6: Risk Management

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Risk Management

Introduction

Risk management is an integral part of the management of major public infrastructure assets.

This section provides an overview of the risk management process for Community Facility assets, also summarising the significant risks identified in the asset specific Sections 7 to 16.

SDC takes an enterprise-wide approach to managing risks through a formal enterprise risk management framework based on ISO 31000:2018 Risk Management - Principles and Guidelines1. The application of this standard assists SDC in developing consistent processes for identifying, assessing and treating risks.

Figure 0-1 illustrates the elements of the risk management process from ISO 31000:2018 Risk Management.

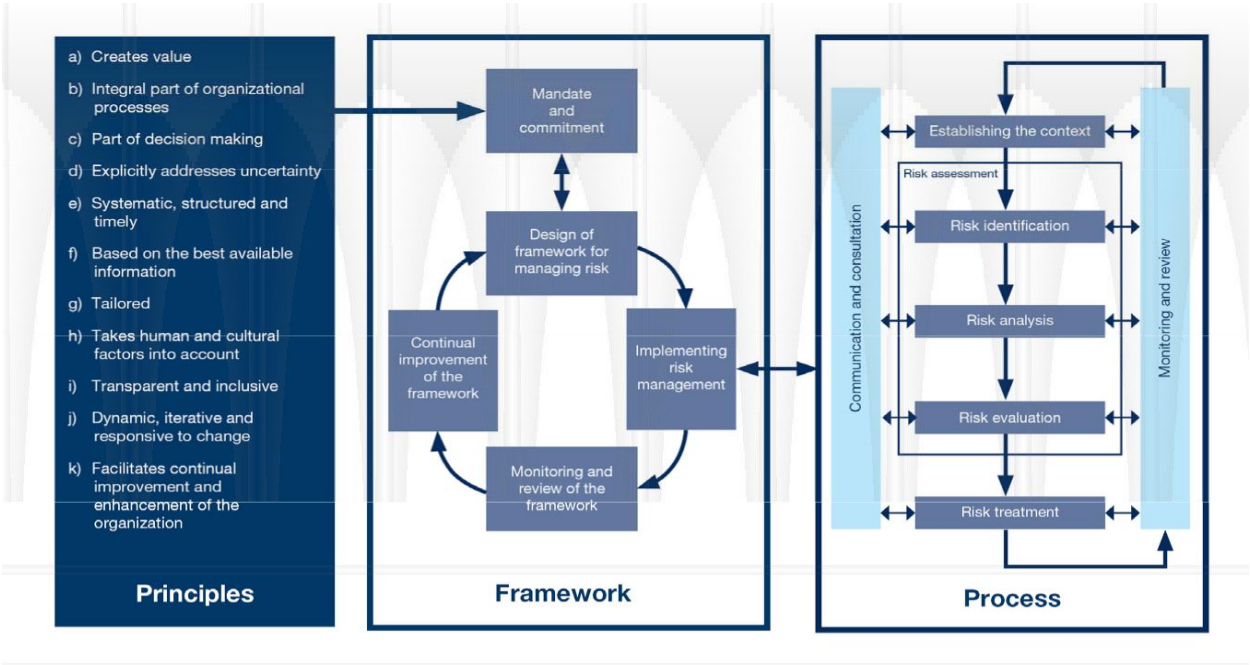


Figure 0-1: Risk Management Principles, Framework and Process – Overview

Communicate and Consult

Potential risk events are considered based on information derived from consultation with contractors, local management committees and Council staff. Further consultation with the wider community also occurs during the development of the levels of service and through other planning mechanisms (e.g. Reserve Management Plans). Risk tables have been populated based on discussions with SDC asset managers and service delivery personnel. The risk assessment process then identifies the tasks required to manage, monitor and minimise risk.

1 Supersedes AS/NZS 4360:2004

Establish the Context

The Risk Context for Council is established by a Corporate Risk Policy and Framework, which defines the relative importance of all the various types of risk foreseen and the level of response required for each.

Risk Policy

A corporate Risk Management Policy and Framework aligned with AS/NZS ISO 31000 was formally adopted by Council in August 2017. It was updated in 2020 to reflect the COVID-19 situation. The Policy has the following objectives:

- Achieving Council's goals, programs, targets with a commercially and politically acceptable level of risk;
- Ensuring all staff understand and fully accept their risk identification and control responsibilities;
- Ensuring all staff implement appropriate risk management processes naturally as part of their daily work;
- Establishing a best practice model for corporate governance and risk management for local government in New Zealand

The Policy Statement within this document states:

> To accomplish this Policy's purpose, the Council must establish and maintain an effective Risk Management Programme, to manage risks and incorporate the Councils risk appetite as expressed within the Risk Consequence table below.
>
> Roles and responsibilities for the fulfilment of this are expressed in the below section.
> This Risk Management Policy is the governing document in setting the requirements for risk management and risk appetite, for all types of risk, across the Council.

It defines four broad categories of risk, which are also categorised by organizational responsibility as illustrated in the tables below.

Risk Category	Description
Strategic	Risks associated with high-level goals that align with the Councils Strategic direction of the Long-Term Plan
Operational	Risks associated with departmental functions and daily operations
Project	Risks associated with Project Management and Project delivery
Compliance	Risks associated with regulatory/legislative requirements (H&S).

Table 0-1: Broad Risk Categories

Risk Categories		
Category	**Description**	**Unit Responsibility**
Asset / Infrastructure	Managing assets – including condition assessment, replacement and planning new assets	Assets & Property and Commercial
Financial / Audit	Risks associated with budgetary requirements and allocation Grants or operational budgets not being met	Enabling services
Customer Relations / Service Delivery	Meeting the current and changing expectations of customers	Business Relationships
Environment	The risks arising from the management of the environment when applying Council services and functions	Environment Services, Property and Commercial & Assets
People and Capabilities	Risks associated with recruitment and retention of employees and workforce planning. Includes payroll and HR issues	People and Capabilities
Compliance / Legal	Compliance with legislative and policy framework	All Council Units
Political / Reputation	Risks associated with the delivery of Local Government legislation and meeting Council's overall strategic goals	CEO / COUNCIL
Safety & Welfare	Risk associated with the safety and welfare of employees and contractors of Council	All Council Units

Table 0-2: Risk Management Responsibilities

Types of Risk

There are several key risk areas that are important and relevant to SDC's Community Facilities activity, which are described in the following table:

Risk Area	Description
Asset Risk	Asset risk is fundamentally associated with the performance of assets, both from a delivery of services perspective and from a cost management perspective. The longer an asset has been operating, the more historical performance data is available for analysis to ensure budgets are set realistically. However, it is also important to note that the longer the asset has been operating the older the asset will be and the more prone the asset will be to performance issues and the need for additional (or unbudgeted) expenditure on maintenance or replacement.
Demand Forecasting Risk	Community infrastructure projects that do not have a previous operating history rely heavily on educated 'guesswork' to ascertain how many people are willing to pay for the service provided. This work is complex and relies heavily on a range of inexact and changing inputs.
Natural Hazards Risk	Natural disasters such as floods, fires and earthquakes can have devastating effect on the service.
Information Technology Risk	Continued operation of business information systems is critical to SDC continuing to meet its service obligations. The systems contain both commercially and personally sensitive information, and system reliability, security and data accuracy are of paramount importance. Technology risk also arises from the use of technology that has no, or relatively limited, previous application in the sector. It may also be associated with older, proven technology that has not previously been used on the scale proposed for a new project. New technology can be prone to 'teething' issues on start-up and commission, creating some cost and performance issues and potential discontinuity in operation.
Financial Risk	Prudent financial management of the Community Facilities activity is critical to providing cost effective services. There are well established corporate controls and mitigating actions in place to mitigate this risk.
Service Delivery Risk	Service delivery risk is the risk associated with all aspects of the performance of systems and services, which can bring reduction in or loss of service. An example of such risk is a critical service where a failure by the provider results in a loss of service. Risk may also be associated with inadequate disaster recovery provisions.
Environmental Risk	Environmental risk is the actual or potential threat of adverse effects on living organisms and the environment by effluents, emissions, wastes, resource depletion, etc., arising out of an organization's activities
People Risk	SDC is a lifeline utility that operates and manages community assets, requiring qualified, skilled and competent staff. There are a number of specialist roles where the knowledge resides with key individuals, or where the employment market cannot provide competent and qualified resources quickly. The loss of key personnel and associated loss of knowledge in critical roles has the potential to compromise SDC service to customers.
Legal Risk	Legal risk is the risk of not meeting laws and regulations, and the risk of a claim due to an event occurring which results in a liability for SDC or other loss which results in a liability for SDC.
Reputational Risk	Reputational risk, often called reputation risk, is a risk of loss resulting from damages to an organisations reputation, consequent to an adverse event.
Health and Safety Risk	In providing services to the community, workers are exposed to significant process and operational safety risk, which have the potential to cause serious and fatal injuries to workers and members of the public. SDC has identified those risks and potential consequences and is continually reviewing existing controls and mitigation actions.

Table 0-3: Types of Risk

Identify the Risks

Risk identification is about identifying sources of risk, areas of impact, events, opportunities, failure to innovate and their causes and potential consequences. The aim is to generate a list of risks based on those impacts or events. It is important to identify risks with not pursuing an opportunity. All significant causes and consequences should be considered.

Risk events have been identified based on consideration of possible failure modes relating to physical risks to assets (including natural disasters, external impacts, and operational failures), risks to health and safety, and other risk categories highlighted above.

SDC has undertaken a comprehensive risk analysis of the various Community Facilities asset groups and identified and rated key risks for each group as follows:

- Recreational Reserves
- Cemeteries
- Community Halls
- Forestry
- Gravel Reserves
- Passive Reserves
- Pools
- Properties
- Public Toilets
- Rental Housing

Analyse Risks

Risk analysis involves developing an understanding of a risk. It provides an input to risk evaluation and to decisions on whether risks need to be treated, and the most appropriate risk treatment strategies and methods. The tables attached below are Council's tools for expressing the Likelihood, Consequence and Level of risk.

A "risk rating" can be obtained by using the Likelihood and Consequence Tables and applying the descriptor levels to the Risk Priority Matrix.

Risk analysis has been carried out by assigning a consequence and likelihood to each risk event based on information available in strategic and tactical documents as well as discussions with SDC staff. During this analysis any existing controls were also identified.

