



# GOULBURN MULWAREE COUNCIL CLIMATE CHANGE ASSESSMENT AND ADAPTATION PLANNING

March 2020

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## This Report

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## Report Prepared for

The Goulburn Mulwaree Council.

## Editorial Team

Mrs Ellie Diaz; JLT Strategic Risk Services.

## Use of This Report

This report has been prepared for use solely by the Goulburn Mulwaree Council for the sole purpose of its climate change risk assessment and adaptation planning. The information contained herein is for the sole use of the Goulburn Mulwaree Council in respect of decisions and strategies that may be directly or indirectly affected by the findings of this report. The climate change risk assessments contained within this report are based on the specific information supplied by the Goulburn Mulwaree Council and have been prima facie accepted by the authors of this report and have not been independently verified for accuracy. JLT accept no responsibility for any loss that may arise from the use of this report due to any incompleteness or inaccuracy in the information provided.

# ASSUMPTIONS AND LIMITATIONS

There is a level of uncertainty regarding climate change projections, including those for New South Wales. JLT Consulting acknowledges that climate change data may change over time and has committed to the scenarios and projections available at the time of the assessment.

This review considered the original assessment work of 2010 and utilised scientific data that is currently available through such sources as:

- the New South Wales Government by the CSIRO,
- the Australian Bureau of Meteorology,
- the NSW Office of Environment and Heritage (OEH) and
- the Intergovernmental Panel for Climate Change (IPCC)

This data did not include scenarios for all weather events such as hail or storm surge, or commentary on other potential climate change factors such as the heat island effect.

The focus of this Climate Change Risk Assessment is to build on the work already done in 2010 and review those assessments in light of new and more region specific data that will more accurately inform Council policy decisions.

The aim continues to focus on planned and gradual adaptation on the awareness that conditions have or are likely to change over the short and long term and that action is or will be required to return to, maintain, or achieve a desired state.

The scope of this project is to identify adaptation-planning initiatives where the impact levels rated HIGH and/ or EXTREME. Medium and Low level risk impacts are outside the scope of this project in respect of developing adaptation initiatives, however Council is encouraged to continuously monitor, review and manage climate change risks at all levels and scenarios.

Council acknowledges that the information provided for this study is within the scope of those who participated in the workshops only and that this report may be used as a reference for reviewing not only Council's climate change and environmental management strategies but any high strategy that may have been identified within the Adaptation Action Plan. Some impacts and risk levels may have been omitted or misrepresented.

Council also acknowledges that whilst this study focussed on the potential adverse impacts of climate change, opportunities may also arise from the changing climate. Council proposes to identify and incorporate such opportunities in subsequent assessments and adaptation plans.

# EXECUTIVE SUMMARY

Goulburn Mulwaree Council, as member of the Statewide Mutual Liability Scheme (Statewide Mutual) selected to participate in the Climate Change Risk Assessment program offered to member Councils as part of its 18/19 series of funded initiatives.

Goulburn Mulwaree Council originally participated in the programme during 2010 and developed the original Climate Change Risk Assessment and Adaptation Planning. This year Council sought to conduct a review of the original assessment in light of updated data and initiatives undertaken subsequent to the original study.

Goulburn Mulwaree Council (GMC) understands the impact that Climate Change can potentially have on Council operations and the importance of not only understanding the risks associated but proactively develop and implement initiatives that will help Council to adapt to these potential changes. As such undertook to take this process further and developed new initiatives aimed to create resilience within Council through effective adaptation.

## The Risk Assessment

On 18 October 2019 Goulburn Mulwaree Council participated in the Climate Change Risk Assessment workshop with representation from most areas of the organisation and identified a total of **27** risks; the ratings as follows.

Nil (0) rated

Four (4) risks rated

Twenty (20) risks rated

Three (3) risks rated

LOW
MEDIUM
HIGH
EXTREME

Their expertise of the participants was crucial to ensuring the process was holistic in its approach. In addition, this process also took into consideration the initiatives undertaken by the Goulburn Mulwaree Council since the original assessment.

This project was undertaken using the latest Climate data and scenarios available.

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 Goulburn Mulwaree Council.

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

The short to medium term effects of climate change may directly impact on the functionality of Council. Studies indicate that there is a real risk that the impact on Council assets and operations could increase in a number of areas such as:

- Inability to preserve “community” owned and valued assets affected by more intense natural disasters.
- The number of claims in the area of asset damage (physical damage to Council owned buildings infrastructure and assets);
- Higher insurance premiums as a result of increased claims;
- Professional indemnity issues relating to the management of the development and building approvals, issuing of certificates, verbal advice;
- Corporate governance issues including failure to implement legislation, financial responsibility, strategic planning and corporate responsibility; and

- Public liability issues caused by extreme weather events.

## Adaptation Planning

The focus of the Adaptation Planning process is primarily focused on risks that rated HIGH & EXTREME, given the nature of some of the MEDIUM rated risks, Council considered it prudent to also determine possible adaptation initiatives for some of the Medium rated risks. A further workshop was conducted to identify possible adaptation initiatives.

The workshop also provided an opportunity to revisit the risk statements and the outcome of the review resulted in the twenty (20) High and two (2) Extreme rated risks. Adaptation initiatives were developed for these 22 risks.

This report aims to consolidate the information of both the Risk assessment and the Adaptation Planning sessions. As such the report re-illustrates the findings of the risk assessment conducted in October 2019 as amended and subsequently outlines the Action Plan for the new adaptation initiatives proposed for implementation.

The Adaptation Action Plan is found on pages 23 to 31 the proposed actions are to be implemented in accordance with the responsibility and timeframes outlined therein. Further, a series of overall recommendations are presented on page 13 for Council's action.

The outcomes are now presented for consideration and appropriate action.

# CLIMATE CHANGE RISK ASSESSMENT DATA ANALYSIS

The following provides a graphical representation and analysis of the Climate Change Risk Assessment including impacts, and ratings.

Current controls and proposed adaptation initiatives were also identified for the High and Extreme risks as well as Most Medium and a few Low rated risks.

The information in this report also includes the respective graphs from the 2013 results for comparison purposes, having regard to amendments required to undertake the 2019 assessment.



