STATEWIDE MUTUAL PROGRAM

CLIMATE CHANGE RISK ASSESSMENT

EUROBODALA SHIRE COUNCIL

17 JUNE 2020



Prepared for

Eurobodalla Shire Council

Developed by

Statewide Mutual

Editorial Team

Ms Ellie Diaz - Principal; on behalf of Statewide Mutual

Disclaimer

The Climate Change Risk Management Assessments contained within this report have been developed solely on the site-specific information supplied by various participants and have been prima facie accepted by the authors of this report. The information has not been independently verified for accuracy. JLT accepts no responsibility for any loss that arises out of Council having failed to bring all relevant facts to our attention or having provided inaccurate information.

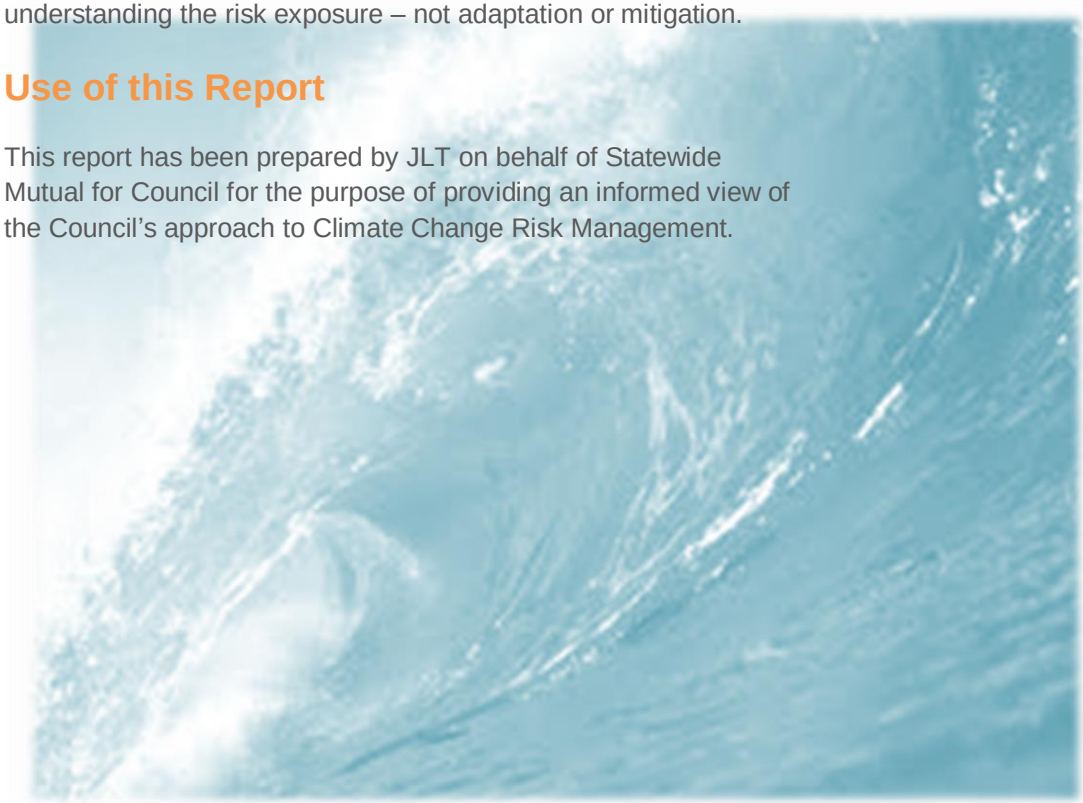
Assumptions & Limitations

It is understood that there is a level of uncertainty regarding climate change projections, including those for New South Wales. JLT acknowledges that climate change data may change, and has committed to the scenarios available at the time of the assessments.

The focus of the Climate Change Risk Assessments is one of understanding the risk exposure – not adaptation or mitigation.

Use of this Report

This report has been prepared by JLT on behalf of Statewide Mutual for Council for the purpose of providing an informed view of the Council's approach to Climate Change Risk Management.





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Executive Summary

Eurobodalla Shire Council, as member of the Statewide Mutual Liability Scheme (Statewide Mutual) selected to participate in the Climate Change Risk Assessment program proudly offered to member Councils as part of its series of funded initiatives.

Statewide Mutual understands the impact that Climate Change can potentially have on Council operations and the importance of understanding the risks associated.

Eurobodalla Shire Council participated in the Climate Change Risk Assessment workshop on 17 June 2020 with representation from most areas of the organisation and identified a total of 37 risks; the ratings as follows.

Three (3) risks rated	LOW
Nine (9) risks rated	MEDIUM
Twenty five (25) risks rated	HIGH
None (0) risks rated	EXTREME

This project was undertaken using the latest available Climate data projections.

The NSW and ACT Governments and the Climate Change Research Centre (NARCliM) at the University of NSW, together with other NSW Government authorities have partnered to develop Regional Climate Modelling for key catchment areas with climate change projections at a regional scale through interactive mapping.

The workshop made use of the projected impacts of climate variation that are specifically related to its region, thus providing a more accurate assessment of the impacts on Eurobodalla Shire Council.

This report outlines the findings and results of the risk assessment based on the applied methodology.

It is now up to Council to peruse the findings and to take the appropriate action on the recommendations provided on page 25.



Analysis of all Impacts

Table 1 – Number of Risks per Scenario and Risk Rating

Table 1 - Impact Rankings by Scenario

	Temperature	Hot Days	Rain	Fire Weather	Sea Level	**Total Impacts**
Low	1	0	0	0	2	3
Medium	2	3	3	0	1	9
High	7	5	3	7	3	25
Extreme	0	0	0	0	0	0
	10	**8**	**6**	**7**	**6**	**37**

