107342

TAURANGA CITY COUNCIL CLIMATE CHANGE RISK ASSESSMENT – risk rating workshop

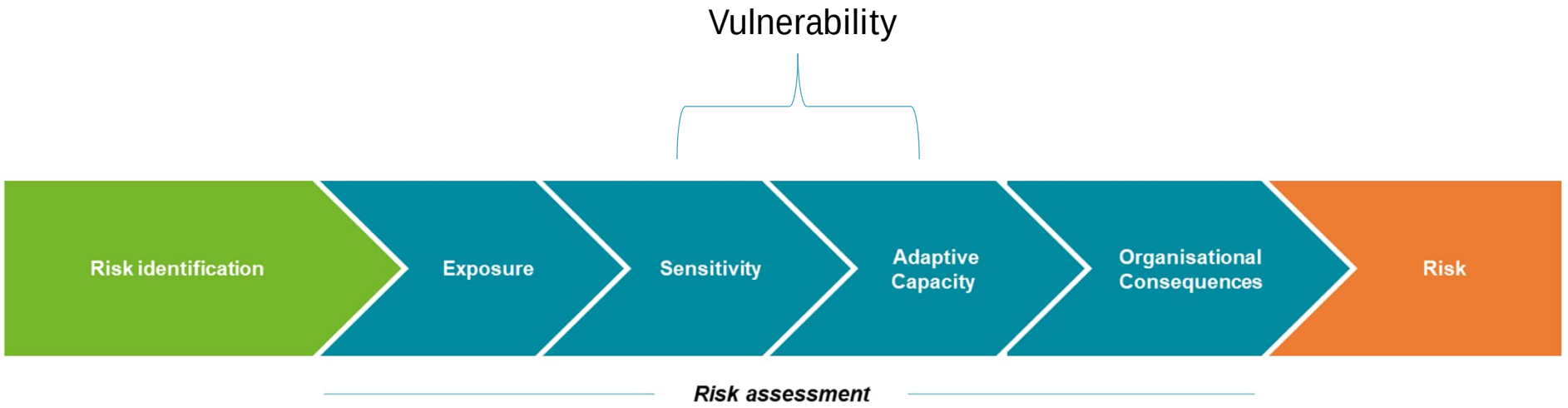
Spaces & Places

5 June 2025

Workshop agenda

Agenda item	Timing
Introduction & overview of method	11:30am – 11:40am
Physical risk rating	11:40am – 1:25pm
Next steps	1:25pm – 1:30pm

Risk identification and rating



Exposure

Exposure (can use either A or B)			
A) Qualitative definition (for an event impacting on a single element or general single group). Eg an economic sector within a district, or a large infrastructure location (e.g. treatment plant).		B) Quantitative definition for an event impacting on a wide number of elements (useful where geospatial data exists) (e.g. infrastructure networks).	
Exposure rating (A)	Definition	Exposure rating (B)	Definition
Very High	Has happened several times in the past year and in each of the previous 5 years *or* May occur several times per year in the future	Very High	Significant and widespread exposure of elements to the hazard. Option 1: >50% of sector or element is exposed to the hazard in a 1% event Option 2: >25% of the of sector or element is exposed to the hazard in a 1 in 10 year event Option 3: >10% of network is exposed annually
High	Has happened at least once in the past year and in each of the previous 5 years *or* May arise about once per year in the future	High	High exposure of elements to the hazard. Option 1: 25-50% of sector or element is exposed to the hazard in a 1% event Option 2: 10-25% of the of sector or element is exposed to the hazard in a 1 in 10 year event Option 3: 0-5% of network is exposed annually
Moderate	Has happened during the past 5 years but not in every year *or* May arise once in 25 years in the future	Moderate	Moderate exposure of elements to the hazard. Option 1: 10-25% of sector or element is exposed to the hazard in a 1% event Option 2: 5-10% of the of sector or element is exposed to the hazard in a 1 in 10 year event
Low	May have occurred once in the last 5 years *or* May arise once in 25 to 50 years in the future	Low	Low exposure of elements to the hazard. Option 1: 5-10% of sector or element is exposed to the hazard in a 1% event Option 2: 0-5% of the of sector or element is exposed to the hazard in a 1 in 10 year event
Very Low	Has not occurred in the past 5 years *or* Unlikely during the next 50 years in the future	Very Low	Isolated elements are exposed to the hazard. Option 1: 0-5% of sector or element is exposed to the hazard in a 1% event

Vulnerability

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Sensitivity relates to how the element will fare when exposed to a hazard, which is a function of its properties or characteristics. Sensitivity can be influenced by age, condition, material, design etc.