# ANALYSIS OF ALL IMPACTS

## 2019 Risk Ranking of All Impacts

**Table 1 – Number of Risks per Scenario and Risk Rating**

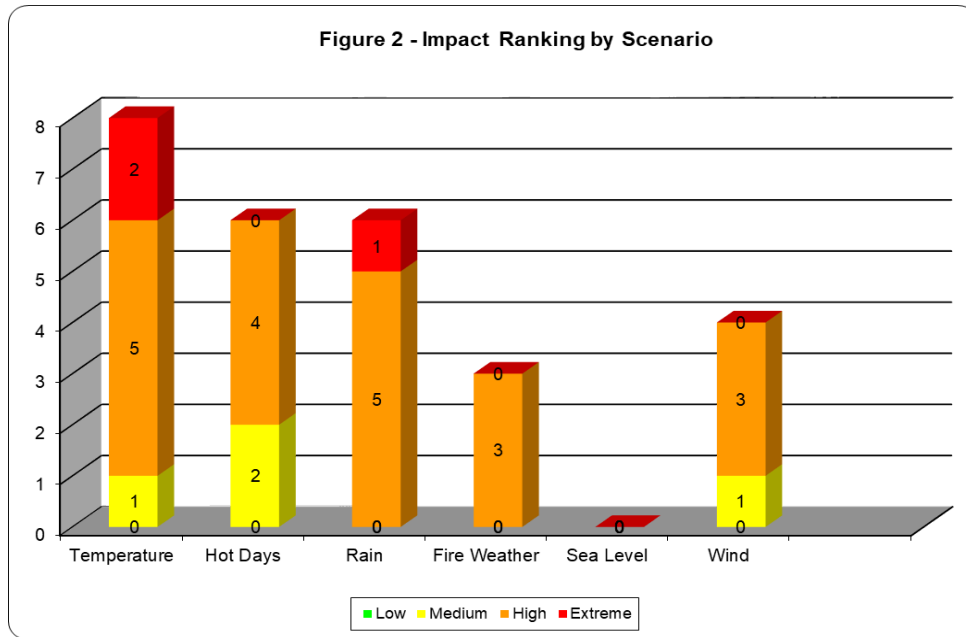
Table 1 - Impact Rankings by Scenario						Table 1 Ranking All Impacts Total	
	Temperature	Hot Days	Rain	Fire Weather	Wind		
Low	0	0	0	0	0	<b>Low</b>	<b>0</b>
Medium	1	2	0	0	1	<b>Medium</b>	<b>4</b>
High	5	4	5	3	3	<b>High</b>	<b>20</b>
Extreme	2	0	1	0	0	<b>Extreme</b>	<b>3</b>
	<b>8</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>27</b>	<b>27</b>

- A total of 27 risks were identified across the five risk scenarios presented.
- 20 of these risks rated in the HIGH category with three risks rated EXTREME. These risks are the focus of the proposed Adaptation Planning strategies developed for consideration in Council’s medium and long term planning
- Four (4) risks were rated MEDIUM and none scored a rating of LOW.

### 2013 Outcome

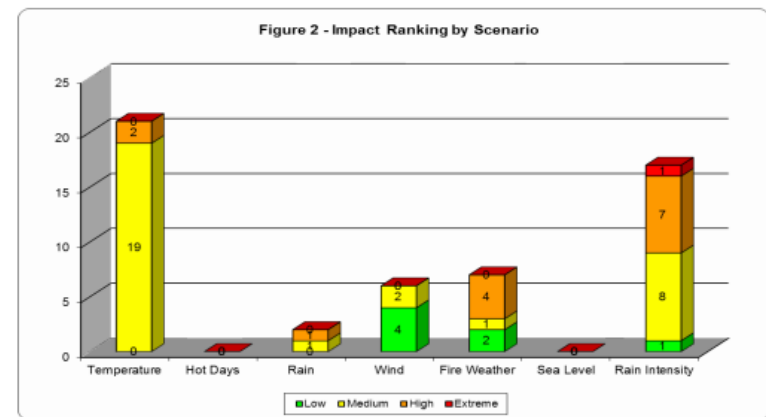
Table 1 - Impact Rankings by Scenario									Table 1 Ranking All Impacts Total		
	Temperature	Hot Days	Rain	Wind	Fire Weather	Sea Level	Rain Intensity				
Low	0	0	0	4	2	0	1			<b>Low</b>	<b>7</b>
Medium	19	0	1	2	1	0	8			<b>Medium</b>	<b>31</b>
High	2	0	1	0	4	0	7			<b>High</b>	<b>14</b>
Extreme	0	0	0	0	0	0	1			<b>Extreme</b>	<b>1</b>
	<b>21</b>	<b>0</b>	<b>2</b>	<b>6</b>	<b>7</b>	<b>0</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>53</b>

## 2019 Impact Ranking by Scenario

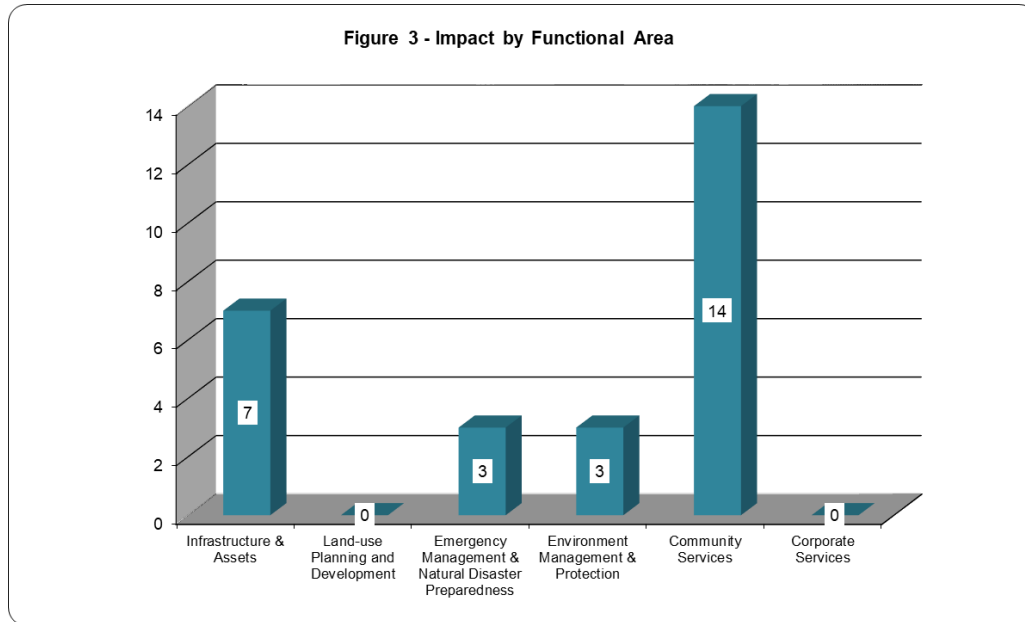


The results reveal a total of eight (8) risks associated with increased Temperatures. The projections for temperature reflect an increased not only in the high temperatures but also in the low average temperatures. There are an equal number of risks associated with Hot Days and Rainfall both with six risks.