Likelihood	Likelihood Description	Scoring	Probability % (to assist assessment)
Frequent	Will almost certainly occur, and at least once in a month	5	91-100
Often	Will probably occur 6-12 times per year	4	71-90
Likely	1-5 times per year – likely to occur at least once in the next two – three months. There is a chance in the foreseeable future.	3	51-70
Possible	May occur at least once in the next year. Little chance of occurrence in foreseeable future.	2	21-50
Rare	Not expected to occur this year but may occur in a future period – unlikely in foreseeable future.	1	1-20

Rating Level	Consequence Description	Score
Catastrophic	• Catastrophic loss of public or stakeholder confidence, or breakdown in standards, which requires major recovery action to restore reputation or effectiveness; or • Clearly threatens operations or ability of organisation to achieve its objectives, or • Major unexpected financial overspend or loss, • Loss of life • Prolonged national media and political attention	5
Major	• Major unexpected financial overspend or loss • Significant dissatisfaction expressed by stakeholders, • Serious harm, national media attention, or • Unexpected failure to meet a standard	4
Moderate	• Failure leading to review of project or operation that will require changes to processes or goals, or • Likely to cause some damage or, disruption or breach of controls, or • Moderate financial overspend or loss, • Regional media attention, loss of image • Injury to staff or contractor	3
Minor	• Localised or isolated failure to meet stakeholder requirements or standards, • Unlikely to cause damage or threaten the effectiveness of the project, • Minor financial impact, involves management time	2
Insignificant	• Very low impact that will not be visible, negligible	1

	Consequence				
Likelihood	**Insignificant (1)**	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
Frequent (5)	5	10	15	20	25
Often (4)	4	8	12	16	20
Likely (3)	3	6	9	12	15
Possible (2)	2	4	6	8	10
Rare (1)	1	2	3	4	5

Risk Score	Level of Risk	Action Required	Attention of / assigned to
15-25	Extreme risk	Requires immediate assessment of actions	ELT/Council (as required), Statutory bodies.
8-12	Significant risk	Requires remedial assessments and action via the annual planning process	Unit Manager, Programme Sponsor, Programming Steering Group
4-6	Moderate risk	Address via new procedures and/or modification of existing practices and training	Programme manager, workstream leaders.
1-3	Low risk	No formal requirement for further action, unless escalation of risk is possible.	Workstream leads, project managers.

The table above shows the combined Consequence-Likelihood matrix from the SDC Risk Management Policy Framework used to prioritise risks, which range from Extreme to Low. Any risk event scoring at the 'Moderate' level or above is considered by SDC to be of sufficient magnitude to require mitigation action.

Evaluate Risks

Risk Evaluation is the process used to assist in making decisions, based on the outcomes of risk analysis, about which risks need treatment and the priority for treatment implementation. Decisions should take account of the wider context of the risk and include consideration of the tolerance of the risks borne by parties other than the organisation that benefits from the risk.

Treat Risks

Risk treatment involves selecting one or more options for modifying risks and implementing those options. Once implemented, treatments provide or modify the controls. An action should be implemented to treat certain risks. Council will tolerate a certain "acceptance" level of risk. Any risk that is rated low or moderate should be monitored and reviewed in line with relevant processes and systems.

Treatment options can include:

- Avoiding the risk;
- Taking the risk to pursue an opportunity;
- Removing the risk source;
- Changing the likelihood of the situation;
- Changing the consequence of the situation;
- Sharing the risk (contracting, partnering with another organisation);
- Retaining the risk by informed decision (tolerating the risk).

Methods for treating risks or future control actions have been developed by SDC staff. These tasks are required to reduce the risks to an acceptable level for SDC. Where risks cannot be eliminated, consideration is given to mitigation, i.e. reducing the effect if an event occurs. Implementation tasks and actions identified during this process for each service area to control and manage risks are incorporated into standard operating procedures, for example:

- Swimming pool faecal accident response – mitigate effect of a contamination event
- Building warrant of fitness inspections – eliminate substandard building component

Actions to manage identified risks have generally also been built into operational contracts where required or are included as part of contract documentation and process reviews.

Risk management is also factored into capital investment decision-making and the design of assets that are being replaced or added. Decisions on renewal or new works expenditure are made using multi-criteria analysis that includes evaluation of environmental, social, cultural and economic risks associated with each investment option identified. Further information is presented in Section 19, Asset Management Practices.

Risk Management Process

A comprehensive process has been undertaken in identifying, analysing, evaluating and developing control measures to ensure risk for community facilities assets and services can be effectively managed. This has involved looking at generic risks that will impact on all service areas as well as specific risks that relate to individual service areas.

The processes outlined in the Risk Management Policy and Framework have been followed and the matrices used to rate the risks. Both current and future control measures have been identified particularly where there is a need to put in place additional controls or risk mitigation measures.

The outcome from this process is recorded in the table in Annex 6-A.

Summary of Key Responses

A wide range of treatments and future controls are described above. Key responses are summarised below:

- The Council's Audit and Risk Committee has focused on several areas that have known risks associated with them. Reports have been prepared for Gravel Reserves, Community Pools, and Playgrounds. This process helps to ensure support is given for putting in the required risk controls in place.
- Contract requirements are generally satisfactory, and where appropriate these have been strengthened with additional controls. For example, contractors must be "site-wise" accredited, and all tree-trimming work must be carried out by trained arborists.
- Reserves and Community Centres which have previously been managed by Committees typically lacked formal specifications and monitoring processes. To better manage risk all compliance and asset management activities are now undertaken by qualified staff or have been incorporated into contracts.
- Swimming pools have had continuous safety audits and compliance checks undertaken following the initial audit carried out in 2016. This matter is regularly reported to Council's Audit and Risk Committee.
- There are significant changes for Gravel Reserves. Health and safety audits have been carried out on all major pits, identifying issues such as signage, fencing, access and face stability, which have been or are being rectified. On an ongoing basis, "B" grade quarry managers will carry out H&S checking. Quarries which have been leased out have similar requirements placed on their management. Furthermore, Quarry Management Plans and Health and Safety documents are independently reviewed against the Mining Regulations.
- A major project is planned from 2021 to improve data on tree health and condition to ensure this asset is managed to protect public health and safety.

Further to the above and in addition to the risk register included as Annex 6-A, relevant risk management documents and detailed registers and controls include the following:

Asset Group	Document / Register	Comment
Community Halls	Council operated community centres (RCC, LEC, WMCC)	Documents which identify hazards, risks and controls for different parts of each building, the environs, and operations within the buildings.
Swimming Pools	Aquatics Specific Risk Register	Document which identifies hazards, risks and controls for different parts of pool complexes, their environs, and operations, including the potential for drownings.
	Report on Health and Safety Compliance at Selwyn Aquatic Facilities 2016 and subsequent reports to the Audit and Risk Committee (2019 and 2020)	Internal document which reports on an assessment carried out in accordance with the requirements of the Health & Safety at Work Act 2015 (HSWA) – seeking to fulfil best practice HSWA "due diligence" requirements. A 4 level audit scoring system was used to identify risks in relation to a range of elements associated with 8 pool locations and the Selwyn Aquatic Centre. Further corrective actions identified from audit in 2019 and update on progress and recommendations. Refer Section 0 for further details.
Gravel Reserves (Quarries)	Quarry Inspection for Operating Pits (on-going)	Document which identifies the hazardous areas within the quarry, assesses acceptability, and defines specific actions and costs to mitigate the risks. Supports and on-going health and safety remediation programme and monthly inspections by certified quarry operator.
	Amendment to the Operating Pits Quarry Management Plans (2020)	Document which relates to Health and Safety, Emergency and Hazard Risk Management at this site. Refers to key requirements and includes a risk register
	SDC Site Hazard Register for Pits (2020)	Document which identifies potential hazards, controls, checks and sign-offs relating to work in the pit.
Various	Property Group Specific Risk Register	Document which identifies a range of hazards and risks associated with the use of tools, heavy plant, helicopters, stings, motorised plant, working at night, dust/smoke inhalation, road works, adverse weather, trailer use, appliances, vehicle use, firefighting, stress/fatigue/trauma, working in confined spaces and a range of other operational hazards. Identifies controls and risk ratings with controls in place.

Table 0-8: Key Risk Management Documents

Swimming Pools Health and Safety Compliance Report

The risk assessment considered the following elements, developing a combined score based on 0-3 elemental scores. Note that this method does not consider the likelihood of a particular event occurring, but rather it uses descriptive criteria that determine the relative level of potential risk. In effect, the higher the combined score the more likely an adverse event such as drowning or water contamination is to occur.

- People hazards, access and security
- Health, accidents, injuries and emergencies
- Signage
- Water quality, filtration and circulation systems, plant room
- Chemicals including cleaning products
- Electrical safety

The maximum possible score is 18, and the results for all sites are summarised below.

Killinchy Pool	16 (Extreme)
Leeston Pool	12 (Extreme)
Sheffield Pool	14 (Extreme)
Darfield Pool	5 (High)
Southbridge Pool	5 (High)
Selwyn Aquatic Centre	3 (Moderate)

Table 0-9: Key Risk Management Documents

The audit highlighted the need for corrective action to be taken at 6 sites, with only the Selwyn Aquatic Centre achieving a "Moderate" score. Recommendations are made within the report in relation to each site; these have now either been implemented or works are incorporated in this AcM Plan. Prebbleton and Courtenay Pools have subsequently been closed and demolished.

Following this report regular monitoring and auditing of risks has been carried out and reported to the Council's Audit and Risk Committee. Corrective actions identified and recommendations based on this process include:

- A consistent and approved induction process for all non-lifeguarded Pool sites. The induction will cover things such as; emergency procedures, risks, Pool rules, key contacts and site plans.
- Water test schedule to be developed by Selwyn District Council Officers at all non-lifeguarded sites to comply with New Zealand Standard 5826:2010. This will include preopening then 3 hourly water testing during opening hours. All committee representatives responsible for water treatment to undergo external training in the form of completing Introduction to Pool Operations (Unit Standard 20046).
- Further communication of the required inductions, supervision and water quality standards to occur to non-lifeguarded Pool committees. Fortnightly spot checks to occur as to supervision at non lifeguarded Pools, water treatment compliance and induction processes. These checks will be templated and actions recorded. Failure to comply with the required standards may result in temporary Pool closure.
- Continuation of alterations to the shift patterns at lifeguarded Pools to allow for the best possible supervision of Pools and the greatest efficiency for Selwyn District Council, as well as the best possible working conditions for staff.
- Temporary closure of Halkett Pool for the 2020/21 season due to on-going issues with management, supervision and water quality.

Monitor and Review

Risk is monitored by the completion of work or in subsequent inspections during annual reporting, and reviewed every three years as part of the Activity Plan update. For example:

- Pools Compliance Audit (from 2016)
- Playground Assessments 2020, which includes survey of condition, and safety
- SDC Public Toilets Assessment 2020
- Bridges Condition Report 2016 (includes comments/actions on risks, compliance)
- Sports Field Lighting Report 2020
- Building Defects Reports (various) 2019-2020 that include items with risks to assets and users

Asset Criticality

Critical assets are “those which have a high consequence of failure, but not necessarily a high probability of failure”. This is important as it draws attention to those assets which are the most important, irrespective of the likelihood of failure of the asset. Critical assets typically require more proactive management to minimise or eliminate this risk.