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Sensitivity rating	Definition
Extreme	Extremely likely to be adversely affected, because the element or asset is extremely sensitive to a given hazard.
High	Highly likely to be adversely affected, because the element or asset is highly sensitive to a given hazard.
Moderate	Moderately likely to be adversely affected, because the element is moderately sensitive to a given hazard.
Low	Low likelihood of being adversely affected, because the element has low sensitivity to a given hazard.
Very Low	Very low likelihood of being adversely affected, because the element has low sensitivity to a given hazard.

Adaptive capacity
Relates to how easily/efficiently an at-risk element can adapt (autonomously) or be adapted (planned) when exposed to a climate hazard. Again, this is a function of an at-risk element's properties or characteristics. Adaptive capacity can be influenced by ease or cost of repair, level of redundancy / back up etc

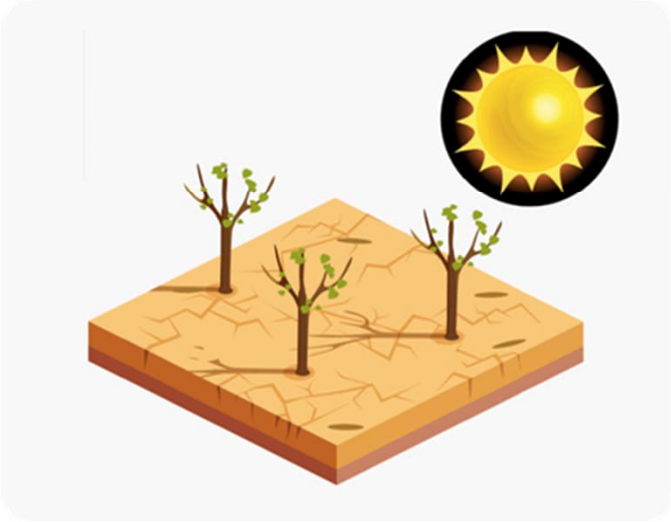
Adaptive capacity rating	Definition
Very Low	The organisation, element or asset has a very low capacity to adapt.
Low	The organisation, element or asset has a low capacity to adapt.
Medium	The organisation, element or asset has a moderate capacity to adapt.
High	The organisation, element or asset has a high capacity to adapt
Very High	The organisation, element or asset has a very high capacity to adapt