## 2013 Outcome

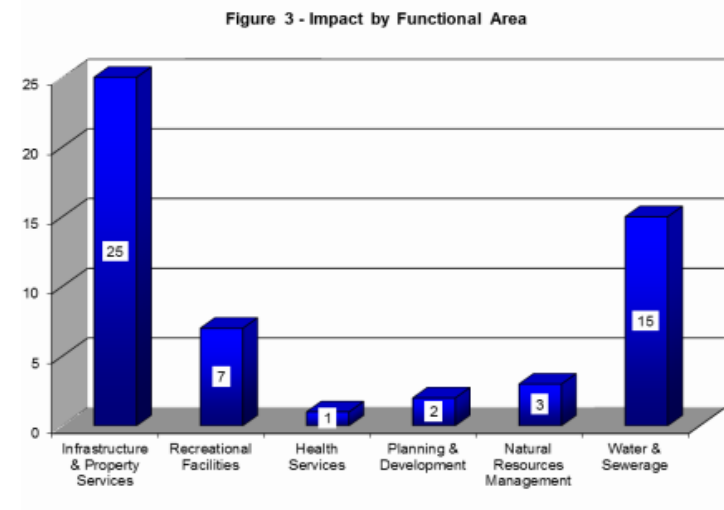


## 2019 Impact Ranking by Functional Area

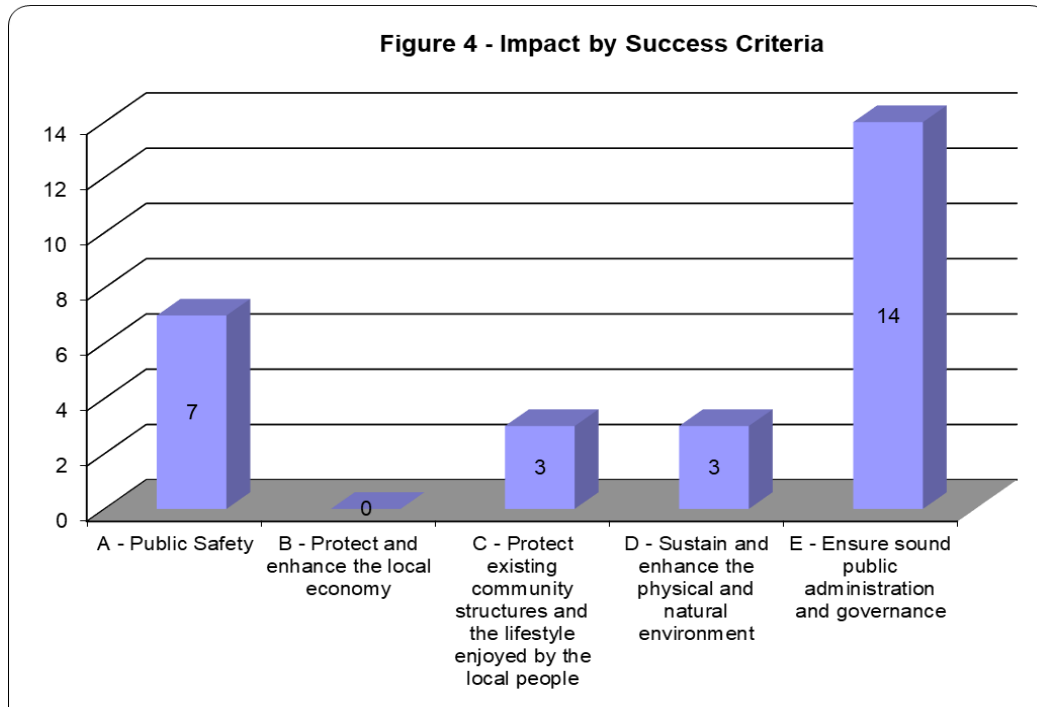


14 (52%) of the total 27 risks identified were considered to impact on Council's areas of Community Services.

## 2013 Outcome



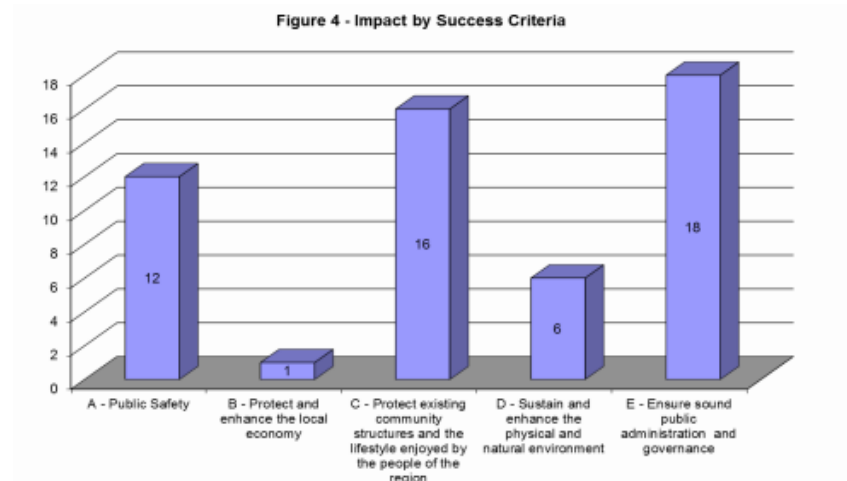
## Impact by Success Criteria



There are five generic Local Government success criteria that may be impacted by Climate Change. Out of the 27 risks, 14 risks (representing 52%) were considered to impact Council's ability to "Ensure sound public administration and governance".

A far second there were seven risks (representing 26%) assessed as impacting on "Public Safety".

## 2013 Outcome



# BACKGROUND

## PROJECT OBJECTIVES

The objectives of this project are to:

- Acknowledge Council's corporate responsibility by understanding the potential risks presented by climate change on the LGA;
- Undertake a risk assessment that aligns with AS ISO 31000;
- Understand the impact of climate change on the organisation and the community it aims to serve;
- Develop strategies that focus on adaptation to potential climate change impact
- Identify strategic initiatives that can be used to inform Council's medium and long term management planning.