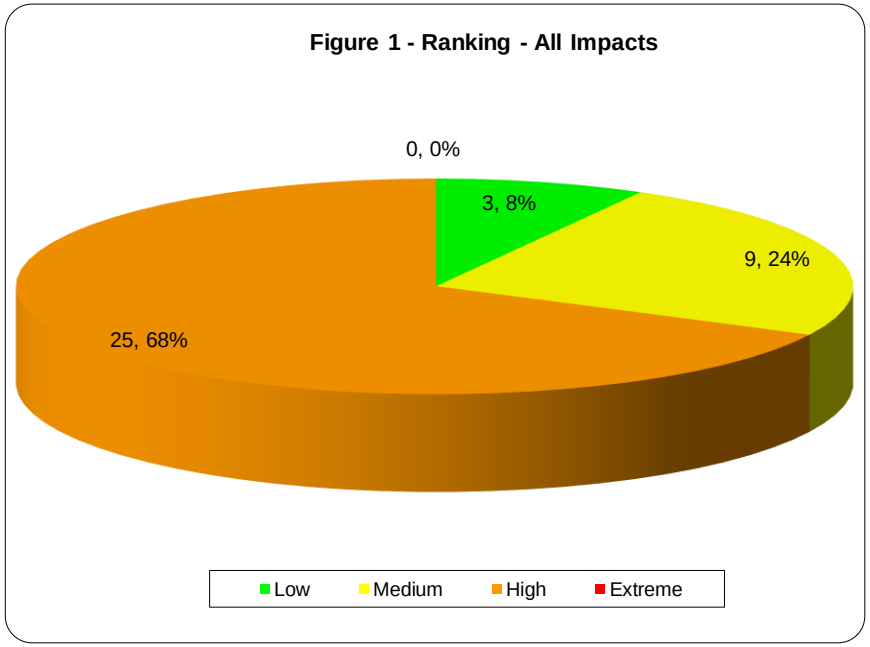




Figure 2 - Impact Ranking by Scenario

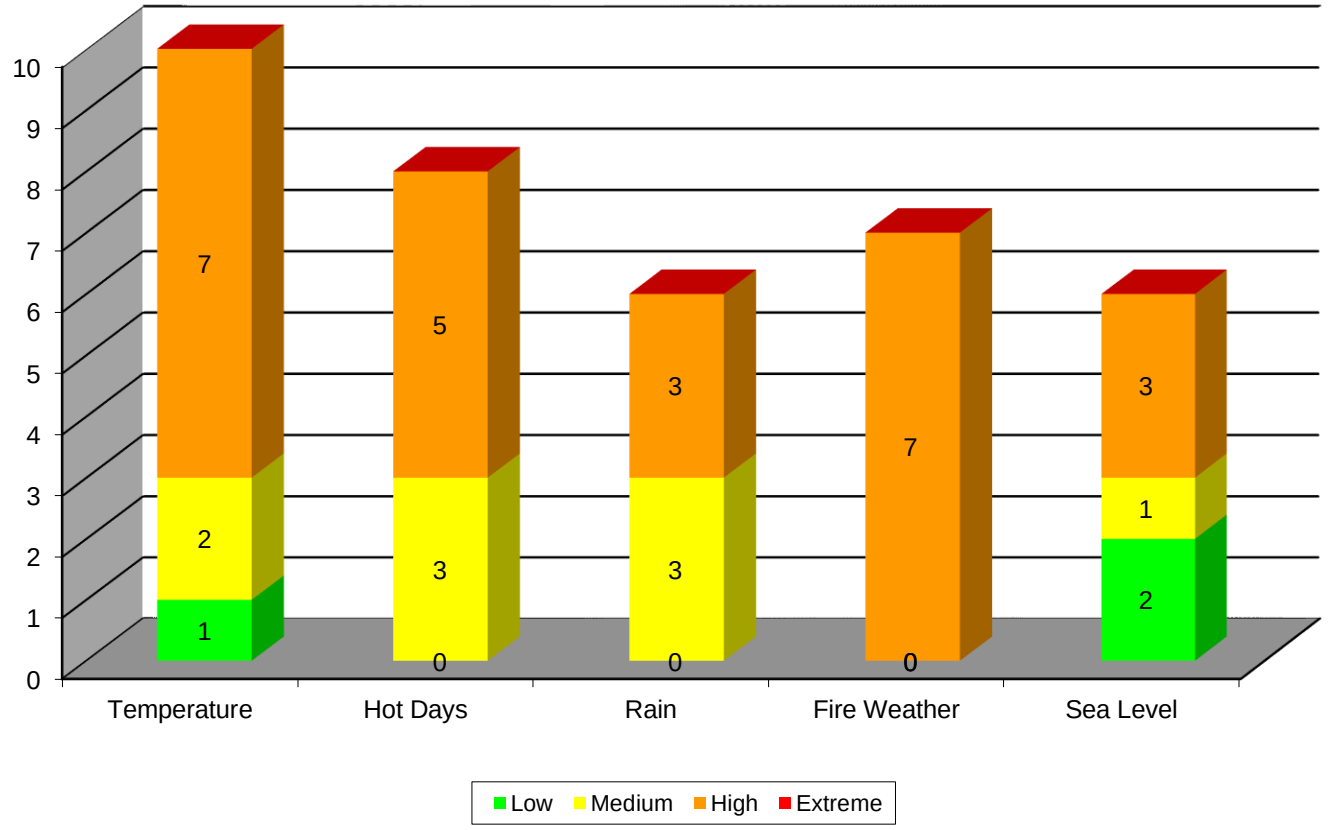




Figure 3 - Impact by Functional Area

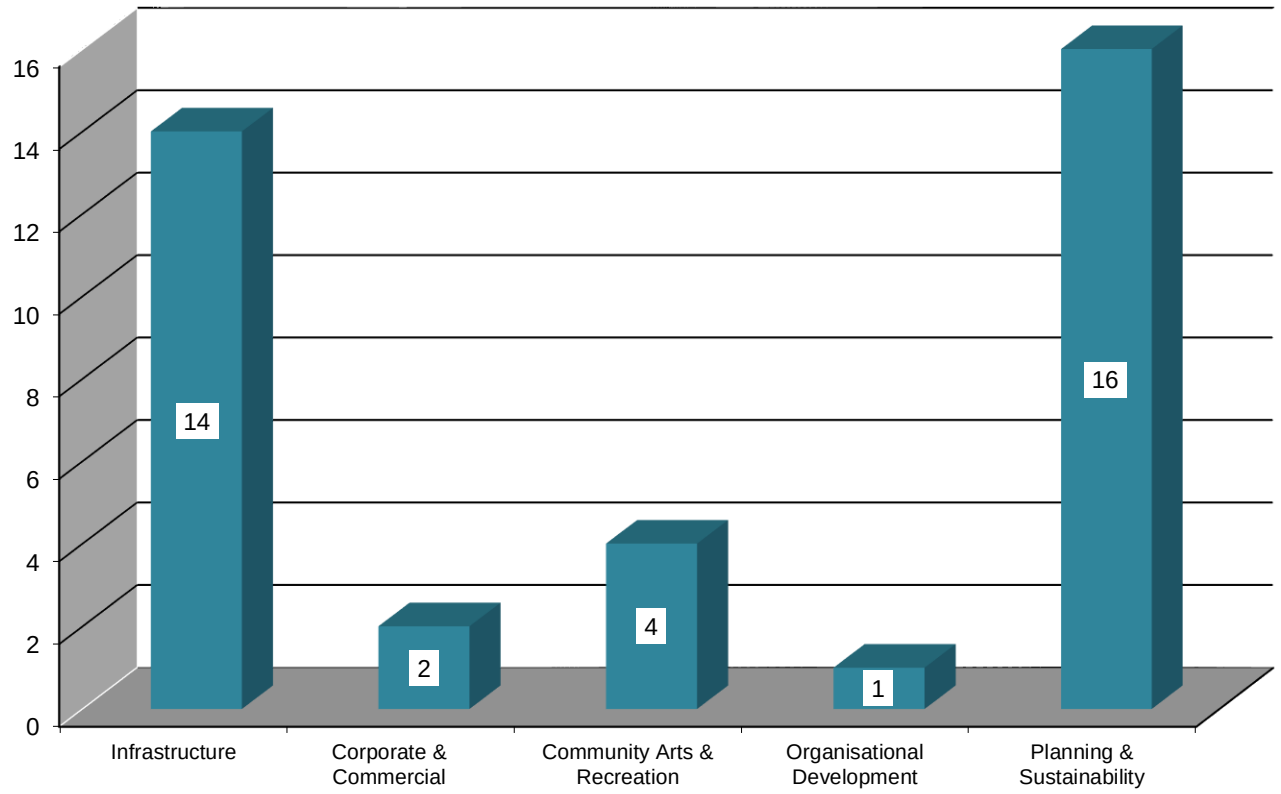
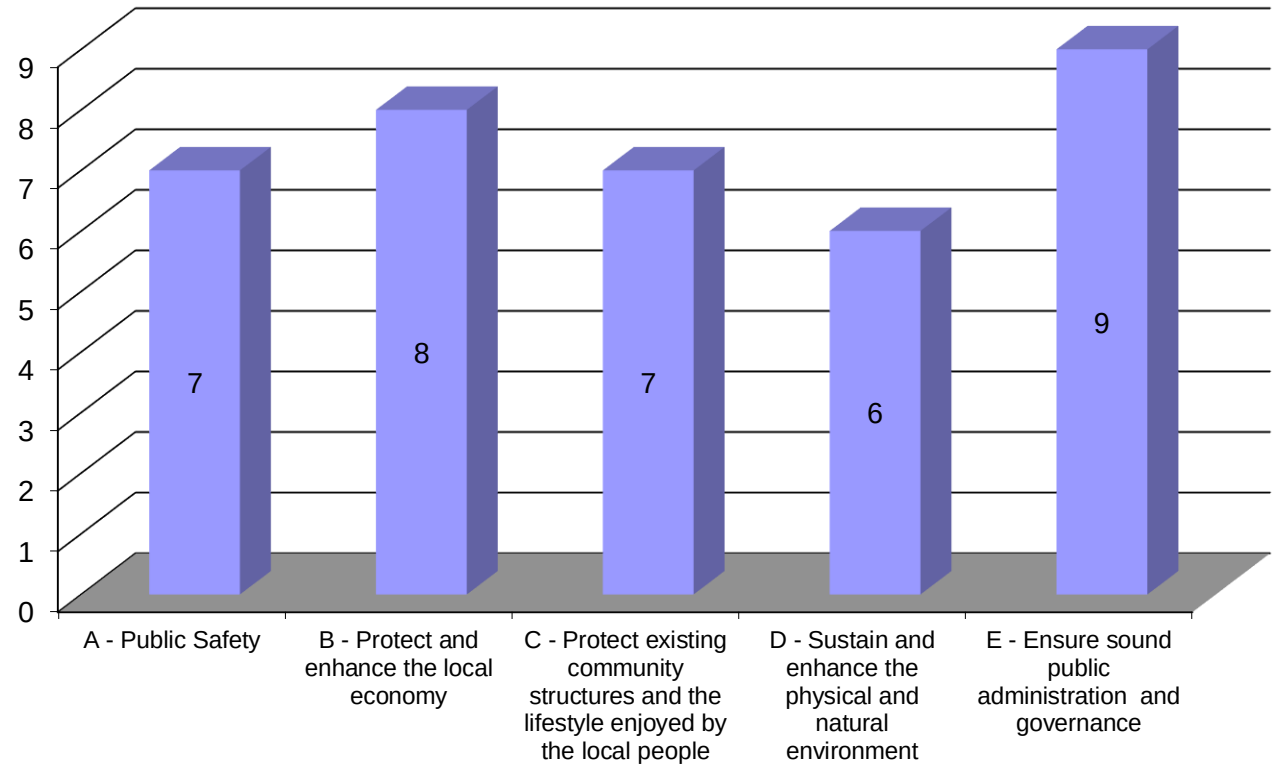




Figure 4 - Impact by Success Criteria





Methodology

The Climate Change Risk Assessment process includes three necessary stages:

- Research on the relevant Climate data
- Risk assessment workshop facilitation and
- Development of a report outlining the project and risk assessment results.

The process is facilitated by a JLT Consultant on behalf of Statewide Mutual. The Consultant's role is to guide attendees through the risk assessment process utilising Climate specific tools and information.

Central to the process is the Australian Standard for Risk management – as ISO 31000 and provides the framework for assessing climate change impacts.

The risk assessment process is largely based on the likelihood and consequence approach and a standard/ recognised risk assessment and matrix tool for evaluating the risks. This process was enhanced with the use of:

- Climate Change Scenarios and specific projections that best reflected Council geographical location.
- The impact on Functional Areas posed by the scenarios
- Assessment of the impact on Council's ability to achieve a generic set of Local Government objectives or Success Criteria measuring as a result of the projections being realised

Details of these three parameters are found at **Appendix 4.**

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(Quotes)

"Data and analysis from the Bureau of Meteorology and CSIRO show further warming of the atmosphere and oceans in the Australian region, as is happening globally. This change is occurring against the background of high climate variability, but the signal is clear.