Consequence

Category	Sub-category	Low - 1	Minor - 2	Moderate - 3	Significant - 4	Severe - 5	Risk Definition
Achievement of Outcomes or Objectives		Minimal delay or interruption to work on a single strategic outcome / objective. No impact on the agreed delivery timeframe.	Short-term delay or interruption to work on a single strategic outcome / objective. **OR** Short-term delays or interruptions to work on multiple strategic outcomes / objectives. Achievement is managed within pre-agreed contingency timeframe(s).	10% of strategic outcomes / objectives: - unable to be achieved, and / or - no longer meets the needs of the community. Medium-term delays or interruptions to work on a single strategic outcome / objective. **OR** Short-term delays or interruptions to work on multiple strategic outcomes / objectives. Achievement of some outcomes / objectives can be managed with preagreed contingency timframe(s). The LTP or project plan requires revision.	25% of strategic outcomes / objectives: - unable to be achieved, and / or - no longer meets the needs of the community. Medium-term delays or interruption to work on multiple strategic outcomes / objectives. Achievement is not managed with preagreed contingency timframe(s). The LTP or project plan requires significant revision.	50% of strategic outcomes / objectives: - unable to be achieved, and / or - no longer meets the needs of the community. The LTP or project plan requires rewriting.	The risk that an internal or external disruption impacts the achievement of agreed strategic outcomes / or project objectives.
Financial		No increase in cost.	Cost increase can be reallocated from within current budget.	Cost increase can be absorbed within current budget parameters, including contingency funding.	Cost increase cannot be absorbed within budget parameters, including contingency funding. Funds are re-prioritised from other budgets to continue the impacted project / activity.	Cost increase results in decision not to continue to fund project / activity. Additional funds need to be obtained to meet legislative requirements.	Risk that disruptive events in our internal or external business activities and services impact on unplanned expenditure
Health, Safety & Wellbeing	Health & Safety	Near miss with potential to cause injury or illness. First aid not required.	Injury or illness that requires first aid or minor treatment.	Injury or illness that requires medical treatment, other than first aid Notification to Worksafe may be required.	Serious injury or illness that requires medical treatment through hospitalisation. Mulitple people affected by the same event where they require medical treatment, other than first aid. Notifiable event reported to Worksafe.	One or more fatalities or permanent disability (or unable to participate in work) Multiple people with serious injury or illness by the same event where they require medical treatment through hospitalisation. Notifiable event reported to Worksafe.	Risks arising from internal (or external) events impacts employees, contractors (including volunteers) or members of the community as a result of council activity or condition of the site
	Wellbeing	No absence from work People Leader / HR Business Partner support required	Potential for absence Possibility of external support required eg Employment Assistance Programme	Absence from work for up to 10 days External support required	Absence from work for up to 3 weeks Ongoing external support required	Absence from work for more than 1 month Professional support required	The risk that a disruptive event impacts the overall wellbeing of staff
Regulatory / Legal	Contractual	No contractual breaches	Minor contractual breaches with potential impact on the delivery of obligations and outcomes Potential for verbal warning to be issued	One or more moderate contractual breaches with an impact on the delivery of obligations and outcomes. Potential financial impact through activation of penalty clauses. Potential for financial loss or additional expenditure for TCC to remediate Potential for written warning to be issued	Significant contractual breach or multiple breaches with an impact on the delivery of obligtions and outcomes. Financial impact through activation of penalty clauses. Potential financial loss or additional expenditure for TCC to remediate Consider contract termination and litigation	Severe contractual breach or multiple significant contractual breaches with impact on the delivery of obligations and outcomes requiring court proceedings or criminal action. Likely financial impact. Termination of contract.	The risk that a disruptive event impacts the delivery of contractual obligations and outcomes
	TCC bylaws	No impact to TCC's ability to administer /enforce bylaws.	Minor impact to TCC's ability to administer /enforce bylaws resulting in potential regulatory scrutiny and verbal warnings. Potential financial impact to TCC in fines/penalties for not administrating / enforcing bylwas.	Moderate impact to TCC's ability to administer /enforce one or more bylaws resulting in regulatory scrutiny and written warnings. Potential financial impact to TCC in fines/penalties for not administrating / enforcing bylaws.	Significant impact to TCC's ability to administer /enforce mutiple bylaws resulting in regulatory action and/or restrictions on Council activities. Potential financial impact to TCC in fines/penalties for not administrating / enforcing TCC bylaws.	Central government intervention following suspension of TCC operational licenses or certifications. Full regulatory review of TCC's ablity to enforce legislation. Substantial financial impact to TCC in fines / penalties.	The risk that a disruptive event impacts TCC's ability to administer / enforce TCC bylaws
	External legislation	No non-compliance by TCC.	Minor non-compliance by TCC resulting in potential regulatory scrutiny and verbal warnings. Potential financial impact to TCC in fines/penalties.	One or more non-compliances by TCC resulting in regulatory scrutiny and written warnings. Potential financial impact to TCC in fines/penalties.	Significant non-compliance, or multiple non-compliances by TCC, resulting in regulatory action and/or restrictions on Council activities. Potential financial impact in fines/penalties to TCC.	Regulatory authority review of legislative non-compliance by TCC, resulting in regulatory action and / or restrictions on Council activities. Substantial financial impact in fines/penalties to TCC.	The risk that a disruptive event impacts on TCC's ability to comply with external regulations and legislation
Organisational (Workforce?) Capability / Capacity		Minimal reduction in capability and / or capacity in one area with no impact on service delivery.	Short term reduced capability and / or capacity in one or more areas, requiring some temporary workarounds to maintain service delivery	Reduced capability and /or capacity in one or more areas resulting in a reduced level of service with continued use of workarounds	Reduced capability and /or capacity in one or more areas resulting in an unacceptable delivery of some key services to a significant proportion of the community (more than 25%)	Reduced capability and /or capacity in one or more areas resulting in an unacceptable delivery of some key services to a substantial proportion of the community (more than 50%)	The risk that a disruptive event impacts on the availability (capacity) of staff or contractors, or the skills, materials and equipment they require (capability)