## IMPACT ON LOCAL GOVERNMENT

Local governments are responsible for delivering a broad range of services to the community, and for managing and maintaining a substantial number of assets and infrastructure that not only deliver essential services to the community but are of local, regional, state and national significance.

Local governments by their very nature are on the frontline in respect to dealing with and being affected by the impacts of climate change and as such, can play a critical role in ensuring that local conditions and needs are adequately considered in the overall adaptation response.

They are strongly positioned to inform State and Commonwealth Governments about the on-the-ground needs of local and regional

communities, to communicate directly with communities, and to respond appropriately and in a timely manner to local changes. They also have the ability to collaborate with other local government authorities and to involve the local community directly in efforts to facilitate effective change.

## 2013 GOULBURN MULWAREE COUNCIL CLIMATE CHANGE ASSESSMENT

The Goulburn Mulwaree Council participated in the first Climate Change Risk Assessment and Adaptation Planning programme funded by Statewide Mutual in 2013. This assessment identified a total 53 risks with the following risk assessment ratings:

- 7 rated Low
- 31 rated Medium
- 14 rated High and
- 1 rated Extreme

The greatest number of risks, whilst mainly Medium, related to impact from Temperature.

The largest impact of these risks (19) representing 36% were attributed to Community Services and seven risks to the Infrastructure and Assets area.

Council's ability to "Ensure Sound Public Administration and Governance" was the most affected with 18 risks representing 34%.

Adaptation initiatives were developed for the 14 risks rated High and the one Extreme.



# ASSESSMENT TOOLS

This review aims to revisit and compare the 2013 assessment data and update in light of more current and more localised projections now available.

## Risk ID

Each risk identified is given a Risk Identification code. This code is made up of the following identifiers:

- Success Criterion
- Climate Scenario:
- Functional Area
- Number of the risk

The ID is then displayed as CS/SC/FA/N

## Success Criteria

‘Success Criteria’ are overall typical local government long term objectives, as originally defined in Climate Change Impacts & Risk Management A Guide for Business, Australian Greenhouse Office 2006. For consistency purposes the same were used in this year’s assessment.

These criteria give consideration to the impact of Climate change on Council in terms of its ability to:

- A** Maintain public safety
- B** Protect and enhance the local economy
- C** Protect existing community structures and the lifestyle enjoyed by the people of the region
- D** Sustain and enhance the physical and natural environment

- E** Ensure sound public administration

## Functional Areas of Council

As done in the original assessment, all functions of Council are grouped into generic areas consistent with all local government across the State. These areas were slightly modified as follows:

- I** Infrastructure and Assets
- E** Environmental Management & Protection
- CS** Community Services
- L** Land-use Planning and Development
- D** Emergency Management & Natural Disaster Preparedness
- C** Corporate Services

The agreed distribution of Council’s business operations (functional areas) in line with the above categories is found at Appendix 7

Example: a risk identified in the Temperature Scenario, impacting Council’s ability to maintain public safety and affecting the Functional Area of Infrastructure is coded as “TAI1”.

The report also captures how the Success Criteria are impacted by the various Climate Scenarios and the specific Functional Areas potentially affected in each. This grouping is found in Appendix 6

## Risk Evaluation

The risks were evaluated using the same evaluation matrix as that of 2013 for effective comparison of the assessments and consistency with the NSW OEH.

The Risk Matrix tools can be found at Appendices 1 to 3.

# RECOMMENDATIONS

Goulburn Mulwaree Council clearly understands the importance of being aware of the potential impact of Climate Change on its assets, operations and community and is commended for not only actively driving the implementation of initiatives identified in the original assessment but choosing to once again take steps to revisit the risks and develop new adaptation initiatives.

In this reviewed assessment, Council continues to build on its work through ongoing climate change adaptation planning.

However, it should not stop here.

It is imperative that the valuable work already conducted is now integrated in all the relevant areas of the organisation and that it is used to inform management planning decisions with clear regard of the identified threats and proposed adaptation strategies.

The following general recommendations are offered for Council consideration and implementation:

1. Consider the new adaptation initiatives with a view to implement within recommended timeframes, or earlier if deemed necessary.
2. Review all risk assessments including low and medium risks on a periodic basis in line with updated projections.
3. Stay informed and consider any changes in relevant climate change data, operating environment, legislation, economy, demographics, and other relevant factors when reviewing adaptation plans and risk assessments.
4. Categorise adaptation initiatives and integrate these into Council's medium and long term planning programs e.g. 4, 10 and 20 years to inform future planning.

5. Include climate change risk management and adaptation plans into strategic (e.g. Council's 20 year Community Strategic Plan) and other relevant management planning and decision making processes.
6. Map vulnerable areas in line with Climate projections and where relevant, review LEP and DCP controls as necessary.
7. Investigate the use of Section 94 and Voluntary Planning Agreements to contribute to required infrastructure implementation to reduce the impacts of climate change.

# 2019 CLIMATE CHANGE ASSESSMENTS AND ADAPTATION PLAN SUMMARY

Goulburn Mulwaree Council identified twenty climate change risks rated HIGH and three impacts rated EXTREME. These twenty-three risks were the focus of this report and the proposed adaptation initiatives for the relevant Climate Scenario as summarised below.

As part of undertaking the adaptation, planning process the risks were once again reviewed resulting in a variation in the adaptation planning initiatives.

## Scenario 1 – TEMPERATURE

- Mean temperatures are projected to rise by 0.7 °C by 2030. The increases are occurring across the region with the greatest increases during summer and spring.
- Mean temperatures are projected to rise by 2 °C by 2070. The greatest increases seen in the north and west of the region during summer and spring.
- By 2030 the South East and Tablelands is projected to experience an average of 12 fewer nights below 2 °C per year and continue to decrease by 35 nights per year by 2070