Air and ocean temperatures across Australia are now, on average, almost a degree Celsius warmer than they were in 1910, with most of the warming occurring since 1950… ...Rainfall averaged across all of Australia has slightly increased since 1900. Since 1970, there have been large increases in annual rainfall in the northwest and decreases in the southwest. Autumn and early winter rainfall has mostly been below average in the southeast since 1990.

Atmospheric greenhouse gas concentrations continue to rise and continued emissions will cause further warming over this century. Limiting the magnitude of future climate change requires large and sustained net global reductions in greenhouse gases.".

State of the Climate 2014 – CSIRO & BOM

"Observed impacts of climate change are widespread and consequential. Recent changes in climate have caused impacts on natural and human systems on all continents and across the oceans. This conclusion is strengthened by more numerous and improved observations and analyses since the AR4. For many natural systems on land and in the ocean, new or stronger evidence exists for substantial and wide-ranging climate change impacts.."

IPCC WGAR5 accepted March 2014



Climate Change Risk Assessment

Scenario for TEMPERATURE

Maximum temperatures are projected to rise on average across the region by 0.7 degrees C in the near future (2020-2039, hereafter 2030). The greatest increases in temperature will be occurring during summer and spring. By the far future (2060-2079, hereafter 2070) the maximum temperature on average across the region is projected to rise by 2.1ºC.

Minimum temperatures are projected to rise on average across the region by 0.6ºC by 2030 and 2.0 ºC by 2070.

ID	Risk Statement An increase in the average annual temperature may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s? YES / NO
TBPS1	changes to ecosystems and an increased range and prevalence of weed and pest species, resulting in a decrease in agriculture & aquaculture productivity	B - Protect and enhance the local economy	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs	Highly beneficial	Possible	Moderate	**HIGH**	YES
TDPS2	changes to ecosystems and species distributions and the loss or decline of ecological communities, plant and animal species	D – Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs	Mostly beneficial	Possible	Moderate	**HIGH**	YES
TEPS3	increases in Council's greenhouse gas emissions due to higher energy usage within Council from increased use of air conditioners and electricity, affecting Council's carbon footprint	E - Ensure sound public administration and governance	Planning & Sustainability	Energy efficiency programs; Emission Reductions Plan	Highly beneficial	Unlikely	Minor	**LOW**	NO
TAI4	stress to tree species leading to increased public risk and legal liability and cost to council (i.e. falling limbs and trees removals)	A - Maintain public safety	Infrastructure	Tree inspection policy and code of practice.	Highly beneficial	Unlikely	Major	**MEDIUM**	Monitor



ID	Risk Statement An increase in the average annual temperature may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s? YES / NO
TAPS5	increases in the occurrence of algal blooms and cause a reduction in water quality and risk to public safety	A - Maintain public safety	Planning & Sustainability	Water quality monitoring and notification program. Weekly Water NSW reports on algal blooms. Natural resource management and Landcare programs. Aeration at DCD. Water supply treatment.	Highly beneficial	Possible	Moderate	**HIGH**	YES
TCI6	increased evaporation and demand for water consumption impacting on Council's water supply	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Highly beneficial	Likely	Moderate	**HIGH**	YES
TCCA7	the reduced usability of open spaces, reserves and recreational assets	C - Protect existing community structures and the lifestyle enjoyed by the local people	Community Arts & Recreation	Smart irrigation controls.	Some benefit	Likely	Moderate	**HIGH**	YES
TEPS8	increased migration to the Eurobodalla, increasing the demand on existing infrastructure and services	E - Ensure sound public administration and governance	Planning & Sustainability	Eurobodalla Settlement Strategy	Some benefit	Possible	Minor	**MEDIUM**	YES
TBI9	increased demand for water resulting in water restrictions and increased costs to consumers and economic impacts to businesses	B - Protect and enhance the local economy	Infrastructure	Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Mostly beneficial	Almost certain	Moderate	**HIGH**	YES
TAPS10	increased prevalence and distribution of vector-borne diseases (that is diseases spread by organisms, such as mosquitoes or ticks) resulting in impacts to human health	A – Maintain public safety	Planning & Sustainability	Natural resources Mgt, Landcare and invasive species programs.	Some benefit	Possible	Major	**HIGH**	YES



Scenario for HOT DAYS

The number of hot days (days above 35 degrees Celsius) are projected to increase across the region by an average of 3 days per year by 2030. Hot days are projected to increase across the region by up to 8 additional days per year by 2070. The greatest increases in the number of hot days will be occurring during summer and spring.

COLD NIGHTS:

The region as a whole will see a decrease in cold nights with an average of 12 fewer nights per year by 2030 and projected to be even greater (approx. 35 fewer) by 2070.

ID	Risk Statement An increase in the number of hot days may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s ? YES / NO
HDA1	increases in cases of heatstroke, mental health issues, death and general safety issues to the community, especially in vulnerable people	A – Maintain public safety	Community Arts & Recreation	Current emergency management arrangements with NSW Police as the combat agency. Staff working directly with vulnerable people avoid activities on hot days. Group homes are air-conditioned.	Some benefit (reduces likelihood)	Possible	Major	**HIGH**	YES
HDC2	more frequent or severe damage to road infrastructure, impacting on road users and costs to council	C – Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Monitor weather forecast for road reseals works scheduling.	Mostly beneficial	Possible	Minor	**MEDIUM**	Monitor
HDE3	reduced productivity and increased workplace health and safety issues for Council staff and contractors	E – Ensure sound public administration and governance	Organisational Development	WHS Policies and Procedures, Training, PPE	Some benefit	Possible	Moderate	**HIGH**	YES
HDECS4	increased demand on council assets (such as pools and beaches), services and resources to manage and respond to hot day impacts	E – Ensure sound public administration and governance	Corporate and Commercial	Contract management, budgets and resourcing review process.	Some benefit	Possible	Minor	**MEDIUM**	Monitor
HDB5	increased urban heat impacts resulting in a reduced use of public places and town and village centres	B – Protect and enhance the local economy	Planning & Sustainability	Nil	No benefit	Likely	Minor	**MEDIUM**	YES



ID	Risk Statement An increase in the number of hot days may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s ? YES / NO
HDB6	negative impacts on aqua culture and agriculture resulting in the loss of productivity	B – Protect and enhance the local economy	Planning & Sustainability	Development Control Plan; State Environment Planning Policies, business support programs, Nature-based Tourism Feasibility Study, Eurobodalla Destination Action Plan, Economic Development Strategy.	Some benefit	Possible	Moderate	**HIGH**	YES
HDD7	changes to ecosystems and the loss of ecological communities, plant and animal species	D – Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs and Grey-Headed Flying-fox programs	Some benefit	Possible	Major	**HIGH**	YES
HDE8	increased peak day water demand	E - Ensure sound public administration and governance	Infrastructure	Water reservoir storages.	No Benefit	Likely	Major	**HIGH**	YES



Scenario for RAINFALL

The projections for the region's annual average rainfall range from a decrease (drying) of 10% to an increase (wetting) of 6% by 2030 and still span both drying and wetting scenarios
(-6% t0 +10%) by 2070.