Climate Hazards

TEMPERATURE INCREASE AND DROUGHT



- EXTREME TEMPERATURE
- INCREASED HUMIDITY
- NEW PESTS AND DISEASES
- DROUGHT
- WILDFIRE

COASTAL HAZARDS

- SEA LEVEL RISE
- COASTAL INUNDATION
- COASTAL EROSION
- GROUNDWATER RISE
- OCEAN TEMPERATURE + ACIDFIICATION

FLOODING AND EXTREME WEATHER

- EXTREME PRECIPITATION
- INLAND FLOODING
- EXTREME WEATHER EVENTS
- EXTREME WIND
- LANDSLIPS

	Hazard	Description	Present day	2050 RCP4.5		2050 RCP8.5		2100 RCP4.5		2100 RCP8.5	
Temperature increases and drought	**Higher temperature**	• Significant seasonal variability exists both in present day and future change. • Spatial variability exists with Maketu, Murupa and coastward of Kawerau are expected to better hotter than most places. • Hot days are defined as days with 25°C or greater. • Frost days are defined as days when the daily minimum temperature drops below 0°C.	• Median ~15°C • 25-40 hot days • 0-60 frost days		+ 0.5°C + 0-25 hot days Up to 10 fewer frost days		+ 1.0°C + 0 to 25 hot days Up to 10 fewer frost days		+ 1.5°C + 30 to 40 hot days Up to 15 fewer frost days		+ 3.0°C +70 to 80 hot days Up to 30 fewer frost days
	Drought	• Drought is expected to become more common and more severe in Tauranga and Te Puke areas compared to the Uruwera and Raukumara ranges. • An increase in the number of dry days is expected for most of the BOP region. Autumn is typically the season where the largest increase is expected.	• 120 to 240 dry days (i.e. <1mm)		- 2 to + 6 dry days (coastal) +4-6 dry days (inland)		+ 4 to 6 days most areas		+ 8 to 10 days most areas		+15 to 20 days most areas
	Increased fire weather	• Fire risk is projected to increase due to increasing temperatures, lower rainfall and more drought.	• 7.7 days of Very High and Extreme forest fire danger days		50-100% increase				50-100% increase		
	Annual rainfall & rainfall variability	• By 2090 under RCP 4.5 annual rainfall decreases are pronounced for inland and western coastal areas. Under RCP 8.5 annual rainfall is set to decline for the whole region by 2-6%.	• Rainfall depth for a 24hr, 100-year event typically varies from 230- 370 mm		- 8% to - 15% in summer rainfall		- 8 to - 15% in summer rainfall +8% to 10% winter rainfall		+8% to 10% winter rainfall		- 10% to - 15% summer rainfall + 4% to 8% in winter rainfall
Flooding and extreme rainfall	**Rainfall and flooding**	• Maximum 1-day and 5-day rainfall is generally projected to increase, with larger extents of increase by 2090, particularly around Urewera and Raukumara Ranges. • Extreme, rare rainfall events are likely to increase in intensity in the BOP Region. This will drive an increase in associated extreme flood events.	• Rainfall depth for a 24hr, 100-year event typically varies from • 230- 370 mm • Inland flood modelling available for some areas within the region. Refer to Appendix A for details		+ 6% rainfall depth (24hr, 100yr)		+ 9% rainfall depth (24hr, 100yr)		+ 7% rainfall depth (24hr, 100yr)		+18% rainfall depth (24hr, 100yr)
	Extreme weather events (wind & storms)	• While the overall trends indicate a reduction in mean windspeed (MWS), storms in the BOP may have stronger circulation, leading to stronger winds and storm surge. • Summer storms are predicted to be more frequent and produce larger rainfall accumulation. Whilst winter storms are predicted to decrease wet spells are to be short-lived but more intense.	• 4.9m/s MWS		-2% to -4% MWS in summer + 0-1 % MWS in spring		-3% to -6% MWS in summer + 1-3 % MWS in spring		-1% to -3% MWS in summer		-6% to -10% MWS in summer + 1-2 % MWS in spring
Coastal hazards	**Sea level rise (SLR)**	• SLR in the 20th century at Moruriki was 1.90mm/year [+- 0.25mm]. • When assessing SLR, vertical land movement (VLM) should be considered as outlined in MfE (2022) Interim guidance on the use of new sea-level rise projections. • VLM is variable across the coastline: Western Bay from Matata: typically neutral or uplifting, with up to +5.0 mm/yr (uplift) near Maketu-Pongakawa. Eastern Bay from Matata: typically slight uplift, neutral or subsidence, with up to -3.0 mm/year (subsidence) near Matata.	• Represented by mean high water spring tide 10%								
	Sea level and groundwater rise	• Groundwater recharge may decline in the future due to projected reductions in soil moisture and mean annual low flow and increases in potential evapotranspiration deficit. • Coastal aquifers may also be affected by sea-level rise in terms of flow velocities, shallow groundwater levels and increased salinity.	• Not modelled		+0.25m SLR		+0.30m SLR		+0.55m SLR		+0.80m SLR
	Coastal flooding	• The extent of coastal flooding in low lying coastal areas is projected to increase due to SLR.	• Represented by coastal flooding modelling from NIWA 2019. Refer to Appendix A for details								
	Coastal erosion	• The extent of coastal erosion is projected to increase in some coastal areas due to SLR.	• Modelling available for parts of the region. Refer to Appendix A for details								
	Salinity impacts	• Sea level rise may increase the extent to which the effects of salinity impacts are sustained.	• Inferred coastal flooding modelling from NIWA 2019								
	Ocean temperature	• Sea surface temperatures are increasing globally • Projections provided are for the South West Pacific and therefore don't necessarily incorporate local effects that would influence in coastal waters.	• 17.2°C		+1.0°C				+2.5°C		