There are five risks rated HIGH and one risk rated EXTREME out of a total eight risks in this scenario for which future adaptation initiatives were identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
TCI1	There is a risk that the demand for swimming facilities will increase that will cause extended opening hours, extra parking needed, health standards of pools may deteriorate	HIGH	<ul style="list-style-type: none"> <li>○ Tender out</li> <li>○ On a needs basis hours are adjusted as required</li> </ul>	<ul style="list-style-type: none"> <li>○ The purpose of the tender is for asset improvement and to maintain water quality (threatened by projected increase in temps);</li> <li>○ Improvements will allow for the potential increase of usage, opening times and capacity (incl. extra parking spaces).</li> <li>○ Once improvements finalised, operational resources will be increased to appropriate levels.</li> <li>○ The new asset will incorporate adequate shading</li> </ul>
TECS3	An increase in temperature may cause changes in energy usage demand and higher costs in Council facilities	HIGH	<ul style="list-style-type: none"> <li>○ Ongoing fitting of solar panels to buildings</li> </ul>	<ul style="list-style-type: none"> <li>○ Develop a program of regular maintenance and inspection;</li> <li>○ Investigate alternative renewable energy supplies.</li> </ul>

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
				<ul style="list-style-type: none"> <li>○ Consider introducing passive building design for future building structures</li> <li>○ LGP Contract continuation</li> <li>○ Investigate possibility of installing timers on internal lights</li> </ul>
TAI6	There is a risk that increased temperatures will cause an increase in algae blooms within water storages	HIGH	<ul style="list-style-type: none"> <li>○ Programmed testing and treatment occurs</li> <li>○ Closures for recreation</li> </ul>	<ul style="list-style-type: none"> <li>○ Inclusion of alternative water treatment options for water treatment plants;</li> <li>○ Investigate options for addressing increased algal blooms more effectively</li> </ul>
TDE7	An increase in temperature may cause changes in biodiversity and ecosystems with <i>adverse</i> impacts on flora and fauna	HIGH	<ul style="list-style-type: none"> <li>○ Street trees, landscape plans</li> </ul>	<ul style="list-style-type: none"> <li>○ Make adjustment to the selection criteria of plants;</li> <li>○ Continue to update plans of management to consider climate change risk of increased average temperature;</li> <li>○ Explore opportunities with State Govt on research and management methods</li> </ul>
TCI8	There is a risk that the demand for recreational areas will increase and that will cause greater usage and/or a change in usage patterns with contingency plans	HIGH	<ul style="list-style-type: none"> <li>○ Provision for lighting and increased security</li> <li>○ Upgraded air con Veolia</li> <li>○ Irrigation systems and alternative water supplies for parks</li> </ul>	<ul style="list-style-type: none"> <li>○ Review schedule for public events relating to usage of facilities for activities to be held during suitable times;</li> <li>○ implement the water re-use scheme for sporting field irrigation;</li> <li>○ Consider change in close and opening times for some facilities;</li> <li>○ Review plans of management for facilities to consider climate change impacts</li> </ul>
TEI9	There is a risk that increased temperatures will cause an increase in usage and increase in evaporation rates and water supply capacity will be adversely affected	EXTREME	<ul style="list-style-type: none"> <li>○ Multiple sources of supply</li> <li>○ Ongoing monitoring</li> </ul>	<ul style="list-style-type: none"> <li>○ Develop and implement water security improvement measures;</li> <li>○ Increase use of re-use of effluent to minimise use of potable water supply;</li> <li>○ Increase capacity of HSP; demand management measures.</li> </ul>

## Scenario 2 – HOT DAYS

- Hot days are projected to increase across the region by an average of 3 days per year by 2030. The greatest increases are seen in the Southern Tablelands and North South West Slopes which are projected to experience an additional 5-10 days per year.
- Hot days are projected to increase across the region by an average of 8 days per year by 2070. The greatest increases are seen in the Southern Tablelands and North South West Slopes which are projected to experience over 30 days per year.

There are four risks rated HIGH and none risk rated EXTREME out of a total six risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
HDECS1	An increase in hot days may cause heat stress in operational staff <i>resulting in</i> personnel safety and productivity <i>being impacted</i>	HIGH	<ul style="list-style-type: none"> <li>o Working in Extreme Weather Conditions Procedure</li> </ul>	<ul style="list-style-type: none"> <li>o Continue to implement the "Working in Extreme Weather Conditions" procedure and ensure it is observed consistently across the organisation;</li> <li>o Implementing education initiatives / reminders ahead of and during hot days</li> </ul>
HDAI5	An increase in hot days may lead to increased levels of heat stress in the community	HIGH	<ul style="list-style-type: none"> <li>o On an upgrade or needs basis</li> </ul>	<ul style="list-style-type: none"> <li>o Upgrading of aquatic centre will mitigate demand by providing comfort away from the heat;</li> <li>o Consider installation of management options and measures such as misting devices to mitigate heat impact at strategic locations;</li> <li>o Increase suitable tree planting for shade;</li> <li>o Conduct a site assessment of recreational areas in hot days to better understand the impact;</li> <li>o Review plans of management;</li> <li>o Where buildings have been upgraded, retro-fit buildings to cope with high temperatures (insulation/ventilation etc.);</li> <li>o Improve lighting and security in facilities suitable for night use</li> <li>o Investigate the potential for new bus shelter and drinking station installation.</li> </ul>
HDECS7	An increase in hot days may lead to an increased risk of power outage at Council facilities impacting on productivity and community activities	HIGH	<ul style="list-style-type: none"> <li>o Generators can be provided for essential infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>o Reduce load with new technologies and use of solar systems</li> </ul>
HDEI8	An increase in hot days may lead to an increased demand for potable water	HIGH	<ul style="list-style-type: none"> <li>o Hours of operation</li> <li>o Scheduling work</li> </ul>	<ul style="list-style-type: none"> <li>o Continue water security measures and review process regularly.</li> <li>o Additional reuse of effluent;</li> <li>o Increase capacity of HSP;</li> <li>o Demand management measures</li> </ul>



## Scenario 3 – RAINFALL

- There is little change in annual rainfall by 2030. Decreases in rainfall are during winter and spring, with the greatest decreases in the Southern Tablelands during spring. The greatest increases are across the region during autumn.
- By 2070 rainfall will vary across the South East and Tablelands region. The greatest increases are seen across most of the region during summer and autumn. There are large decreases in rainfall across most of the region during spring and winter in the Snowy Mountains and far south coast.

