported by monthly water quality monitoring data in priority catchments.	14.1.7.3 New level of service – no current performance		14.1.7.3 Target 3 Average annual reduction in copper measured through contaminant load modelling supported by water quality testing at priority catchments: >0%	14.1.7.3 Target 3 Average annual reduction in copper measured through contaminant load modelling supported by water quality testing at priority catchments: >1%	14.1.7.3 Target 3 Average annual reduction in copper measured through contaminant load modelling supported by water quality testing at priority catchments: >2%	14.1.7.3 Target 3 Average annual reduction in copper measured through contaminant load modelling supported by water quality testing at priority catchments: >2%

4. What levels of service do we propose to change from the current LTP and why?

To review changes to levels of service between those adopted for the Amended Long Term Plan 2016-25 (Annual Plan 2017/18) and the draft Long Term Plan 2018-28, refer to [section 4 of the draft Service Plan](#).

5. How will the assets be managed to deliver the services?

The flood protection and control work service is managed according to best practice to ensure that Council complies with its statutory requirements and achieves the levels of service as expected by the community. Management processes include:

Plan: assess current flood risk, determine future needs and identify, evaluate and recommend options to achieve reduction in flood risk in accordance with Council guidelines and policies. Develop options for floodplain management with an all-hazards approach

Regulate: issue standards, specifications and bylaws to ensure that the service is safe, reliable and resilient and enforce adherence through the Council's consent processes

Build: conceptualize, design, specify and procure contractors to build new assets

Operate: ensure that flood protection and control networks and facilities are operated appropriately, efficiently and effectively

Maintain: perform planned and cyclic maintenance for a reliable and compliant service

Repair and renew: review asset condition in the context of age, material, maintenance, etc. and establish a prioritized programme for asset repair and renewal to ensure effectiveness and efficiency of supply

Customer services: receive, prioritize and respond to customer complaints and requests for services

How are works identified and prioritised?

Core Renewals

There are core renewal programmes to cover all asset types and detailed methodologies for development of these renewals programmes are being developed in the Draft Lifecycle Management Manual with results in the 2018 Land Drainage Asset Management Plan.

At a high level:

- Long term (years 4-30) budget planning is based on installation year and theoretical useful life where the theoretical useful life takes into account material, manufacturer, manufacturing standard, condition assessment results and expert judgement from literature.
- Short term (years 1-3) budgets and programs identify and prioritise specific renewals projects based on condition assessment results, performance assessment results, breakage rates, criticality, obsolescence, risk and alignment with transport (road) renewal works and development.

For the **LDRP** Council and community expectations of the programme are high with a strong desire to see the most flood prone areas remediated as soon as possible. As such considerable efforts are going into identifying and prioritising projects and maximising savings and efficiencies at project level to enable the greatest benefits in the shortest time. There are a range of tools used to aid prioritisation of projects within the programme:

- The City Wide Stormwater Model, validated by floor level surveys etc., is being used to better define the extent of flood risk and will inform long term sustainable decision making.
- The City Wide Economic Assessment Model has better defined cost benefit assessments that do not easily consider differences between above and below floor flood risk, infrastructure versus policy responses (e.g. managed retreat), future climate change effects, etc.
- Strategy and Planning Group's consideration of Natural Hazards and Three Waters strategies will begin to better inform the LDRP and potentially identify areas for savings or alternative funding.
- Project investigations consider the cost benefits of a number of options and identify cost by damage, remediation, and enhancement.

A prioritised physical works package has been developed based upon an engineering intervention approach of defence. The budget estimate for the entire programme totals \$1.2 billion (+/-40%). The projects have been categorised and prioritised in groups:

- LDRP high priority
- Avon River Flood Protection
- Heathcote River Flood Protection Programme
- Styx River Flood Protection Programme
- Estuary and Sumner Flood Protection Programme
- LDRP Medium/Low Priority
- Strategic policy decisions still need to be made before investing in new flood protection infrastructure (including stop banks, tide barriers or flood pumps), particularly as the effects of sea level rise become evident. Other options such as strategic retreat may be more cost effective.

The prioritisation of the groups is based upon a range of weighted, qualitative and quantitative criteria:

- Flood risk and effects
- Cost benefit
- Alignment with long-term planning objectives, other programmes and projects (Regenerate Christchurch, Otakaro, DCL, roading etc)
- Five values (non-drainage values i.e. ecology, landscape, recreation, heritage, culture)

There are a range of defence measures included in the programme, such as:

- Stopbanks
- Pump stations
- Channel modifications, e.g. widening, regarding, bank trimming
- Storage
- Property level defences e.g. house raising

Growth, Backlog and Improved Levels projects are established through network planning processes for issue identification and assessment. This includes responding to known flooding issues and areas of planned growth.

Prioritisation is based on assessment of the level of capital works needed to achieve compliance to statutory obligations, meet current Levels of Service and Council objectives as currently defined, and to provide the flood protection and stormwater management service in a sustainable manner in accordance with customer expectations. Priorities are determined from analysis applying the qualitative and quantitative criteria applied to the LDRP programme.

6. What financial resources are needed?

Refer to the **Activities and Services** section in the most recently adopted [Long Term Plan / Annual Plan](#).

7. How much capital expenditure will be spent, on what category of asset, and what are the key capital projects for this activity?

Refer to the **Capital Programme** section in the most recently adopted [Long Term Plan / Annual Plan](#).

8. Are there any significant negative effects that this activity will create?

Effect	Mitigation
Cost to Council / Ratepayers of operating flood protection and control works.	<p>Follow documented procedures and industry best practice for cost minimisation.</p> <p>Follow technological developments and implement cost saving initiatives on a continuous improvement basis.</p> <p>Focus process key performance indicators on cost efficiency.</p> <p>Ensure staff are kept updated with technological and operational best practice through attendance at conferences and participation in specialist industry working groups.</p>

Social, cultural and environmental effects of construction works and ongoing floodplain management	<p>Management of construction activities to minimise risk of non-compliance with relevant consent conditions.</p> <p>Develop and deliver floodplain management plans that consider all six values.</p>
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9. Does this Service Plan need to change as a result of a service delivery review?

A Service Delivery Review or Exemption report (Section 17A) for this activity has been carried out. Based on the outcome of this report no changes to the service plan or delivery model are required.