All models agree that spring rainfall will decrease by -2% to -19% by 2070, with autumn rainfall projected to increase across the region with the largest increases around Bega and Eden. Summer rainfall is projected to increase by 2070 across most of the region except the Snowy Mountains. Winter rainfall changes vary across the region.

ID	**Risk Statement** Increased variance in rainfall may cause	**Impact on Council's ability to:**	**Functional Area**	**Current Controls**	**Adequacy of Control**	Likelihood	Consequence	**Rating**	**Requires Future Adaptation Initiative/s? YES / NO**
RDPS 1	changes to ecosystems and environmental flows and the loss of plant and animal species and ecological communities and may lead to soil erosion and reduced water quality	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs, water quality monitoring program,	Mostly beneficial	Possible	Moderate	**HIGH**	YES
RBPS 2	variations in the environmental flows to rivers and ICOLLS* which may impact water dependent industries and tourism	B - Protect and enhance the local economy	Planning & Sustainability	ICOLL opening policy. Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs, water quality monitoring program.	Highly beneficial	Possible	Minor	**MEDIUM**	NO
RCI3	more intense weather events causing increased and more widespread damage to property and infrastructure including roads, telecommunications, water and electricity supply	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Current emergency management arrangements with SES as the combat agency, development controls, stormwater management, development controls.	Mostly beneficial	Almost certain	Moderate	**HIGH**	YES
RAI4	more intense weather events resulting in inadequate Council resources for emergency management response	A - Maintain public safety	Infrastructure	Staff trained up in emergency services operations, capacity to use other areas of council (e.g. construction) during high demand times	Highly beneficial	Possible	Minor	**MEDIUM**	Monitor
RAI5	increased threats to life and injury (i.e. drowning) to staff and the public from flooding events	A - Maintain public safety	Infrastructure	Current emergency management arrangements with SES as the	Some benefit	Unlikely	Major	**MEDIUM**	YES



ID	Risk Statement Increased variance in rainfall may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s? YES / NO
				combat agency, WHS Policies and Procedures, Training, PPE					
RBI6	longer dry periods impacting on water supply, agricultural production, irrigation demand and maintenance of unsealed roads	B - Protect and enhance the local economy	Infrastructure	Development controls, water restrictions, recycled effluent, Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Some benefit	Almost certain	Moderate	**HIGH**	YES



Scenario for FIRE WEATHER

Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather days. The FFDI combines observations of temperature, humidity and wind speed. Fire weather is classified as severe when the FFDI is above 50.

The region is expected to experience an increase in average and severe fire weather in the near future and the far future. The increases in average and severe fire weather are projected to occur mainly in spring and summer.

Although the increases in severe fire weather are relatively small (up to 2 more days every five years by 2030) they are projected to occur in spring and summer.

ID	Risk Statement An increase in the number of FFDI days may	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s? YES / NO
FWAI1	increase the threat to life and injury (burns, smoke inhalation, air pollution) to staff and the public from bushfires	A - Maintain public safety	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZ*s and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, WHS policies & procedures.	Mostly beneficial	Likely	Major	**HIGH**	YES
FWCI2	increase the threat of fire damage to public and private property and Council assets	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, development controls, WHS polices & procedures, development controls.	Mostly beneficial	Likely	Major	**HIGH**	YES
FWBPS 3	increase the threat of fire to businesses and areas used for recreation by locals and tourists and impact the viability of businesses in the region	B - Protect and enhance the local economy	Planning & Sustainability	Nature-based Tourism Feasibility Study, Eurobodalla Destination Action Plan, Economic Development Strategy, business support programs	Some benefit	Likely	Major	**HIGH**	YES
FWCI4	increase the threat of fire resulting in damage to essential infrastructure including roads, telecommunications, water and electricity supply	C - Protect existing community structures and the lifestyle	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire	Mostly beneficial	Likely	Major	**HIGH**	YES



ID	Risk Statement An increase in the number of FFDI days may	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation Initiative/s? YES / NO
		enjoyed by the local people		Management Committee, WHS policies & procedures, development controls,					
FWEI5	increase the threat of fires resulting in disruption to business continuity and service provision	E - Ensure sound public administration and governance	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, WHS policies & procedures, development controls, Business Continuity Plan	Mostly beneficial	Likely	Moderate	**HIGH**	YES
FWECC 6	cause an increased demand on council assets (i.e. evacuation centres), services and resources to prepare, respond to and recover from an increased threat of fire	E - Ensure sound public administration and governance	Corporate and Commercial	Emergency response and recovery funding arrangements. Administration in managing costs & claims	Mostly beneficial	Possible	Moderate	**HIGH**	YES
FWDPS 7	cause changes to ecosystems and the loss of plant and animal species, ecological communities, habitat and vegetation corridors and may lead to soil erosion and reduced water quality	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries, other natural resources Mgt and Landcare programs, water quality monitoring program	No benefit	Possible	Major	**HIGH**	YES



Scenario for SEA LEVEL

It is projected that the sea level will rise by 0.10 for 2030 and 0.72 by 2100 – Eurobodalla Shire Council has endorsed these and they are locally adjusted. (Source: the Interim Coastal Hazard Adaptation Code which was informed by the South Coast Regional SLR Policy & Planning Framework)

Climate modelling projects a decrease in the number of small to moderate East Coast Lows (ECLs) in the cool season with little change in these storms during the warm season. However extreme ECLs in the warmer months may increase in number but extreme ECLs in cool seasons may not change. An increase in the frequency and/or intensity of ECLs could exacerbate the effects of sea level rise on coastal erosion.[1]