There are five risks rated HIGH, one risk rated EXTREME out of a total six risks for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
REI1	There is a risk that there will be an increase in frequency and severity of flood events (leading to damage to infrastructure and demand on personnel to manage clean-ups; waste; insurance claims) disruption to services	HIGH	<ul style="list-style-type: none"> <li>○ 1989 Overland Flow Mapping</li> <li>○ General Storm water infrastructure Maintenance</li> <li>○ Emergency Management Plans</li> <li>○ Planning documents</li> <li>○ 2016 Flood Mapping Goulburn</li> </ul>	<ul style="list-style-type: none"> <li>○ Review of overland study;</li> <li>○ Completion of flood risk management study and allocate appropriate resources to implement measures;</li> <li>○ Continue to work with Emergency services during events;</li> <li>○ Reviewing infrastructure;</li> <li>○ Seek grant funding opportunities available for mitigation measures;</li> <li>○ Complete the review of contributions plan.</li> <li>○ Increase awareness of OEMP and Flood Management Plans</li> <li>○ Review operational budget requirements for emergency management resources</li> </ul>
REI2	There is a risk of reduced yield into water storages during low rainfall periods of the year	HIGH	<ul style="list-style-type: none"> <li>○ Proactively pumping back from river into dams</li> </ul>	<ul style="list-style-type: none"> <li>○ Develop and implement water security improvement measures;</li> <li>○ Increase use of re-use of effluent to minimise use of potable water supply;</li> <li>○ Increase capacity of HSP; demand management measures.</li> </ul>
REI3	An increase in rainfall intensity may lead to increased operational resourcing to reduce asset damage repairs and constant infrastructure maintenance	HIGH	<ul style="list-style-type: none"> <li>○ Reactive response</li> </ul>	<ul style="list-style-type: none"> <li>○ Continual infrastructure asset improvement;</li> <li>○ Continue to implement gradual bridge replacement program;</li> </ul>

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
				<ul style="list-style-type: none"> <li>o Additional improvement works program for roads</li> </ul>
RAI4	An increase in rainfall intensity may impact on the standard and safety of sporting fields	HIGH	<ul style="list-style-type: none"> <li>o Reactive response; close fields notification</li> </ul>	<ul style="list-style-type: none"> <li>o Improve design for new assets with better drainage.</li> <li>o Preventative closing of sporting fields (proactive)</li> <li>o Sporting Facilities Policy completed</li> </ul>
RAI5	An increase in rainfall intensity may cause significant increase in public safety risks via asset damage	EXTREME	<ul style="list-style-type: none"> <li>o Reactive response</li> </ul>	<ul style="list-style-type: none"> <li>o - Updating storm water infrastructure;</li> <li>o - Continue to implement gradual bridge replacement program;</li> <li>o - Additional improvement works program for roads;</li> <li>o - continue public notification and education.</li> </ul>
RDE6	There is a risk that the changes in rainfall pattern may adversely impact on the natural environment	HIGH	<ul style="list-style-type: none"> <li>o Weed control</li> <li>o Response to erosion</li> <li>o Catchment Management Plans</li> </ul>	<ul style="list-style-type: none"> <li>o - Make adjustment to the selection criteria of plants;</li> <li>o - Continue to update plans of management to consider climate change risk of increased average temperature;</li> <li>o - Engage with State Govt on research and management methods</li> </ul>

## Scenario 4 – FIRE WEATHER

- Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather. The FFDI combines observations of temperature, humidity and wind speed. Fire weather is classified as severe when the FFDI is above 50
- By 2030 Severe fire weather is projected to have minimal increase across the region during summer and spring. These increases are being seen during the peak prescribed burning season (spring) and peak fire risk season (summer).
- Severe fire weather is projected to increase across the region by 2070. The increases are greatest in the Southern Tablelands and North South West Slopes, during spring and summer. Declines are projected during Autumn due to increases in rainfall. These increases are being seen during the peak prescribed burning season (spring) and peak fire risk season (summer).

There are three risk rated HIGH out of a total three for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
FWE11	There is a risk that an increase in fire weather days could lead increased risk of damage to Council infrastructure and assets	HIGH	<ul style="list-style-type: none"> <li>o Fire Management Plans</li> <li>o Hazard Reduction Plan</li> <li>o liaise with RFS for grant funding opportunities</li> </ul>	<ul style="list-style-type: none"> <li>o Continue to implement hazard reduction activities in land under the management and control of Council;</li> <li>o Continued liaison with emergency services (RFS) regarding fire reduction programs and strategies</li> </ul>
FWAD3	There is a risk that an increase in fire weather days could lead increased risk to safety of the community, including loss of property	HIGH	<ul style="list-style-type: none"> <li>o Fire Management Plans</li> <li>o Hazard Reduction Plans</li> </ul>	<ul style="list-style-type: none"> <li>o Implement fire danger warning notification regarding the use of community facilities in high fire risk areas;</li> <li>o Implement fire education program via RFS fire liaison meetings and other appropriate avenues</li> <li>o Evacuation/Emergency Centre preparation/plan.</li> </ul>
FWDD4	There is a risk that an increase in fire weather days could lead adverse impact on the natural environment	HIGH	<ul style="list-style-type: none"> <li>o Fire Management Plans</li> <li>o Hazard Reduction Plan</li> </ul>	<ul style="list-style-type: none"> <li>o Review plans of management to consider impact of climate change risk.</li> <li>o Develop Bushfire Strategy in conjunction with the RFS</li> </ul>

## Scenario 5 – WIND

- There is a risk that there will be an increase in average wind speed of 8% by 2030 (Summer and Autumn).

There are three risk rated HIGH out of a total three for which future adaptation initiatives have been identified:

Risk ID	Impact Description	Impact Rating	Current Controls	Proposed Future Adaptation initiatives
FWEI1	There is a risk that greater occurrence of extreme winds will result in more severe infrastructure damage	HIGH	<ul style="list-style-type: none"> <li>○ Building compliance codes</li> <li>○ Ongoing asset maintenance</li> </ul>	<ul style="list-style-type: none"> <li>○ Ensure adequate clearance around building assets,</li> <li>○ Continued asset and maintenance /inspection;</li> </ul>
FWAD2	There is a risk that greater occurrence of extreme winds resulting in personal	HIGH	<ul style="list-style-type: none"> <li>○ Ongoing risk management</li> <li>○ Ongoing asset maintenance</li> <li>○ WHS Training</li> </ul>	<ul style="list-style-type: none"> <li>○ Continue asset management and effective tree management through inspections and proactive maintenance programs</li> </ul>
FWEI3	There is a risk that there may be an increased interruption to essential services resulting in impact on council operations	HIGH	<ul style="list-style-type: none"> <li>○ EMRP</li> </ul>	<ul style="list-style-type: none"> <li>○ Review and update Business continuity plan;</li> <li>○ Ensure timely access to alternate power source</li> <li>○ Ensure there is adequate clearance of trees around building assets;</li> <li>○ Prepare and relocate assets ahead of weather event to mitigate loss</li> <li>○ Ensure continued implementation of asset maintenance /inspection program</li> </ul>

# 2019 ADAPTATION INITIATIVES ACTION PLAN

The following is a practical table to be used as an Action Plan for ensuring the initiatives identified are achieved. Finalise by completing the actions required to implement each of the initiatives and agree on a timeframe. This is a working table. The responsibility for the specific actions may be delegated to Operational level however, it is encouraged to assign the accountability to a senior/ Director level.