Asset Criticality Model

The asset criticality model is built on 8 factors that are scored. The factors and scoring a based on the Council’s risk framework.

There are a number of community facilities assets that have an emergency response or welfare function such as a community centre being used as a post-emergency welfare centre. This function is considered in scoring for the ‘safety/welfare’ factor and a higher score indicates the asset is necessary to be operating as part of Council emergency response plans.

The criticality factors are as follows:

Potential Impact	Description
Reputation:	Failure of the asset results in a loss of reputation for SDC.
Safety & Welfare:	Failure of the asset creates a health & safety hazard and/or the asset cannot perform an emergency function.
Environmental:	Failure of the asset has an environmental impact.
Legal/compliance:	Failure of the asset has a legal or non-compliance impact for SDC.
Loss of Service:	Failure of the asset results in a loss of service to its users.
Human Resources:	Failure of the asset results in staff being at risk or unable to undertake duties.
Financial:	Failure of the asset has a cost or income impact on SDC.
Asset Management:	Failure of the asset has a significant impact on asset management programmes

Each of the criticality factors are scored according to consequence of failure for the asset/facility in terms of: insignificant; minor; medium; major and catastrophic. These scores are then summed and classified into a criticality description of Very Low, Low, Moderate, High and Very High (as shown in table 6-8 below). Higher scores represent a greater impact of any of those factors should they fail. This scale has been defined across the wider SDC Assets group, with ratings being recorded in the asset management system.

Note that this is implemented looking at whole buildings/facilities/assets, rather than on subcomponents at this time. Although some work has been done at the component level to understand criticality to ensure the appropriate inspection and maintenance regimes are in place. In some cases this will occur as part of regular building inspections for BWOF and IQP.

Score	Criticality Description
<15	Very Low
16-19	Low
20-24	Moderate
25-29	High
30+	Very High

Table 0-10: Criticality Scores

In general, failure of the assets in the higher criticality bands could be expected to have severe adverse impacts on SDC’s customers and stakeholders, affecting outcomes such as public health and safety, economic well-being, and environmental sustainability. Availability of suitable alternatives is limited. At the

other end of the scale, failure of the lowest level of criticality would have little to no adverse impacts on customers, the local economy or the environment.

Table below provides the results of the criticality assessment for Community Facility assets and indicates the criticality bands.

Asset Type	Asset Grade/Importance	Assessed Criticality
Civic Building	SDC HQ - IL4 ER Ops Centre	very high
Indoor Aquatic Facility	SAC - District Pool	very high
Public Toilet - State Highway	Grade 1	high
Community Centre	High Use/ER Welfare	high
Community Centre	High Use/ER Centre	high
Community Centre	High Use	high
Civic Building	Library/Service Centre	high
Medical Centre	Health Hub	high
Outdoor seasonal pool	Sub-district pool	high
Sports Park and facilities	District use	high
Playground	Destination Playground	high
Open Cemetery	High use	high
Community Centre/Hall	Moderate Use/ER Centre	moderate
Community Centre/Hall	Moderate Use	moderate
Medical Centre	Local Medical Centre	moderate
Gravel Pit	Operational	moderate
Forest Plantation	Production only	moderate
Forest Plantation	Recreation/Production	moderate
Outdoor seasonal pool	Local community pool	moderate
Sports Park and facilities	Local use	moderate
Rural Recreation Reserve	High use - camping site	moderate
Conservation Reserve	Sensitive ecological area	moderate
Playground	Community Park	moderate
Playground	Local use	moderate
Street trees	Listed trees	moderate
Street trees	Standard trees	moderate
Open Cemetery	Low use	moderate
Public Toilet - Township	Grade 2	moderate
Public Toilet - Camping Site	Grade 2	moderate
Public Toilet - Remote	Grade 3	low
Remote Rural Hall	Low Use/ER Centre	low
Remote Rural Hall	Low use	low
Community use building	Public use	low
Heritage Building - Listed	Public occupation	low
Heritage Building - Not Listed	Public occupation	low
Commercial lease property	Significant business	low
House	Occupied	low
Gravel Pit	Non-operational	low
Sports Park and facilities	Remote - low use	low
Rural Recreation Reserve	Low use - remote	low
Passive open space	Civic space/square	low
Passive open space	Informal use	low
Passive open space	Walking/cycling links	low
Passive open space	Ecological link	low
Community use building	Storage purpose	very low
Heritage Building - Listed	Not occupied	very low
Heritage Building - Not Listed	Not occupied	very low
Commercial lease property	Minor business	very low
House	Unoccupied	very low
Closed Cemetery	Closed	very low

Table 0-11: Criticality Assessment Outcomes Showing Bands of Criticality

Critical Assets

The general criticality profile of the Community Facilities asset portfolio is described below. Table 612 below shows those assets that are in the high or very high criticality band and provides some information on specific components and how they are treated. Criticality is, in most cases, more due to operational risks rather than the need for the services to be reinstated after emergency events (apart from emergency operations centres). Community Facilities in general are a low priority for reinstatement or replacement in an emergency and can be isolated if they are rendered unsuitable for use in such events.

However, the investments made in key buildings and facilities, and significant operational costs, make these 'financially critical' and others such as swimming pools can have potentially serious consequences if failure occurs to plant and equipment. This situation justifies further asset and risk management consideration.

Asset Group	Specific Critical Assets	Response
Recreation Reserves	District level parks (e.g. Foster Park) as a significant business operation.	Reflected in contract specifications, inspection schedules and on-site management approach
	Playground Equipment, skate parks.	Reflected in contract inspection schedules and annual; surveys by RoSPA 3 certified inspector
	Bridges (including platforms, boardwalks etc.)	Reflected in inspection schedules and 6 yearly structural assessments.
Township Reserves and Streetscapes	Playground Equipment (especially high use playgrounds).	Reflected in inspection schedules and annual surveys by RoSPA 3 certified inspector.
	Bridges (including platforms, boardwalks etc.)	Reflected in inspection schedules and 6 yearly structural assessments.
Cemeteries	High use cemeteries – legislative requirements to provide for residents' interment and for civil emergency function (e.g. pandemic).	Reflected in contract specifications; capacity maintained to allow for unanticipated demand
Public Toilets	Higher-profile (more visible Grade 1 facilities) locations are more critical.	Reflected in inspection and contract cleaning schedules; remote monitoring of alarm systems for effluent systems
Community Centres and Halls	Selwyn Sports Centre, Lincoln Events Centre, West Melton Community and Recreation Centre and Darfield Recreation and Community Centre as significant business operations and post emergency functions.	Reflected in IQP inspections and building WoF; Cleaning and inspection schedules; BMS system installed and monitored
	Roof cladding & storm water systems	Annual washdown/clean and inspection; 3 years condition inspections
	Waste water systems	Monthly compliance monitoring; remote alarm system monitoring Annual inspection for performance
	Water supply systems (non-reticulated)	Filtration systems installed; Testing as per Water Plans
	Stairs and handrails	Regular (monthly) inspections; 3 yearly condition inspection
	Building fire systems and egress	Reflected in IQP inspections and building WoF
	Electrical systems	3 yearly condition inspection of fuse box by Certified electrical contractor; Heat survey of wiring (on priority basis)
Swimming Pools	Selwyn Aquatic Centre- as a significant business operation and consequential risk of failure	Reflected in operating procedures; Attained Poolsafe certification; Staff training programmes Regular inspection of assets by IQP plus regular audit and report to Audit & Risk BMS system installed and monitored
	Sub-district pools (Darfield, Southbridge) as a significant business operation and consequential risk of failure	Reflected in operating procedures; Attained Poolsafe certification; Staff training programmes

Asset Group	Specific Critical Assets	Response
		Regular inspection of assets by IQP plus regular audit and report to Audit & Risk
	Plant/filter systems for water treatment	Inspection as per operating procedures (including emergency procedures); Trained water treatment operators; Annual condition and performance inspections by qualified engineer
	Leisure equipment (e.g. hydro slides)	Inspection as per operating procedures (including emergency procedures); Annual condition and performance inspections by qualified engineer
	Fences and gates	Inspection as per operating procedures; Annual condition inspections
Property and Buildings	Council Headquarters (for response in emergencies) Te Ara Ātea (as a significant business operation) Selwyn Health Hub (under construction) as a critical building to support district health services Library/service centres as significant business operations Further work is required to define and manage critical components for all buildings. Reflected in IQP inspections and building WoF and facilities maintenance contracts	
Rental Housing	Not identified as critical assets but components managed to meet tenancy and Healthy Homes requirements. Reflected in inspections, particularly for fire compliance.	
Gravel Reserves	No identified critical assets however health and safety risks are manged via operations	
Forestry	No identified critical assets; however fire and other risks are managed via operations.	

Table 0-12: Critical Assets

The criticality identification process also enables the development of targeted maintenance and condition inspection programmes based on overall criticality. These have been proposed as follows:

Application of Criticality Rating		
Criticality Rating	**Maintenance Inspections**	**Condition Inspections**
Very High	At least monthly	Annually
High	At least quarterly	Annually
Moderate	At least annually	Every 3 years
Low	At least biennially	Every 3 years
Very Low	At least triennially	Every 3 years

Table 0-4: Application of Criticality Rating to Inspection Programmes

It is planned to incorporate the approach described above into revisions of contract documents and formal building inspection programmes. The risk associated with asset criticality has been taken into consideration in developing planned maintenance and renewal programmes for the various building assets covered under

this Activity Management Plan. Those assets that have higher levels of criticality (that often have a higher level of complexity) are also subject to more comprehensive asset management planning and intensive operational practice to reduce the likelihood of failure. Assets with lower criticality do not require the same level of asset management treatment or inspection programmes.

It is planned to establish a more extensive approach to defining critical assets and associated inspection programmes for all asset groups. Further work is required to define and manage critical components. The level of information collected has been established in accordance with the criticality of the facility and its components. Criticality information at both facility and component level will be transferred to inventories held in the Asset Management System as part of the data improvement process.

Criticality and Risk

It is useful to communicate the likelihood and impact of potential asset failure in financial terms, so that Council can consider the acceptable risk tolerance level. This is important as it drives intervention levels for asset management.