ID	Risk Statement An increase in sea level rise and coastal inundation events may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation initiative/s? YES / NO
SLDPS1	the loss or changes to key ecosystems which could impact on the local plants and animals and reduce the natural ecosystem services such as nutrient and sediment removal, fish production, etc	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs	Highly benef icial	Possible	Major	**HIGH**	YES
SLDPS2	damage to coastal nature reserves, estuaries, beaches, foreshore vegetation and recreational areas	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs	Mostly beneficial	Likely	Moderate	**HIGH**	YES
SLCI3	loss/damage to public and private property and infrastructure, particularly low-lying coastal and estuarine areas due to erosion, re-alignment of shores, increased flooding, etc	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Interim Coastal Hazard Adaptation Code, flood studies, Coastal Management Plans. Raising road levels, improving drainage, relocating assets. More resilient construction for new /renewed buildings/assets. Development controls	Mostly beneficial	Possible	Moderate	**HIGH**	YES

[1] https://climatechange.environment.nsw.gov.au/-/media/NARCLim/Files/Climate-Change-Impact-Reports/Eastern-Seaboard-Climate-Change-Initiative_16.pdf?la=en&hash=F94BD33F0F4CA2EA62E4D3E3B26850E47B7236C3 Accessed 26/06/2020



ID	Risk Statement An increase in sea level rise and coastal inundation events may cause	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Likelihood	Consequence	Rating	Requires Future Adaptation initiative/s? YES / NO
SLBPS4	impacts on water quality due to the salinisation of coastal fresh waterways resulting in the damage/loss to the natural environment, agriculture, aquaculture and freshwater bores	B - Protect and enhance the local economy	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs. 2018 Ground Water Salinisation Study Tuross water pump station bores are vulnerable – don't pump during low water	Some benefit	Unlikely	Minor	**LOW**	Monitor
SLECA5	an increased demand on council services, funds and resources to prevent, prepare for and respond to sea level rise impacts	E - Ensure sound public administration and governance	Corporate & Commercial	Delivery and operational planning to determine budget and resourcing needs Asset management planning.	Some benefit	Unlikely	Moderate	**MEDIUM**	YES
SLECA6	impacts on legal liability or loss of reputation due to decisions around coastal planning and development	E - Ensure sound public administration and governance	Corporate & Commercial	Development controls. Coastal Mgt programs. Sea Level Rise Policy, Interim Coastal Hazard Adaptation Code.	Highly beneficial	Unlikely	Minor	**LOW**	Monitor



Summary of Risks Requiring Future Adaptation Planning

ID	Risk Statement	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Rating
HDE8	increased peak day water demand	E - Ensure sound public administration and governance	Infrastructure	Water reservoir storages.	No Benefit	HIGH
FWAI1	increase the threat to life and injury (burns, smoke inhalation, air pollution) to staff and the public from bushfires	A - Maintain public safety	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZ*s and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, WHS policies & procedures.	Mostly beneficial	HIGH
FWCI2	increase the threat of fire damage to public and private property and Council assets	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, development controls, WHS polices & procedures, development controls.	Mostly beneficial	HIGH
FWBPS3	increase the threat of fire to businesses and areas used for recreation by locals and tourists and impact the viability of businesses in the region	B - Protect and enhance the local economy	Planning & Sustainability	Nature-based Tourism Feasibility Study, Eurobodalla Destination Action Plan, Economic Development Strategy, business support programs	Some benefit	HIGH
FWCI4	increase the threat of fire resulting in damage to essential infrastructure including roads, telecommunications, water and electricity supply	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, WHS policies & procedures, development controls,	Mostly beneficial	HIGH
TAPS10	increased prevalence and distribution of vector-borne diseases (that is diseases spread by organisms, such as mosquitoes or ticks) resulting in impacts to human health	A – Maintain public safety	Planning & Sustainability	Natural resources Mgt, Landcare and invasive species programs.	Some benefit	HIGH
HDA1	increases in cases of heatstroke, mental health issues, death and general safety issues to the community, especially in vulnerable people	A – Maintain public safety	Community Arts & Recreation	Current emergency management arrangements with NSW Police as the combat agency. Staff working directly with vulnerable people avoid activities on hot days. Group homes are air-conditioned.	Some benefit (reduces likelihood)	HIGH



ID	Risk Statement	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Rating
HDD7	changes to ecosystems and the loss of ecological communities, plant and animal species	D – Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs and Grey-Headed Flying-fox programs	Some benefit	HIGH
TBI9	increased demand for water resulting in water restrictions and increased costs to consumers and economic impacts to businesses	B - Protect and enhance the local economy	Infrastructure	Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Mostly beneficial	HIGH
FWDPS7	cause changes to ecosystems and the loss of plant and animal species, ecological communities, habitat and vegetation corridors and may lead to soil erosion and reduced water quality	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries, other natural resources Mgt and Landcare programs, water quality monitoring program	No benefit	HIGH
SLDPS1	the loss or changes to key ecosystems which could impact on the local plants and animals and reduce the natural ecosystem services such as nutrient and sediment removal, fish production, etc	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs	Highly beneficial	HIGH
RCI3	more intense weather events causing increased and more widespread damage to property and infrastructure including roads, telecommunications, water and electricity supply	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Current emergency management arrangements with SES as the combat agency, development controls, stormwater management, development controls.	Mostly beneficial	HIGH
RBI6	longer dry periods impacting on water supply, agricultural production, irrigation demand and maintenance of unsealed roads	B - Protect and enhance the local economy	Infrastructure	Development controls, water restrictions, recycled effluent, Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Some benefit	HIGH
FWEI5	increase the threat of fires resulting in disruption to business continuity and service provision	E - Ensure sound public administration and governance	Infrastructure	Emergency management arrangements with RFS as the combat agency, APZs and fire mitigation works, planning through Eurobodalla Bush Fire Management Committee, WHS policies & procedures, development controls, Business Continuity Plan	Mostly beneficial	HIGH
TCI6	increased evaporation and demand for water consumption impacting on Council's water supply	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Integrated Water Cycle Management Strategy, Drought Management Plan, water loss management and efficiency programs	Highly beneficial	HIGH