## TEMPERATURE

	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
TCI1	There is a risk that the demand for swimming facilities will increase that will cause extended opening hours, extra parking needed, health standards of pools may deteriorate	High	<ul style="list-style-type: none"> <li>The purpose of the tender is for asset improvement and to maintain water quality (threatened by projected increase in temps);</li> <li>Improvements will allow for the potential increase of usage, opening times and capacity (incl. extra parking spaces).</li> <li>Once improvements finalised, operational resources will be increased to appropriate levels.</li> <li>The new asset will incorporate adequate shading</li> </ul>	Highly beneficial	LOW	<ul style="list-style-type: none"> <li></li> </ul>	Director Operations	
TECS3	An increase in temperature may cause changes in energy usage demand and higher costs in Council facilities	High	<ul style="list-style-type: none"> <li>Develop a program of regular maintenance and inspection;</li> <li>Investigate alternative renewable energy supplies.</li> <li>Consider introducing passive building design for future building structures</li> <li>LGP Contract continuation</li> <li>Investigate possibility of installing timers on internal lights</li> </ul>	Some Benefit (reduces likelihood)	MEDIUM	<ul style="list-style-type: none"> <li></li> </ul>	Director Utilities	



	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
TAI6	There is a risk that increased temperatures will cause an increase in algae blooms within water storages	High	<ul style="list-style-type: none"> <li>Inclusion of alternative water treatment options for water treatment plants;</li> <li>Investigate options for addressing increased algal blooms more effectively</li> </ul>	Highly beneficial	MEDIUM	<ul style="list-style-type: none"> <li></li> </ul>	Director Utilities	
TDE7	An increase in temperature may cause changes in biodiversity and ecosystems with adverse impacts on flora and fauna	High	<ul style="list-style-type: none"> <li>Make adjustment to the selection criteria of plants;</li> <li>Continue to update plans of management to consider climate change risk of increased average temperature;</li> <li>Explore opportunities with State Govt on research and management methods</li> </ul>	Mostly beneficial (reduces consequence)	HIGH	<ul style="list-style-type: none"> <li></li> </ul>	Director of Planning & Environment; Director Operations	
TCI8	There is a risk that the demand for recreational areas will increase and that will cause greater usage and/or a change in usage patterns with contingency plans	High	<ul style="list-style-type: none"> <li>Review schedule for public events relating to usage of facilities for activities to be held during suitable times;</li> <li>implement the water re-use scheme for sporting field irrigation;</li> <li>Consider change in close and opening times for some facilities;</li> <li>Review plans of management for facilities to consider climate change impacts</li> </ul>	Mostly beneficial (reduces consequence)	MEDIUM		Director Operations	
TEI9	There is a risk that increased temperatures will cause an increase in usage and increase in evaporation rates and water supply capacity will be adversely affected	Extreme	<ul style="list-style-type: none"> <li>Develop and implement water security improvement measures;</li> <li>Increase use of re-use of effluent to minimise use of potable water supply;</li> <li>Increase capacity of HSP; demand management measures.</li> </ul>	Highly beneficial	HIGH		Director Utilities	

## HOT DAYS

	Risk Statement	Rating	Proposed Adaptation Initiative	Effective ness	Residua l Rating	Actions to implement Initiative	Accountabi lity	Timeframe (end date or milestones)
HDECS1	An increase in hot days may cause heat stress in operational staff <i>resulting in</i> personnel safety and productivity <i>being impacted</i>	High	<ul style="list-style-type: none"> <li>Continue to implement the "Working in Extreme Weather Conditions" procedure and ensure it is observed consistently across the organisation;</li> <li>Implementing education initiatives / reminders ahead of and during hot days</li> </ul>	Highly beneficial	LOW		All Directors	
HDAI5	An increase in hot days may lead to increased levels of heat stress in the community	High	<ul style="list-style-type: none"> <li>Upgrading of aquatic centre will mitigate demand by providing comfort away from the heat;</li> <li>Consider installation of management options and measures such as misting devices to mitigate heat impact at strategic locations;</li> <li>Increase suitable tree planting for shade;</li> <li>Conduct a site assessment of recreational areas in hot days to better understand the impact;</li> <li>Review plans of management;</li> <li>Where buildings have been upgraded, retro-fit buildings to cope with high temperatures (insulation/ventilation etc.);</li> <li>Improve lighting and security in facilities suitable for night use</li> <li>Investigate the potential for new bus shelter and drinking station installation.</li> </ul>	Highly beneficial	MEDIUM		Director Operations	

	<b>Risk Statement</b>	<b>Rating</b>	<b>Proposed Adaptation Initiative</b>	<b>Effective ness</b>	<b>Residua l Rating</b>	<b>Actions to implement Initiative</b>	<b>Accountabi lity</b>	<b>Timeframe</b> (end date or milestones)
HDECS7	An increase in hot days may lead to an increased risk of power outage at Council facilities impacting on productivity and community activities	High	<ul style="list-style-type: none"> <li>o Reduce load with new technologies and use of solar systems</li> </ul>	Highly beneficial	MEDIUM		Director Operations & Director Utilities	
HDEI8	An increase in hot days may lead to an increased demand for potable water	High	<ul style="list-style-type: none"> <li>o Continue water security measures and review process regularly.</li> <li>o Additional reuse of effluent;</li> <li>o Increase capacity of HSP;</li> <li>o Demand management measures</li> </ul>	Highly beneficial	MEDIUM		Director Utilities	