Figure 2.2: Climate hazard projections for the Bay of Plenty[7].

Example risk workbook

Risk_ID	Direct / indirect	Climate Hazard	Element at risk	Risk Statement	Exposure					Exposure rating justification / comments	Sensitivity	Sensitivity rating justification / comments	Adaptive capacity	Adaptive capacity rating justification / comments	Consequence	Consequence Justification	Risk (Exp x Sens x AC x Cons)				
					Present	Mid 2050 RCP4.5	Mid 2050 RCP8.5	Long 2100 RCP4.5	Long 2100 RCP8.5								Present	Mid 2050 RCP4.5	Mid 2050 RCP8.5	Long 2100 RCP4.5	Long 2100 RCP8.5
P.1	Direct	Increased coastal inundation (sea level rise)	Coastal protection infrastructure	Risk to coastal protection infrastructure due to increased coastal inundation (sea level rise)	Low	Moderate	Moderate	High	Very High	Storm surge and SLR are projected to increase over the centuary will increase overtopping of eastern breakwater and seawalls	High	Moderate - Coastal protection infrastructure is designed to a specific level of service, as this is exceeded damage to the structure is likely.	High	Medium - Coastal protection may be strengthened to higher design standard, however it is difficult and costly to move coastal protection infrastructure	High	High - Overtopping of the sea wall can impact operations, may cause damage and is costly to repair	Low	Moderate	Moderate	High	High
P.2	Direct	Increased temperature	Road surface	Risk to road surface due to increased temperature	Low	Low	Low	Moderate	High	Hot days are expected to increase by 30-70+ days by 2100 in both RCP scenarios. This could lead to more frequency of asphalt melting	Extreme	Asphalt has a higher stone size and is generally considered to be less sensitive to the impacts of high temperatures than other roading. Being situated so close to the coast also makes it difficult for temperatures to get hot enough	Low	Difficult and costly to replace all asphalt on site	High	Damaged asphalt is a health and safety concern and can disrupt operations	Moderate	Moderate	Moderate	High	Extreme
P.3	Direct	Increasing pests and invasive species	Operations	Risk to operations due to increasing pests and invasive species	Low	Low	Low	Moderate	High	Significant uncertainty in understanding increasing pets and invasive species. Generally expected to see an increase over time.	High	High - Biosecurity processes are highly sensitive to the impacts of increasing invasive species and will require immediate response to increase monitoring and compliance	Medium	Medium - Increasing in additional monitoring and compliance standards to manage the impacts of increased invasive species. This will potentially require an increased investment into fumigation resources and training for staff	Moderate	Moderate - Increased monitoring and compliance will increase operational costs and cause delay and interruptions to shipping schedules	Low	Low	Low	Moderate	High
P.4	Direct	Extreme weather (wind and storm events)	Staff	Risk to staff due to extreme weather (wind and storm events)	Low	Low	Low	High	High	Overall mean wind speed is expected to decrease over time, however the intensity of events is likely to increase.	High	Extreme weather has the potential to significantly impact people working outdoors. They may be injured by flying debris or blown around in strong winds.	Medium	Ability to shut down operations where weather events are well forecast to protect people working outside. However events such as tornados are difficult to accurately forecast.	Moderate	Potential safety concern causing injury	Low	Low	Low	High	High
P.5	Direct	Extreme weather (wind and storm events)	Containers and cargo	Risk to containers and cargo due to extreme weather (wind and storm events)	Low	Low	Low	Moderate	High	Overall mean wind speed is expected to decrease over time, however the intensity of events is likely to increase.	Moderate	Containers and cargo are generally able to withstand high winds.	Very low	Difficult to store containers in any other way to mitigate impacts of extreme weather.	High	Potential safety concern causing injury or death and damage to goods	Low	Low	Low	Moderate	High


Tonkin+Taylor


Tauranga City