The likelihood of failure of an asset can be difficult to assess, however condition and age are parameters that can provide an indication. The worse the condition of the asset, the more likely it is to fail. Using the replacement cost valuation of the asset group and available condition data, an assessment can be made of the distribution of replacement cost against both criticality and condition. This is shown in the series of tables below which provides a “financial risk exposure” view, given the assumption that an asset in poor condition is more likely to fail than one in good condition. Assets which are both extremely critical and more likely to fail should have higher priority and be replaced or rehabilitated earlier in their lifecycle than others, and at lower levels “run to failure” may be perfectly acceptable.

The group of tables below generally cover the asset groups with a higher level of assessed criticality and include community centres and halls, property and buildings, public toilets and swimming pools. This indicates that, overall, the financial risk exposure is low which is primarily attributable to much of the portfolio being relatively new and the majority of more critical assets being in “good” condition or better.

The most at risk areas include community centres and halls where there is over $3.5 million of assets with high criticality but average condition. This relates to Darfield Recreation and Community Centre and Rolleston Community Centre. There are maintenance and renewal programme in place over the next 10 years that will see these facilities improved. There is also the future possibility of re-purposing Rolleston Community Centre, and this will be the subject of further feasibility work.

The other group of assets with some level of risk is property and buildings with around $2.3 million with high criticality and average condition. This relates to the Leeston Library/Service Centre/Medical Centre building that is planned for replacement by 2024/25 and the Rolleston Library that is being replaced by the new community library and cultural centre (Te Ara Ātea) in 2021. The former library space will be refurbished for an alternative use once Te Ara Ātea opens (a budget of around $500,000 has been allocated for this work).

Note that the cost information presented in the tables is based on current valuation or new build costs (where assets under construction have yet to be valued) as applicable.

Halls & CCs	Asset Condition Linked to Liklihood of Failure				
Asset Criticality Level	1	2	3	4	5
	As New	Good	Average	Poor	Unserviceable
	Very Unlikely	Unlikely	Possible	Likely	Very Likely
5 = Very High					
4 = High	$ 29,050,000	$ 8,390,000	$ 3,651,667		
3 = Moderate	$ 9,400,000	$ 3,262,000	$ 440,000		
2 = Low		$ 2,304,000	$ 754,000		
1 = Very Low					$ 2,000

Property & Buildings	Asset Condition Linked to Liklihood of Failure				
Asset Criticality Level	1	2	3	4	5
	As New	Good	Average	Poor	Unserviceable
	Very Unlikely	Unlikely	Possible	Likely	Very Likely
5 = Very High		$ 14,575,000			
4 = High	$ 47,485,000	$ 1,808,000	$ 2,288,333		
3 = Moderate		$ 790,000	$ 406,000		
2 = Low		$ 13,830,500	$ 72,000		
1 = Very Low		$ 75,000	$ 1,633,000		

Public Toilets	Asset Condition Linked to Liklihood of Failure				
Asset Criticality Level	1	2	3	4	5
	As New	Good	Average	Poor	Unserviceable
	Very Unlikely	Unlikely	Possible	Likely	Very Likely
5 = Very High					
4 = High	$ 1,894,700				
3 = Moderate	$ 1,681,700	$ 208,000			
2 = Low	$ 205,000	$ 55,000			
1 = Very Low					

Swimming Pools	Asset Condition Linked to Liklihood of Failure				
Asset Criticality Level	1	2	3	4	5
	As New	Good	Average	Poor	Unserviceable
	Very Unlikely	Unlikely	Possible	Likely	Very Likely
5 = Very High		$ 25,039,000			
4 = High		$ 781,000			
3 = Moderate		$ 219,000	$ 67,837		
2 = Low					
1 = Very Low					

Table 0-5: Financial Risk Exposure – Replacement Value Compared to Criticality and Condition

Insurance

Insurance Coverage for Assets

Council's policy, subject to cover being available, is to hold insurance to cover damage to, or loss of all:

- Council owned community halls and community centres, reserve buildings and any other Council-owned structures
- Publicly owned and operated community halls, where the township or management committee is elected at large from the area it serves

When additional assets are constructed, Council arranges insurance cover to commence when the construction contractor's policies become inoperative, generally on issue of the contract completion certificate. Insurance coverage may also be checked against regular Valuation Reports, the fixed Asset Register list of assets, or on the renewal date of the insurance contract.

Council continues to retain insurance cover for Professional Indemnity and Public Liability.

Insurance cover maintained for the assets in this Plan is summarised below. At 1 July 2023 Council has combined insurance cover for material damage and business interruption of **$510,820,281** which includes cover for natural disasters. Cover for natural disaster events has deductions that apply from 1% to 10% of the site value depending on the age of the asset (post 2011 risks – 1%; post 2034 risks - 2.5%; all other risks -10%). The cover includes all assets listed on the insurance schedule.

Assets/service	Insurance Position	
	Cover	Comment
Community facility assets	Covered under Material Damage and Business Interruption policy	Cover is $510,820,281 Includes cover for natural disasters Includes all assets listed on the insurance schedule and provides for additions
Horizontal infrastructure	Covered under Material Damage and Business Interruption Policy for Horizontal Infrastructure	Cover is $50,000,000 for any one event or aggregate during the period of insurance
Forestry	Forestry Plantation Timber Insurance Policy	Includes Fire ($130,00) Hail ($10,000) Windstorm (no cover due to age of trees)
Public Liability	Covered under a combined policy for Public Liability, Professional Indemnity & Environmental Impairment Liability	Sum insured is $300,000,000
Professional Indemnity	Covered under a combined policy for Public Liability, Professional Indemnity & Environmental Impairment Liability	Sum insured is $300,000,000
Environmental Impairment Liability	Covered under a combined policy for Public Liability, Professional Indemnity & Environmental Impairment Liability	Sum insured is $1,000,000
Crime	Cover theft by employees and external parties	Sum insured is $1,000,000

Table 0-6: Insurance for Community Facilities

Emergency Management

Emergency Management Plans

SDC has documented procedures relating to Council facilities, developed "under the provisions of the Health and Safety at Work Act (HSWA) 2015, to ensure that the consequences of incidents or harmful exposures are minimised". The Emergency Management Plan2 (EMP) includes:

- SDC Emergency Management Plan for all SDC Areas
- SDC Annual Health & Safety Management Plan
- SDC Emergency Response Plan Action Procedures for all SDC Facilities
- SDC Emergency Procedures Flip Chart

These plans are operationally focussed, and complement other plans relating to CDEM – refer to the next section.

Civil Defence Requirements

The Civil Defence and Emergency Management (CDEM) Act 2002 requires a risk management based approach to the sustainable management of hazards, both natural and man-made. This risk management process is applied across risk reduction, readiness, response, and recovery, as well as being integrated through the involvement of all sectors within the wider CDEM community.

SDC has developed a CDEM Strategy and local arrangements for response to an emergency. This covers the establishment of an Emergency Operations Centre (EOC) from Council premises, and provision of a range of procedures and plans to meet specific types of CDEM contingencies. The EOC uses Standard Operating Procedures (SOP) in carrying out its responsibilities.

Resources covered under the services described in this plan may be utilised for emergency situations. This includes the use of maintenance contractors to maintain 'lifelines'. Individual contract documents outline any contractor requirements to assist with emergency response. In addition the Council provides in-house teams that are trained in civil emergency response. A number of the community centres and halls across the district serve as Civil Defence Sector Posts or as Welfare Centres.

Emergency Operations Centres:

Located in IL4 rated buildings (Selwyn District Head Quarters).

Emergency Centres

May use a number of local community centres and halls or other Council buildings (where these are suitable for emergency response purposes)

Set up and managed locally with support from Civil Defence (Selwyn District Council).

Intended as a place to gather for a short period of time to provide support and information.

Emergency Welfare Centres:

Located in, Lincoln Events Centre, Selwyn Sports Centre, Darfield Recreation Centre, and West Melton Community and Recreation Centre.

Set up and managed by Civil Defence (Selwyn District Council) supported by members of recognised community organisations.

Intended to provide a range of emergency welfare services such as accommodation, clothing, and food, emotional and financial support.

2 Selwyn District Council Emergency Management Plan for all SDC Areas, June 2016

Lifeline Utilities

In terms of the Act, Council is a "Lifeline Utility" and has legal responsibilities. While there are no Community Facilities assets identified as Lifeline Utilities, it is noted that the Civil Defence and Emergency Management centre (EOC) is located within the Rolleston headquarters building.

SDC Lifelines Utilities Response Plan3

The "Lifelines Utilities Response Plan" was prepared to provide guidance to asset managers and response personnel when an event occurs. While the Community Facilities activity is not formally a "lifeline utility" as defined in the CDEM Act 2002, the response plan is relevant due to its inclusion of "Essential Council Buildings".

The purpose of the response plan is "to facilitate the most appropriate and timely achievable responses to adverse events affecting Lifeline Utilities in the Selwyn District". It includes a wide range of natural hazard events and describes emergency response control and coordination arrangements between lifeline utilities and agencies both within SDC and externally (electricity, telecommunications, fuel, fast moving consumer goods and banking).

It provides background information relating to the hazards and highlights the interdependencies between the various utilities (see Section 0 below). Table 6 in the plan highlights the potential effects on SDC Essential Buildings (reproduced below).

Event or Consequence of Failure	Cascade Effect 1	Cascade Effect 2	Cascade Effect 3	Intervention 1 < 24 hrs	Intervention 2 24 - 48 Hrs	Intervention 3 > 2 Days
Events which directly affect Essential SDC Buildings						
Snow loadings or earthquakes	Damage to buildings & facilities	Potential inability to continue service		Facilities checked		
				Ascertain outage periods for affected staff		
				Assess extent of reinstatement		
				Assess alternative housing solutions		
Extreme Cold temperatures	Frozen pipes	Inability to continue service		Run water to waste (to stop freezing)		
Impacts which result from the failure of other utilities						
Road Access lost	No access until access roads cleared	Inability to continue service		Alternative transport arrangements		
	Inability to supply standby generators with fuel	Inability to continue service		Access cleared on basis of criticality	Arrange supply of fuel	
Power outage	No lighting	Inability to continue service		Ascertain power outage periods	Maintenance & Fuelling of standby generators	
	No heating	Inability to continue service				
	No IT/Computers	Inability to continue service				
	Inability to continue service			Send staff home Communicate with public		
	No connection for standby generator	Inability to continue service		Arrange for connection prior to event		
	No hire generators available	Inability to continue service		Instigate Hire Generators agreements		
Communications failures (phones)	Normal operations reduced	Potential inability to continue service		Communicate with public		
	Contract Response times exceeded					

Table 0-7: Effects of Hazards on SDC Essential Buildings

The response plan also describes inter-utility arrangements, protocols, and response priorities. This includes Building Priorities:

> A number of buildings are considered highest priority, these are the Selwyn District Council HQ building in Rolleston and the Welfare Centres. The welfare centres are Lincoln Events Centre, Rolleston Community Centre, Darfield Recreation Centre and Leeston Rugby Club Hall. Note that the Leeston Rugby Club hall is currently being reviewed following a seismic strength assessment and is likely to be withdrawn as a welfare centre and replaced by an alternative building. Other buildings include evacuation and emergency response functions based in the Kirwee and Southbridge Community Halls. These halls have been equipped with permanent over-size generators to ensure continuity of power.