ID	Risk Statement	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Rating
TCCA7	the reduced usability of open spaces, reserves and recreational assets	C - Protect existing community structures and the lifestyle enjoyed by the local people	Community Arts & Recreation	Smart irrigation controls.	Some benefit	HIGH
HDE3	reduced productivity and increased workplace health and safety issues for Council staff and contractors	E – Ensure sound public administration and governance	Organisational Development	WHS Policies and Procedures, Training, PPE	Some benefit	HIGH
HDB6	negative impacts on aqua culture and agriculture resulting in the loss of productivity	B – Protect and enhance the local economy	Planning & Sustainability	Development Control Plan; State Environment Planning Policies, business support programs, Nature-based Tourism Feasibility Study, Eurobodalla Destination Action Plan, Economic Development Strategy.	Some benefit	HIGH
RDPS1	changes to ecosystems and environmental flows and the loss of plant and animal species and ecological communities and may lead to soil erosion and reduced water quality	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs, water quality monitoring program,	Mostly beneficial	HIGH
SLDPS2	damage to coastal nature reserves, estuaries, beaches, foreshore vegetation and recreational areas	D - Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs	Mostly beneficial	HIGH
TBPS1	changes to ecosystems and an increased range and prevalence of weed and pest species, resulting in a decrease in agriculture & aquaculture productivity	B - Protect and enhance the local economy	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs	Highly beneficial	HIGH
TDPS2	changes to ecosystems and species distributions and the loss or decline of ecological communities, plant and animal species	D – Sustain and enhance the physical and natural environment	Planning & Sustainability	Coastal Mgt program for estuaries; other natural resources Mgt and Landcare programs; invasive species programs	Mostly beneficial	HIGH
TAPS5	increases in the occurrence of algal blooms and cause a reduction in water quality and risk to public safety	A - Maintain public safety	Planning & Sustainability	Water quality monitoring and notification program. Weekly Water NSW reports on algal blooms. Natural resource management and Landcare programs. Aeration at DCD. Water supply treatment.	Highly beneficial	HIGH
FWECC6	cause an increased demand on council assets (i.e. evacuation centres), services and resources to prepare, respond to and recover from an increased threat of fire	E - Ensure sound public administration and governance	Corporate and Commercial	Emergency response and recovery funding arrangements. Administration in managing costs & claims	Mostly beneficial	HIGH



ID	Risk Statement	Impact on Council's ability to:	Functional Area	Current Controls	Adequacy of Control	Rating
SLCI3	loss/damage to public and private property and infrastructure, particularly low-lying coastal and estuarine areas due to erosion, re-alignment of shores, increased flooding, etc	C - Protect existing community structures and the lifestyle enjoyed by the local people	Infrastructure	Interim Coastal Hazard Adaptation Code, flood studies, Coastal Management Plans. Raising road levels, improving drainage, relocating assets. More resilient construction for new /renewed buildings/assets. Development controls	Mostly beneficial	HIGH
HDB5	increased urban heat impacts resulting in a reduced use of public places and town and village centres	B – Protect and enhance the local economy	Planning & Sustainability	Nil	No benefit	MEDIUM
RAI5	increased threats to life and injury (i.e. drowning) to staff and the public from flooding events	A - Maintain public safety	Infrastructure	Current emergency management arrangements with SES as the combat agency, WHS Policies and Procedures, Training, PPE	Some benefit	MEDIUM
SLECA5	an increased demand on council services, funds and resources to prevent, prepare for and respond to sea level rise impacts	E - Ensure sound public administration and governance	Corporate & Commercial	Delivery and operational planning to determine budget and resourcing needs Asset management planning.	Some benefit	MEDIUM
TEPS8	increased migration to the Eurobodalla, increasing the demand on existing infrastructure and services	E - Ensure sound public administration and governance	Planning & Sustainability	Eurobodalla Settlement Strategy	Some benefit	LOW

Total 29 (High = 25; MEDIUM = 3; LOW = 1)



What is Next

The nature of Local Government, in its services and functions, means it will feel the impacts of climate change considerably and directly. Many impacts of climate change present risks that require treatment at a 'local' level. Others, due to their scope may require collaboration with key stakeholders, private and public.

Identifying and understanding the potential risks that Climate Change may pose is important. More important however are the actions that Council takes as a result of the assessment.

Overall Recommendations

Council is encouraged to review the outcome of the risk assessment and consider:

- Developing adaptation initiatives for risks rated as High and selected Medium and Low as appropriate.
- Incorporating climate change risk assessment results into strategic and other management planning processes.
- Developing a program to periodically review all risks including those rated Medium and Low in light of current climate change information.
- Any other emerging impacts of climate change on the operating environment, legislation, economy and other factors relevant to Council.
- Categorising potential actions into short, medium and long term plans and incorporating these actions into the appropriate strategic and operational plans.

The report is now submitted for your consideration and appropriate action.



Appendices

Appendix 1 – Participation

The following personnel participated in the CCRA workshop held on 17 June 2020. Their contribution was central to the success of the project.

Name	Position
Kim Bush	Divisional Manager Community Development and Participation
Mark Shorter	Sustainability Coordinator
Warren Sharpe	Director Infrastructure Services
Brett Corven	Divisional Manager Water and Sewer
Debbie Lenson	Divisional Manager Environmental Services
Lindsay Usher	Director Planning and Sustainability
Tony Swallow	Divisional Manager Works
Kathy Arthur	Director Arts and Recreation Services
Chris Tague	Facilities Management Coordinator
Amanda Jones	Divisional Manager Waste Services, Acting Director Commercial and Corporate Services
Elizabeth Rankin	Divisional Manager Strategy and Sustainable Planning
Nathan Farnell	Land Use Planning Coordinator
Scott Westbury	Chief Financial Officer
David Moran	Procurement and Fleet Coordinator
Karen Ison	Fleet Management Officer
Kylie Green	Executive Services Coordinator
Adam Patyus	Waste Services Coordinator
Rob Burke	Asset Engineer
Cameron Whiting	Coastal and Flood Management Planner
Jason Mackey	WHS advisor
Carlyle Ginger	Divisional Manager Technical Services
Also present:	
Melinda Hillery	Senior Project Officer, Climate Resilience and Net Zero Emissions Branch