3 Selwyn District Council Lifeline Utilities Response Plan, November 2016

Pandemic Risk Management – COVID-19

In response to the COVID-19 pandemic situation the 'Selwyn District Council Tactical Business Continuity Plan (BCP)'- COVID-19 Pandemic has been prepared in 2020. This plan is viewed as a living document and has been updated as required.

This plan covers the SDC response to a pandemic. It outlines the action that will be taken internally, to ensure that the critical services SDC delivers continue throughout the event. This plan excludes the 'external' response that will be led by Public Health, District Health Board or CDEM mechanisms.

The plan provides a flexible framework of action, outlining Selwyn District Council's response steps, tailored to the specifics, severity and phase of the pandemic event.

SDC's:

- Phases and triggers are informed by the MoH's phases – which in turn are informed by the WHO phases.
- Alert levels apply our local triggers specific for SDC but are informed by National, and Local, Health Authorities.

This ensures SDC's planning reflects the local situation and services, whilst accounting for national and international terminology and warning levels.

SDC along with other agencies must plan for and respond to a pandemic within our sector for the benefit of staff and our communities.

The actions within this plan are laid out depending on the declared level of alert from the MoH, with added elements to reflect SDC local variations.

Actions are focused on protecting staff, minimising the spread of the infection and continuing to deliver critical services. The plan sets out the required actions and protocols to be followed depending on the Alert Level.

Business Continuity Planning and Response

Council approved the latest version of the 'Business Continuity Response Plan' at the Audit and Risk Committee in July 2020. This plan sets out the overall Selwyn District Council response to any major event that could impact on its 'business as usual' activities. The objectives of this plan are to ensure that:

- staff safety and welfare are ensured
- maximum possible service levels are maintained
- the business recovers from interruptions as quickly as possible
- staff have a clear understanding of roles and responsibilities in an event
- the stress and disruption for staff and customers is minimised
- all necessary resources are available and deployed effectively and efficiently

The plan sets out the composition of the Business Response Team and the procedures, processes, actions and responsibilities for managing significant disruption to usual Council business activities. Templates and checklists are included in the plan to ensure consistent approaches are followed.

To ensure Selwyn District Council is prepared, on-going planning responsibilities include:

- the distribution of the plan to key staff (including updates);
- on-going business response awareness training and exercises;

- conducting an annual review of all plan procedures and supporting information and updating as required.

The figure below sets out the guidelines for responding to an incident or event that will lead to business disruption.

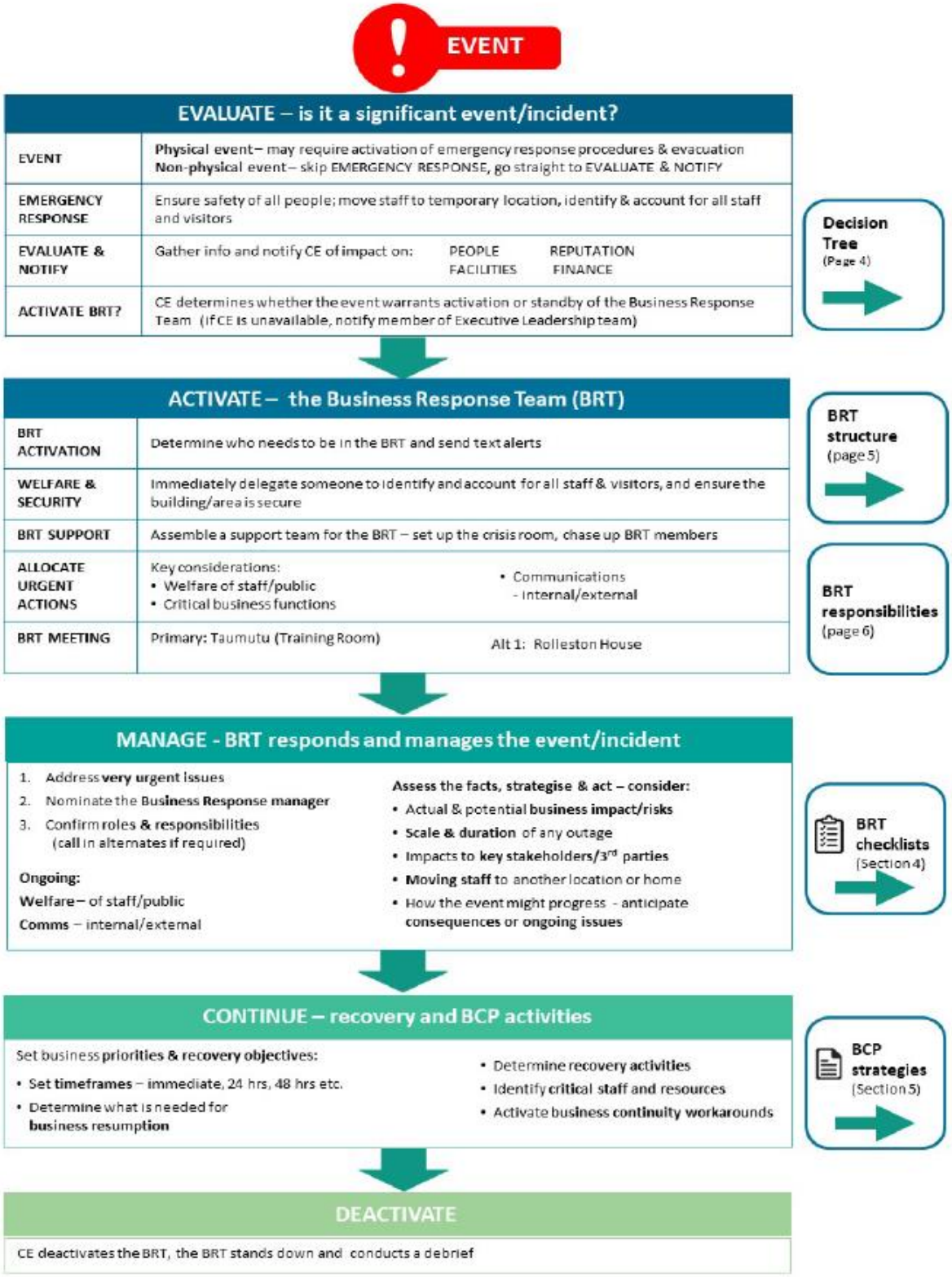


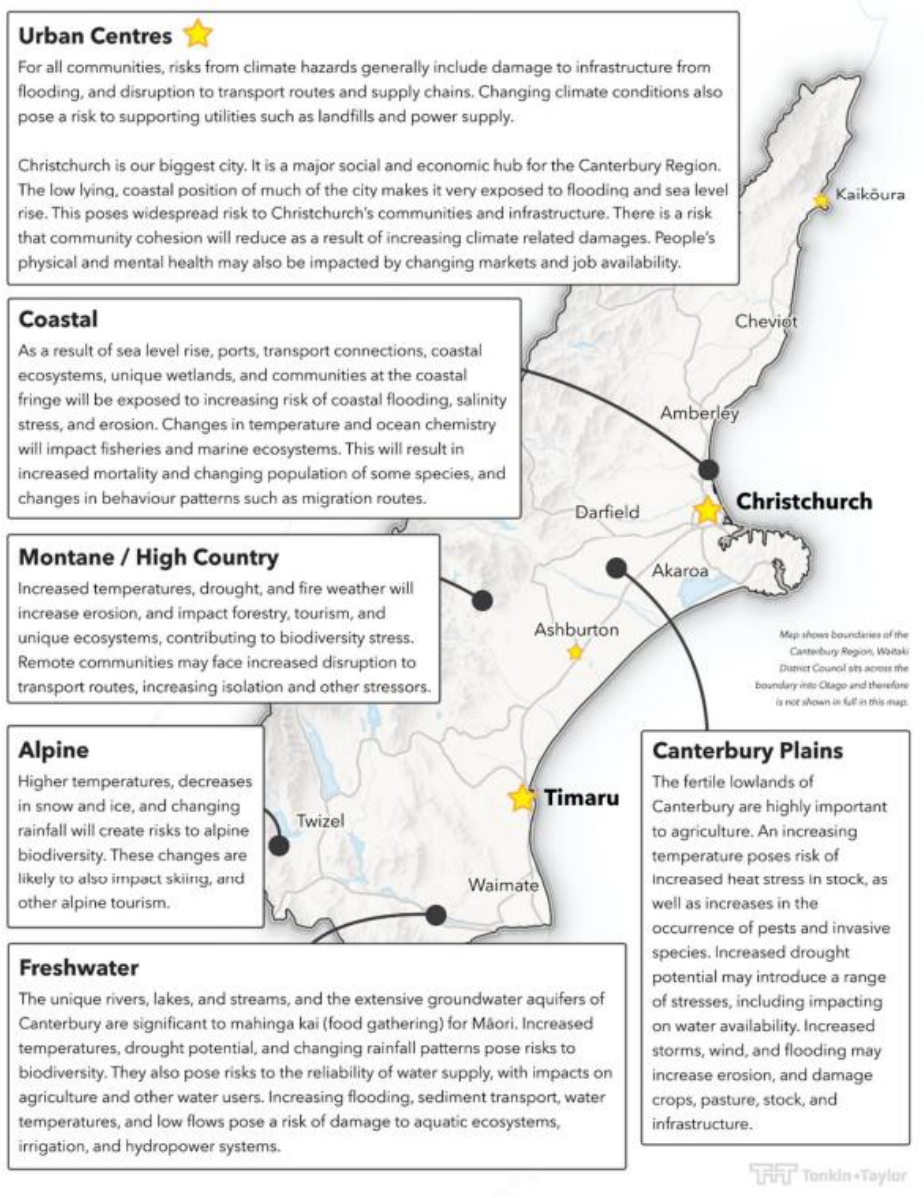
Figure 0-2: Business Continuity Response Activation Guide

Climate Change Risks

In 2020, Environment Canterbury commissioned NIWA to analyse projected climate changes for the Canterbury Region. The report addresses expected changes for various climate variables out to 2100, drawing heavily on the climate model simulations developed in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. In addition, hydrological and sea level rise impacts of climate change was assessed.

These projections created subsequent work to prepare a Canterbury Climate Change Risk Assessment (CCRA). The CCRA aligns with the national risk assessment approach and provides further and relevant detail about the highest risks and opportunities associated with climate change in Canterbury, now and into the future.

The key findings from the report, go across six identified regional environmental environments, all of which are applicable to the Selwyn District. These are as follows:



Summarising these into key risks identified for people, communities, businesses and the environment within the district, largely resultant from flooding, drought and storm and fire events include:

- Damage to buildings and property
- Disruption to lifeline utilities, transport routes and supply chains
- Direct and indirect physical and mental health impacts
- Degradation of natural habitats, biodiversity stresses and reduce opportunities for Mahinga kai

- Increased pressures on economic sectors, particularly agriculture and skiing/alpine tourism

From this, key organisational risks for Council can be identified. These include:

- Damage to facilities, infrastructure and property
- Disruption to services and supply chains
- Changes in demand for services, for example civil and emergency management

2023 Aqualinc report

Alongside the CCRA, Selwyn District Council commissioned a report prepared by Aqualinc (2023 update), to provide a District focussed assessment of climate change. The 2023 update included assessment of Community Facilities, Developed Open Spaces and Natural Open Spaces.

Project climate changes that are likely to occur are as follows:

Temperature

- Over the last 100 years New Zealand has warmed by an average of 1°C
- Future annual average warning in Canterbury spans a wide range: 0.5- 1.5°C by 2040 and 0.5-3.5°C by 2090, depending on the greenhouse gas emission scenario
- By 2040, seasonal mean temperatures across much of Canterbury are projected to increase by 0.5 -1.5°C under RCP4.5. By 2090 they are projected to increase by 1.5-3.0°C under RCP8.5, with increases of 3.0 – 4.0°C for westernmost parts of Canterbury
- The number of hot days is projected to increase by 10-20 days by 2040 for the Selwyn District under both RCP4.5 AND 8.5
- The number of frost days is projected to decrease by 10-30 frost days per year for inland parts of the region. By 2090 the number of frost days is projected to decrease by 20-50 days for inland areas of Canterbury.

Evapotranspiration

- By 2040, both RCP4.5 and RCP8.5 project an accumulated potential evapotranspiration deficit (PED) of 50-100 per year for most eastern parts of Canterbury
- By 2090 under RCP8.5, PED is projected to increase by 100 – 200mm per year for many inland areas of the Selwyn District
- Historical records suggest that rates have not changed significantly over the period 1960-2023

Annual Rainfall

- Annual rainfall is projected to change by between ±5% for most of Canterbury by 2040 and 2090
- Winter rainfall is projected to increase considerably by 2090 under RCP8.5 in many eastern, western and southern parts, with 15-40% more rainfall projected.

Dry Days

- By 2040, under RCP4.5 the annual number of dry days is projected to decrease by up to 5 days for eastern parts of the district and the plains, while increasing by a similar amount elsewhere.
- By 2090 under RCP8.5, this is projected to change by up to ± 15 days.

Extreme rainfall

- Extreme rainfall events are expected to increase everywhere in New Zealand
- With 2°C warming, projections of the increase in 50-year RX1 day and RX5 day events for New Zealand are inconsistent
- With 4°C warming, models project a median increase in the intensity and frequency of heavy precipitation of more than 15% in the 50-year Rx1 day and Rx5 day events compared to the 1°C warming

Snow and windspeed

- The number of snow days is projected to decrease throughout the district, with the largest reductions of the order of 10-25 days in high elevation areas.
- Annual mean wind speed is projected to increase 2-10% for much of the district under RCP8.5

Groundwater

- Groundwater levels in bores drilled into deeper aquifers are projected to decrease with a greater frequency of lower water levels
- Groundwater levels in shallow coastal bores are projected to increase slightly due to sea level rise (SLR)
- SLR will lead to a greater risk of saline intrusion near the coast, but the extent and magnitude has a high degree of uncertainty.

River flows

- Historical river flow data in the Selwyn District does not indicate any long-term trends.
- Mean annual flows in the alpine rivers (Waimakariri and Rakaia) are projected to increase by 3% by the 2040s, because of increased alpine precipitation. The greatest increases are likely to occur in winter
- Foothill river flows may slightly decrease over the next 30 years, due to a small increase in evapotranspiration.
- Towards 2100, the annual cycle of river flows may be significantly modified and is highly dependent on climate future.

Sea level rise

- In the last 60 years, sea levels have risen by 2.44m per year (0.14m total). If global emissions remain high, sea levels will increase by a further 0.21m by 2040 and 0.67m by 2090 (MfE, 2020)
- Sea levels are projected to rise by up to 0.9pm by 2100 under RCP8.5.
- ESL (extreme sea level) events that are historically rare will become more common by 2100 under all emissions scenarios.
- With SLR, saltwater intrusion into coastal and surface waters and soils is expected to be more frequent and enter father inwards.
- Seal level rise may result in Te Waihora / Lake Ellesmere needing to be opened more often or managed under a new operating range. If global emissions remain high and without any change in lake management, lake levels are projected to rise by 0.21m by 2040 and 0.67 by 2090.

Risk assessment of SDC assets

The projected changes mentioned above, create certain risks towards Community Facilities and Open Spaces. A risk table is summarised as follows:

Zone	Environmental factor	Community facilities	Developed open spaces	Natural open spaces
All zones	Temperature (excl. ET impacts)	High	High	Medium
	Annual rainfall	Low	Low	Low
	Drought	Low	High	Medium
	Evapotranspiration (ET)	Low	Medium	Low
	Wind (excluding ET impacts)	High	High	High
	Alpine river flows	Low	Medium	Medium
Alpine, hills and high- Country	Extreme rainfall events (foothills and alpine)	High	High	High
	Foothills-sourced river flows	High	High	Medium
	Snow levels and ice	Low	Low	Low
Plains	Extreme rainfall events (Plains)	High	High	High
	Snow levels and ice	Low	Low	Low
	Ground water levels (upper /mid plains)	Low	Low	Low
Coastal and lower plains	Sea Level rise	Medium	High	Medium
	Extreme rainfall events (Coastal)	High	High	High
	Groundwater levels (Lower Plains)	Low	Medium	Low

A further breakdown for Community Facilities, Developed and Open Spaces are provided as follows.

Community Facilities Risk Summary

Zone	Environmental factor	Vulnerability (Consequence)	Asset impacts	Summary of projected changes	Projected change (Likelihood of impact)	Impact (Risk)
All zones	Temperature (excl. ET impacts)	Moderate	HVAC and air handling systems - increased demand for heating and cooling. Longevity of building envelope (coatings and claddings)	1.5 °C average increase, 10-20 more hot days , 5-10 fewer frost days	High	High
	Annual rainfall	Minor	None	±5% change in average annual rainfall	Low	Low
	Drought	Minor	Dust impacts on HVAC systems (combination of low rainfall and wind). Increased cladding / window washing.	±5 change in number of dry days	Medium	Low
	Evapotranspiration (ET)	Minor	None	PED increase of 50-100 mm per year	Medium	Low
	Wind (excluding ET impacts)	High	Wind damage to assets (roof / structure) in a storm. Impact on HVAC systems (external fans).	Increase in average wind speed 2-10%	Medium	High
	Alpine river flows	Minor	Rakaia Huts community centre.	3% increase in alpine river mean flows, biggest increases in winter	Medium	Low
Alpine, hills and high-Country	Extreme rainfall events (foothills and alpine)	High	Flooding: floodwaters entering buildings; inundation of below-ground areas; access to buildings required for emergency response. Building envelope: roof leaks; Longevity of coatings and claddings.	Increased incidence of high-intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Foothills-sourced river flows	High	Flooding of facilities close to river margins.	3% increase in alpine river flows, biggest increases in winter	Medium	High
	Snow levels and ice	Moderate	Building envelope: freeze-thaw effects, longevity of coatings and claddings (potential benefit of less occurrence)	Reduction in number of average annual snow days by 10-25 days	Low	Low
Plains	Extreme rainfall events (Plains)	High	Flooding: floodwaters entering buildings; inundation of below-ground areas; access to buildings required for emergency response. Building envelope: roof leaks; Longevity of coatings and claddings.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Snow levels and ice	Minor	Building envelope: reduced snow loadings on buildings. Fewer slippery surfaces. (potential benefit of less regular occurrence)	Reduction in extreme snowfall and elevation in snowline	Low	Low
	Ground water levels (upper /mid plains)	Minor	None	Reduced groundwater levels, possibly significant in deeper aquifers towards 2050.	Low	Low
Coastal and lower plains	Sea Level rise	Moderate	Inundation of facilities (particularly during storm events). Wastewater disposal for non-reticulated areas. Impact on shallow well supplies for community facilities.	Mean sea level increase ~0.21 m; increased frequency of extreme sea-level events, unquantified impacts on saltwater intrusion	Medium	Medium
	Extreme rainfall events (Coastal)	High	Flooding: floodwaters entering buildings; inundation of below-ground areas; access to buildings required for emergency response. Building envelope: roof leaks; Longevity of coatings and claddings.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Groundwater levels (Lower Plains)	Moderate	Wastewater disposal for non-reticulated areas (high GW levels - note interaction with SLR). Impact on shallow well supplies for community facilities.	Generally moderately reduced groundwater levels; unquantified interactions with SLR.	Low	Low

As seen in the table above, the projected changes of each environmental factor are assessed against the consequence and the likelihood of impact. This is relevant to the Community Facilities and Developed Open Space risk assessments. If these projected changes were to occur, they would create a low, medium or high risk towards community facilities. The environmental factors that have a high risk of impacting community facilities are temperature, wind, foothills – sourced river flows and extreme rainfall.

There is one medium level risk which is sea level rise. For further information the asset impacts column provides a breakdown of the impacts caused by each factor.