Appendix 2: Consequence and Likelihood Descriptors

Success Criteria	Consequence Rating				
	Insignificant	Minor	Moderate	Major	Catastrophic
A Maintain public safety	Appearance of a threat but no actual harm	Serious near misses or minor injuries	Small numbers of injuries	Isolated instances of serious injuries or loss of lives	Large numbers of serious injuries or loss of lives
B Protect and enhance the local economy	Minor shortfall relative to current forecasts	Individually significant but isolated areas of reduction in economic performance relative to current forecasts	Significant general reduction in economic performance relative to current forecasts	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth	Regional decline leading to widespread business failure, loss of employment and hardship
C Protect existing community structures and the lifestyle enjoyed by the local people	There would be minor areas in which the region was unable to maintain its current services	Isolated but noticeable examples of decline in services	General appreciable decline in services	Severe and widespread decline in services and quality of life within the community	The region would be seen as very unattractive, moribund and unable to support its community
D Sustain and enhance the physical and natural environment	No environmental damage	Minor instances of environmental damage that could be reversed	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Severe loss of environmental amenity and a danger of continuing environmental damage	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage
E Ensure sound public administration and governance	There would be minor instances of public administration being under more than usual stress but it could be managed	Isolated instances of public administration being under severe pressure	Public administration would be under severe pressure on several fronts	Public administration would struggle to remain effective and would be seen to be in danger of failing completely	Public administration would fall into decay and cease to be effective



Appendix 3 - Likelihood Descriptors

Likelihood Rating	Recurrent Risks	Single Events
Almost Certain	Could occur several times per year	More likely than not - Probability greater than 50%
Likely	May arise about once a year	As likely as not - 50/50 chance
Possible	May arise once in ten years	Less likely than not but still appreciable - Probability less than 50% but still quite high
Unlikely	May arise once in ten to 25 years	Unlikely but not negligible - Probability low but noticeably greater than zero
Rare	Unlikely during the next 25 years	Negligible - Probability very small, close to zero.



Appendix 3: Risk Evaluation Matrix

LIKELIHOOD	CONSEQUENCE				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain					
Likely					
Possible					
Unlikely					
Rare					

EXTREME	**Extreme** risks demand/require urgent attention at the most senior level and action plans and management responses are required; cannot be simply accepted as a part of routine operations.
HIGH	**High** risks are the most severe that can be accepted as a part of routine operations but must be managed by a senior manager who reports on progress to the Executive.
MEDIUM	**Medium** risks can be expected to form part of routine operations where specific monitoring and response procedures exist. Management will be assigned to a particular manager and reported on at senior management level.
LOW	**Low** risks will be part of routine operations and expected to be managed by existing controls.



Appendix 4: Climate Change Scenarios and Success Criteria

Climate Change Scenarios

A key feature of the Risk Assessment process is the use of various authoritative sources for climate change scenarios that were applied in this project. The Scenarios applicable for Eurobodalla Shire Council are:

T	**Temperature**	By 2030 Maximum average temperatures are projected to rise by 0.7 ºC. The increases are occurring across the region. The greatest increases in temperature will be occurring during summer and spring. By 2070 the maximum average temperature across the region is projected to rise by 2.1ºC. Minimum average temperatures are also projected to rise across the region by 0.6ºC by 2030 and by 2.0ºC by 2070)
HD	**Hot Days**	The number of hot days (days above 35 degrees Celsius) are projected to increase across the region by an average of 3 days per year by 2030. Hot days are projected to increase across the region by up to 8 additional days per year by 2070. The greatest increases in the number of hot days will be occurring during summer and spring. COLD NIGHTS: The region as a whole will see a decrease in cold nights with an average of 12 fewer nights per year by 2030 and projected to be even greater (approx. 35 fewer) by 2070.
R	**Rainfall**	The projections for the region's annual average rainfall range from a decrease (drying) of 10% to an increase (wetting) of 6% by 2030 and still span both drying and wetting scenarios (-6% t0 +10%) by 2070. All models agree that spring rainfall will decrease by -2% to -19% by 2070, with autumn rainfall projected to increase across the region with the largest increases around Bega and Eden. Summer rainfall is projected to increase by 2070 across most of the region except the Snowy Mountains. Winter rainfall changes vary across the region
FW	**Fire Weather**	Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather days. The FFDI combines observations of temperature, humidity and wind speed. Fire weather is classified as severe when the FFDI is above 50. The region is expected to experience an increase in average and severe fire weather in the near future and the far future. The increases in average and severe fire weather are projected to occur mainly in spring and summer. Although the increases in severe fire weather are relatively small (up to 2 more days every five years by 2030) they are projected to occur in spring and summer.



SL	**Sea Level**	It is projected that the sea level will rise by 0.10 for 2030 and 0.72 by 2100 – Eurobodalla Shire Council has endorsed these and they are locally adjusted. (Source: the Interim Coastal Hazard Adaptation Code which was informed by the South Coast Regional SLR Policy & Planning Framework) Climate modelling projects a decrease in the number of small to moderate East Coast Lows (ECLs) in the cool season with little change in these storms during the warm season. However, extreme ECLs in the warmer months may increase in number but extreme ECLs in cool seasons may not change. An increase in the frequency and/or intensity of ECLs could exacerbate the effects of sea level rise on coastal erosion [2]

[2] https://climatechange.environment.nsw.gov.au/-/media/NARCLim/Files/Climate-Change-Impact-Reports/Eastern-Seaboard-Climate-Change-Initiative_16.pdf?la=en&hash=F94BD33F0F4CA2EA62E4D3E3B26850E47B7236C3 Accessed 26/06/2020



Functional Areas of Council

Potential Climate Change impacts were considered in relation to the following Council Functional Areas:

I	Infrastructure
CC	Corporate & Commercial
CAR	Community Arts & Recreation
OD	Organisational Development
PS	Planning & Sustainability

These functional areas represent Eurobodalla Shire Council's specific organisational structure.

Success Criteria

Success criteria can be best described as long term objectives, and provide a perspective from which to conduct a risk assessment. In many cases a single climate change risk is assessed from a number of perspectives. The following success criteria have been applied and adopted as part of the risk assessment:

A	Maintain public safety
B	Protect and enhance the local economy
C	Protect existing community structures and the lifestyle enjoyed by the local people
D	Sustain and enhance the physical and natural environment
E	Ensure sound public administration and governance

Note: 'Success Criteria' are a representation of local government authorities' overarching long term objectives.

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