Developed open spaces Risk Summary

Zone	Environmental factor	Vulnerability (Consequence)	Asset impacts	Summary of projected changes	Projected change (Likelihood of impact)	Impact (Risk)
All zones	Temperature (excl. ET impacts)	Moderate	Increased water demand for park and horticultural irrigation. Increased winter mowing due to fewer frosts.	1.5 °C average increase, 10-20 more hot days , 5-10 fewer frost days	High	High
	Annual rainfall	Moderate	Increased water demand for park and horticultural irrigation.	±5% change in average annual rainfall	Low	Low
	Drought	High	Increased water demand for park and horticultural irrigation. Increased fire risk. Difficulty of establishing new planting. Loss of existing tree canopy.	±5 change in number of dry days	Medium	High
	Evapotranspiration (ET)	Moderate	Increased water demand for park and horticultural irrigation	PED increase of 50-100 mm per year	Medium	Medium
	Wind (excluding ET impacts)	High	Wind damage to assets (trees, structures) in a storm	Increase in average wind speed 2-10%	Medium	High
	Alpine river flows	Moderate	Flooding of open spaces close to river margins. Safe evacuation of camping ground occupants. (Rakaia Huts)	3% increase in alpine river mean flows, biggest increases in winter	Medium	Medium
Alpine, hills and high-Country	Extreme rainfall events (foothills and alpine)	High	Surface flooding of open spaces. Slips. Damage to tracks and foot-bridges. Restricted use of playing fields. Safe evacuation of camping ground occupants. Tree fall (combination of wind and saturated ground).	Increased incidence of high-intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Foothills-sourced river flows	High	Flooding of open spaces close to river margins. Safe evacuation of camping ground occupants. (Coes Ford)	3% increase in alpine river flows, biggest increases in winter	Medium	High
	Snow levels and ice	Minor	Slight benefit (improved winter access).	Reduction in number of average annual snow days by 10-25 days	Low	Low
Plains	Extreme rainfall events (Plains)	High	Surface flooding of open spaces. Damage to tracks and foot-bridges. Safe evacuation of camping ground occupants.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Snow levels and ice	Minor	None	Reduction in extreme snowfall and elevation in snowline	Low	Low
	Ground water levels (upper /mid plains)	Minor	Upper plains perched shallow GW levels - impact on non-reticulated effluent systems (e.g. Springfield, Hororata)	Reduced groundwater levels, possibly significant in deeper aquifers towards 2050.	Low	Low
Coastal and lower plains	Sea Level rise	High	Inundation of open spaces (particularly during storm events). Wastewater disposal for non-reticulated areas. Salt-water intrusion for small water supplies (domains, etc).	Mean sea level increase ~0.21 m; increased frequency of extreme sea-level events, unquantified impacts on saltwater intrusion	Medium	High
	Extreme rainfall events (Coastal)	High	Surface flooding of open spaces. Damage to tracks and foot-bridges. Safe evacuation of camping ground occupants.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Groundwater levels (Lower Plains)	High	Surface ponding and poor drainage of parks and playing fields. Wastewater disposal for non-reticulated areas. Ability to operate cemeteries. Cemetery compliance with resource consent conditions. Uplift pressures on swimming pools. (High GW levels - note interaction with SLR).	Generally moderately reduced groundwater levels in deeper aquifers; unquantified interactions with SLR.	Low	Medium

If these projected changes were to occur, they would create a low, medium or high risk towards developed open spaces. The environmental factors that have a high risk of impacting developed open spaces is temperature, drought, wind, extreme rainfall events, foothills-sourced river flows and sea level rise. There are three medium risk environmental factors that impact developed open spaces, which are

evapotranspiration, alpine river flows and groundwater levels. For further information the asset impacts column provides a breakdown of the impacts caused by each factor.

Natural Open Spaces Risk Summary

Zone	Environmental factor	Vulnerability (Consequence)	Asset impacts	Summary of projected changes	Projected change (Likelihood of impact)	Impact (Risk)
All zones	Temperature (excl. ET impacts)	Minor	Loss of biodiversity. Establishment of invasive weed species.	1.5 °C average increase, 10-20 more hot days , 5-10 fewer frost days	High	Medium
	Annual rainfall	Minor	None	±5% change in average annual rainfall	Low	Low
	Drought	Moderate	Increased fire risk. Difficulty of establishing new planting. Mortality of existing planting.	±5 change in number of dry days	Medium	Medium
	Evapotranspiration (ET)	Minor	None	PED increase of 50-100 mm per year	Medium	Low
	Wind (excluding ET impacts)	High	Wind-throw / damage to forest crops.	Increase in average wind speed 2-10%	Medium	High
	Alpine river flows	Moderate	Flooding of open spaces close to river margins. Safe evacuation of freedom campers and other users.	3% increase in alpine river mean flows, biggest increases in winter	Medium	Medium
Alpine, hills and high-Country	Extreme rainfall events (foothills and alpine)	Moderate	Surface flooding of open spaces. Slips. Damage to tracks and foot-bridges. Safe evacuation of freedom campers and other users.	Increased incidence of high-intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Foothills-sourced river flows	Moderate	Flooding of open spaces close to river margins. Safe evacuation of freedom campers and other users.	3% increase in alpine river flows, biggest increases in winter	Medium	Medium
	Snow levels and ice	Minor	None	Reduction in number of average annual snow days by 10-25 days	Low	Low
Plains	Extreme rainfall events (Plains)	Moderate	Surface flooding of open spaces. Damage to tracks and foot-bridges. Safe evacuation of freedom campers and other users.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Snow levels and ice	Minor	None	Reduction in extreme snowfall and elevation in snowline	Low	Low
	Ground water levels (upper /mid plains)	Minor	None	Reduced groundwater levels, possibly significant in deeper aquifers towards 2050.	Low	Low
Coastal and lower plains	Sea Level rise	Moderate	Inundation / wave erosion of open spaces (particularly during storm events). Salt tolerance of plant species - salinity propagating inland.	Mean sea level increase ~0.21 m; increased frequency of extreme sea-level events, unquantified impacts on saltwater intrusion	Medium	Medium
	Extreme rainfall events (Coastal)	Moderate	Surface flooding of open spaces. Damage to tracks and foot-bridges. Safe evacuation of freedom campers and other users.	Increased incidence of high intensity rainfall events, large uncertainty, highly dependent on emissions scenario	High	High
	Groundwater levels (Lower Plains)	Moderate	Surface ponding and poor drainage of open spaces. (High GW levels - note interaction with SLR).	Generally moderately reduced groundwater levels; unquantified interactions with SLR.	Low	Low

If these projected changes were to occur, they would create a low, medium or high risk towards natural open spaces. The environmental factors that have a high risk towards natural open spaces are wind and extreme rainfall events. There are five medium risk environmental factors that impact natural open spaces, which are sea level rise, foothills sourced river flows, alpine river flows, drought and temperature.

For further information the asset impacts column provides a breakdown of the impacts caused by each factor.

Specific comments about facilities and open spaces are given below.

- Under all emissions scenarios, the incidence of extreme events like extreme rainfall and flow flows is expected to increase resulting in more frequent inundation of areas
- More frequent occurrence of extreme events will impact on building envelopes and systems, and the accessibility and usability of facilities that are required as part of emergency response.

Options for managing climate related risks and vulnerabilities

Following on from the climate change impacts developed in the Aqualinc report, the Council has undertaken a process to identify and record adaptation actions. This is also in part of responding to the Climate Change Policy that Council adopted that directs Councils mitigation and adaptation works and guides planning and decision-making.

Several climate change adaption actions have been developed and where appropriate have been incorporated into this plan. These measures relate to council assets and services, including:

- Planting drought tolerant plant species.
- Installing efficient and water saving irrigation systems.
- Ensure that all new facilities installed have their foundations above ECANS's flooding guidelines
- New cemeteries aren't installed in areas that will affect groundwater
- specifications and design standards for infrastructure that can accommodate heightened risks now, and in the future e.g. building materials, drainage systems, etc.
- building design and refurbishments that respond to more frequent extreme weather events e.g. resilience to storm damage, increased roof run-off, appropriate shading, etc
- open space, public realm and landscape planting and maintenance regimes that respond to a changing climate e.g. drought resistance, fire resistance, public realm shading, biodiversity protection, etc.

A good practice adaptation hierarchy should be adopted as part of proposed adaptation approaches.

Do not exacerbate risks including:

- Increasing ongoing maintenance costs for the Council and the value of assets in areas of high vulnerability and which may become stranded if managed retreat occurs
- Encouraging private investment into high-risk areas and increasing vulnerability
- Damage to the integrity of natural defence systems such as wetlands or to biodiversity

Reduce risks including:

- When an asset reaches its end of life/or lease terms end
- When an asset is facing significant/immediate threat due to hazards
- When a decision is being made on future disposal, renewal or purchase of assets at a portfolio level including as part of a long-term strategy or network plan
- Following a storm or other such event that triggers an opportunity to relocate that asset

Mitigate residual risks including:

- Consider a range of options to adapt
- Priorities natural and nature-based solutions to enhance co-benefits to the environment taonga and recreational assets from adaptation
- Prioritise options that minimise the financial burden on future generations
- Prioritise long term sustainable risk reduction approaches acknowledging the carbon costs of implementing options, residual risk created by different options and the impacts of maintaining options
- Continue to meet current legal obligations (such as safe access to drinking water). This may require specific ongoing investment in areas vulnerable to climate impacts

Several adaptation actions have been developed and, where appropriate, have been incorporated into this AcMP. These include:

- Budget for increased maintenance, repair and replacement costs for public assets that are exposed to coastal hazards.
- Planning and designing any new community facilities and public spaces to be climate-resilient e.g. location selection, landscaping and building material selection.
- Budget for increased maintenance, repair and replacement costs for public assets that are exposed to flooding.
- Reduced reliance on irrigation systems and ground water sources for community/public facilities.
- Incorporate Climate Change into council biodiversity/conservation management plans and activities.
- Arrangements for new reserves/refuges for species protection.
- Manage water abstraction to retain environmental levels of groundwater in times of drought, low rainfall (where bores are used for irrigation).
- Coastal hazard assessments incorporating Sea Level Rise.
- Wind/storm events - identify most vulnerable aspects of these environments.

The following budget allowance has been made to progress climate change adaptation within the life of this AcMP:

Service Area	Project Description	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	Total 10 Yrs
Operating Expenditure												
Community Centres & Halls	Planning & investigation	$ 40,000	$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 240,000**
Property & Buildings	Planning & investigation	$ 47,515	$ 52,885	$ 52,885	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 153,285**
Cemeteries	Planning & investigation	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 25,000**
Aquatic Facilities	Planning & investigation	$ 15,000	$ 20,370	$ 20,370	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 55,740**
Capital Expenditure												
Community Centres & Halls	Provisional work programme	$ -	$ -	$ -	$ -	$ 420,350	$ 420,350	$ 420,350	$ 420,350	$ 420,350	$ 420,350	**$ 2,522,100**
Property & Buildings	Provisional work programme	$ -	$ -	$ -	$ 110,800	$ 304,800	$ 304,800	$ 304,800	$ 304,800	$ 304,800	$ 304,800	**$ 1,939,600**
Reserves	Provisional work programme	$ -	$ -	$ 65,000	$ 75,000	$ 90,000	$ 100,000	$ 100,000	$ 125,000	$ 125,000	$ 150,000	**$ 830,000**
Reserves	Irrigation Efficiency Upgrades	$ 15,000	$ -	$ 80,000	$ -	$ 480,000	$ -	$ 190,000	$ -	$ -	$ -	**$ 765,000**
Aquatic Facilities	Provisional work programme	$ -	$ -	$ -	$ 110,800	$ 110,800	$ 110,800	$ 110,800	$ 110,800	$ 110,800	$ 110,800	**$ 775,600**
Cemeteries	Sustainable Planting Programm	$ 11,600	$ 5,000	$ 26,600	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	$ 6,500	**$ 88,700**
Reserves	Urban Greening Programme	$ 69,230	$ 71,202	$ 73,175	$ 74,959	$ 76,743	$ 78,527	$ 80,311	$ 82,032	$ 83,753	$ 85,455	**$ 775,387**
Reserves	Shade Structures	$ -	$ -	$ -	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	**$ 175,000**
Total Programme		**$ 198,345**	**$ 249,457**	**$ 443,030**	**$ 403,059**	**$ 1,514,193**	**$ 1,045,977**	**$ 1,237,761**	**$ 1,074,482**	**$ 1,076,203**	**$ 1,102,905**	**$ 8,345,412**

This work programme includes:

- Assessment of risk summaries for Community Facilities, Developed Open Spaces and Natural Open Spaces as recorded in the Impact of Climate Cycles and Trends on Council Assets (Aqualinc 2023)
- Consider specific risks identified and likely impact on individual facilities/assets (using criticality to determine priority for assessment)
- Budgets in the first 3 years have been provided for survey, planning and investigation works
- Provisional budgets have been provided to enable some climate adaptation measures to be implemented (Yrs 4-10)
- Some programmes are proposed such as: urban greening (more planting to increase tree canopy and reduce heat); water conservation with more efficient irrigation systems.
- Increases in pest management budgets for various sites
- New buildings built to meet floor level requirements for flooding
- Consideration of future abandonment of assets in flood prone areas (mainly camping grounds alongside rivers)

Resilience of Infrastructural Assets

Risk management is typically considered in the context of the "4 R's" as shown in the diagram below. When a "shock" event occurs, resilience means increased awareness, reduced vulnerability, faster adaptation and a faster recovery.

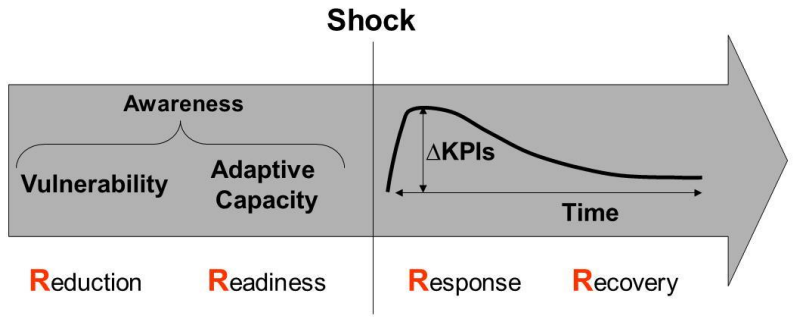


Figure 0-5: Resilience and the 4R's

Natural Hazards

Selwyn District is subject to a wide range of natural hazards, including earthquakes, flooding, tsunami, meteorological events (snow, wind), mass movement (land slip), and wildfire. These are described in more detail in various hazards reports (such as those prepared by ECan) and Canterbury Lifeline Utility Group publications (referred to in the SDC Lifelines Utilities Response Plan above). They are also described in SDC planning documents, such as the District Plan.

- Several significant recent events have been recorded which have caused damage to property and the environment, with no one hazard being a "standard" event. The district has suffered several major events over the last 25 years including a snowstorm 1992, flooding events, multiple wild fires and windstorms and earthquake sequences most notably the Canterbury Earthquakes in 2010 and 2011.

As mentioned in the climate change section, it is anticipated that the frequency and severity of extreme weather events will increase.

Infrastructure Resilience

Resilience (and resilient infrastructure) is based on a design philosophy which acknowledges that failure will occur. Resilience requires early detection and recovery, but not necessarily re-establishing a failed system. Resilience is about the ability to plan and prepare for adverse events, the ability to absorb the impact and recover quickly, and to support a community to adapt to a new environment.

Adverse events, natural disasters, climate change and the related impacts cannot be avoided and as a result Council has to factor this into our long term planning, civil defence planning and how we determine the most appropriate infrastructure requirements (design and location) moving forward to ensure the community's expectations for safe and reliable services and general wellbeing can be met, a risk minimised.

Engineering measures such as asset strengthening can reduce the effects of an event, while readiness is about organisational preparedness.

This diagram also illustrates the importance of pre-event awareness as a key component of resilience – firstly understanding the vulnerability of the assets, and secondly "adaptive capacity" a critical organisational capability for readiness.

Following the event, a sudden change in the levels of service being provided occurs, and it typically takes a much longer period for services to return to full normality.

Infrastructure resilience is a significant issue for communities within the District and across the country, given the range of hazards that New Zealand is exposed to. This relates to both "horizontal" infrastructure such as roads and power lines, and also "vertical" infrastructure largely comprising buildings. Resilience is concerned not only with physical aspects relating to the assets but also with the organisation's capabilities in terms of aspects such as readiness and adaptability.

There are two broad approaches to assessing the risks of natural hazards to infrastructural or built assets – firstly, an all hazards approach which assesses the effects of the loss of the asset on services no matter what the hazard event; and secondly, a specific assessment which identifies the physical impacts of different hazard events on lifeline networks and individual assets.

Note that the response plan above takes an all-hazards approach identifying expected consequences and cascade effects. Further work is required to better understand the impacts of specific hazard events and the level of resilience actual vs desired.

In considering the physical infrastructure itself, it is important to understand how resilient it is now compared to how resilient it should be. This addresses dimensions such as physical robustness, redundancy and design, in the context of specific hazard events. A key factor post-event is how quickly the assets can be reinstated, or service replacement can be put into place, to meet the community's immediate and short term needs before recovery gets underway.

In terms of Community Facilities Assets, critical building infrastructure is required to be constructed or strengthened to the appropriate building standard. For example the Council's emergency operation centre (part of the SDC HQ) is constructed to Importance Level 4 (IL4) standard. Other public buildings are required to be constructed to IL3. Council has undertaken a seismic strengthening programme on a number of public buildings where the standard was inadequate.

To date, the Council has not carried out a comprehensive Lifelines Study or resilience assessment, but has built up a body of knowledge of the impacts of events that have occurred as noted above. Such a study would identify the nature, scale and locality of natural hazard events and carry out a risk assessment of the infrastructure which may be exposed to the hazard events, leading to the identification of mitigation actions for risk "reduction". These actions may range from updating design standards through to asset strengthening or replacement, based on priorities linked to the "resilience gap".

A number of hazard events are assessed in the risk register (refer subsequent sections), however these do not provide a complete "lifelines picture".

An Improvement Plan action is to update the assessment with a particular focus on the resilience of critical assets and systems relating to Community Facility assets which have a role to play in a CDEM event (declared or non-declared).

Interdependencies

An important aspect of the "lifelines approach" above is the concept of "interdependencies".
Understanding of interdependencies is currently achieved through inter-utility communication and by regular SDC involvement with the Canterbury Lifeline Utilities Group.

The table included in Annex 6A identifies interdependencies between lifeline utilities and essential services. Of relevance are the interdependencies with essential SDC buildings, which are included within the Community Facilities activity. The horizontal row, SDC Essential Buildings, shows a high level of dependence on Water, Wastewater, Stormwater, Roading, Electricity, Telecommunications and Fast Moving Consumer Goods (food supplies).

Annex 6A

Lifelines Interdependencies Assessment Table

Utility	Utility Sub-set	Water supply	Waste water	Stormwater	Land Drainage	Water Races	Solid Waste	Roading	Essential SDC Buildings	Rural Fire Fighting	Electricity	Fuel and Gas	Telecoms	Fast Moving Consumer Goods	Railways
Water supply	Intakes	NA	0	0	1	0	0	3	0	1	1	1	2	0	0
	Treatment Plants	NA	2	2	0	0	0	3	3	0	3	2	2	1	0
	Pump Stations	NA	2	2	0	0	0	3	3	0	3	2	2	1	0
	SCADA	NA	0	0	0	0	0	2	2	0	3	2	3	1	0
	Reservoirs	NA	0	1	0	0	0	3	0	0	2	1	2	1	0
	Reticulation	NA	0	0	0	0	0	3	0	0	1	0	1	0	0
Wastewater	Treatment Plants	2	NA	2	0	0	0	3	3	0	3	2	2	1	0
	Pump Stations	2	NA	2	0	0	0	3	3	0	3	2	2	1	0
	SCADA	0	NA	0	0	0	0	2	2	0	3	2	3	1	0
	Reticulation	2	NA	0	0	0	0	3	0	0	1	0	1	0	0
Stormwater	Reticulation	0	0	NA	0	0	0	3	0	0	0	0	0	0	0
Land Drainage	Osbornes Pump Station	0	0	0	NA	0	0	3	0	0	3	2	2	1	0
	Drains	0	0	0	NA	0	0	2	0	0	0	0	0	0	0
Water Races	Intakes	0	0	0	0	NA	0	3	0	1	1	0	0	0	0
	Water Races	0	0	0	0	NA	0	2	0	1	0	0	0	0	0
	Bridges & Siphons	0	0	0	0	NA	0	3	0	0	0	0	0	0	0
	SCADA	0	0	0	0	NA	0	2	2	0	3	2	3	0	0
Solid Waste	Collection	0	0	0	0	0	NA	3	0	0	0	3	2	0	0
	Transfer station	2	2	2	0	0	NA	3	3	0	3	3	2	1	0
	Composting	2	2	2	0	0	NA	3	1	0	3	3	1	1	0
	Recycling	1	2	2	0	0	NA	3	1	0	3	3	1	1	0
Roads	Carriageways	0	0	3	2	0	0	NA	0	2	0	2	1	0	0
	Bridges and Culverts	0	0	1	2	0	0	NA	0	0	0	2	1	0	0
	Street Lights / Traffic Signals	0	0	1	0	0	0	NA	0	0	3	1	3	0	0
Essential SDC Buildings	Buildings	3	3	3	0	0	2	3	NA	1	3	2	3	3	0
Rural Fire Fighting		3	0	0	0	3	0	3	0	NA	0	1	3	2	0
Electricity Networks		1	1	1	0	0	0	3	0	1	NA	2	3	2	0
Electricity Generation		2	2	2	0	0	1	3	0	1	NA	2	3	2	0
Fuel and Gas		2	2	2	0	0	3	3	0	1	3	NA	3	2	0
Telecommunications		2	2	2	0	0	2	3	0	1	3	2	NA	2	0
Consumer Goods		2	2	2	0	0	2	3	0	0	3	3	3	NA	2
Railways		1	1	0	0	0	0	2	0	1	2	3	3	2	NA

Table 0-1: Interdependencies Assessment (Source: SDC Lifelines Utilities Response Plan 2016)