## RAINFALL

ID	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
REI1	There is a risk that there will be an increase in frequency and severity of flood events (leading to damage to infrastructure and demand on personnel to manage clean-ups; waste; insurance claims) disruption to services	High	<ul style="list-style-type: none"> <li>o Review of overland study;</li> <li>o Completion of flood risk management study and allocate appropriate resources to implement measures;</li> <li>o Continue to work with Emergency services during events;</li> <li>o Reviewing infrastructure;</li> <li>o Seek grant funding opportunities available for mitigation measures;</li> <li>o Complete the review of contributions plan.</li> <li>o Increase awareness of OEMP and Flood Management Plans</li> <li>o Review operational budget requirements for emergency management resources</li> </ul>	Highly beneficial	MEDIUM		Director Utilities ; Director Operations	
REI2	There is a risk of reduced yield into water storages during low rainfall periods of the year	High	<ul style="list-style-type: none"> <li>o Develop and implement water security improvement measures;</li> <li>o Increase use of re-use of effluent to minimise use of potable water supply;</li> <li>o Increase capacity of HSP; demand management measures.</li> </ul>	Highly beneficial	HIGH		Director Utilities	
REI3	An increase in rainfall intensity may lead to increased operational resourcing to reduce asset damage repairs and constant infrastructure maintenance	High	<ul style="list-style-type: none"> <li>o Continual infrastructure asset improvement;</li> <li>o Continue to implement gradual bridge replacement program;</li> <li>o Additional improvement works program for roads</li> </ul>	Highly beneficial	HIGH		Director Utilities ; Director Operations	
RAI4	An increase in rainfall intensity may impact on the standard and safety of sporting fields	High	<ul style="list-style-type: none"> <li>o Improve design for new assets with better drainage.</li> <li>o Preventative closing of sporting fields (proactive)</li> </ul>	Highly beneficial	LOW		Director Operations	

ID	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
			<ul style="list-style-type: none"> <li>o Sporting Facilities Policy completed</li> </ul>					
RAI5	An increase in rainfall intensity may cause significant increase in public safety risks via asset damage	EXREME	<ul style="list-style-type: none"> <li>o Updating stormwater infrastructure;</li> <li>o Continue to implement gradual bridge replacement program;</li> <li>o Additional improvement works program for roads;</li> <li>o Continue public notification and education.</li> </ul>	Highly beneficial	MEDIUM		Director Operations	
RDE6	There is a risk that the changes in rainfall pattern may adversely impact on the natural environment	High	<ul style="list-style-type: none"> <li>o Make adjustment to the selection criteria of plants;</li> <li>o Continue to update plans of management to consider climate change risk of increased average temperature;</li> <li>o Engage with State Govt on research and management methods</li> </ul>	Some Benefit (reduces likelihood)	HIGH		Director Planning & Environment; Director Corporate & Community Services; Director Operations	

## FIRE WEATHER

ID	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
FWEI1	There is a risk that an increase in fire weather days could lead increased risk of damage to Council infrastructure and assets	High	<ul style="list-style-type: none"> <li>○ Continue to implement hazard reduction activities in land under the management and control of Council;</li> <li>○ Continued liaison with emergency services (RFS) regarding fire reduction programs and strategies</li> </ul>	Highly beneficial	MEDIUM		Director Operations	
FWAD3	There is a risk that an increase in fire weather days could lead increased risk to safety of the community, including loss of property	High	<ul style="list-style-type: none"> <li>○ Implement fire danger warning notification regarding the use of community facilities in high fire risk areas;</li> <li>○ Implement fire education program via RFS fire liaison meetings and other appropriate avenues</li> <li>○ Evacuation/Emergency Centre preparation/plan.</li> </ul>	Mostly beneficial (reduces consequence)	HIGH		Director Operations	
FWDD4	There is a risk that an increase in fire weather days could lead adverse impact on the natural environment	High	<ul style="list-style-type: none"> <li>○ Review plans of management to consider impact of climate change risk.</li> <li>○ Develop Bushfire Strategy in conjunction with the RFS</li> </ul>	Some Benefit (reduces likelihood)	HIGH		Director Operations & Director Planning & Environment	

## WIND

ID	Risk Statement	Rating	Proposed Adaptation Initiative	Effectiveness	Residual Rating	Actions to implement Initiative	Accountability	Timeframe (end date or milestones)
FWEI1	There is a risk that greater occurrence of extreme winds will result in more severe infrastructure damage	Medium	<ul style="list-style-type: none"> <li>Ensure adequate clearance around building assets,</li> <li>Continued asset and maintenance /inspection;</li> </ul>	Highly beneficial	LOW		Director Operations	
FWAD2	There is a risk that greater occurrence of extreme winds resulting in personal	High	<ul style="list-style-type: none"> <li>Continue asset management and effective tree management through inspections and proactive maintenance programs</li> </ul>	Highly beneficial	MEDIUM		Director Operations	
FWEI3	There is a risk that there may be an increased interruption to essential services resulting in impact on council operations	High	<ul style="list-style-type: none"> <li>Review and update Business continuity plan;</li> <li>Ensure timely access to alternate power source</li> <li>Ensure there is adequate clearance of trees around building assets;</li> <li><i>Prepare and relocate assets ahead of weather event to mitigate loss</i></li> <li>Ensure continued implementation of asset maintenance /inspection program</li> </ul>	Highly beneficial	MEDIUM		Director Operations; Director Utilities	



# APPENDICES

## APPENDIX 1 – RISK 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 2 – RISK CONSEQUENCE DESCRIPTORS

Success Criteria	Consequence Rating				
	Insignificant	Minor	Moderate	Major	Catastrophic
<b>A</b> 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>B</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
<b>C</b> Protect existing community structures and the lifestyle enjoyed by the people of the region	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
<b>D</b> 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
<b>E</b> 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 – RISK MATRIX

Risk evaluation matrix used in the 2019 Risk assessment and analysis.

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

<b>EXTREME</b>	<b>Extreme</b> 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.
<b>HIGH</b>	<b>High</b> 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.
<b>MEDIUM</b>	<b>Medium</b> 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.
<b>LOW</b>	<b>Low</b> risks will be part of routine operations and expected to be managed by existing controls.

## APPENDIX 4 – TOTAL CLIMATE CHANGE RISK ASSESSMENT RESULTS

### TEMPERATURE

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
TCI1	Due to the projected increase in average annual ambient temperature, there is a risk that areas surrounding Council assets and public open spaces will become much hotter and there may be a need to increase the number of shade structures thru trees/other structures	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High
TCI2	As a result of the projected increase in average temperature there is a risk that there could be an increased demand for and load on air conditioning systems within Council buildings i.e. loss of a/Cond efficiency and/or a/Cond failure	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Insignificant	Medium
TCI3	Due to the projected increase in average ambient temperature visitation/usage rates at Council sporting fields may increase resulting in a need to provide council infrastructure such as lighting at sporting ovals for longer and more frequent occasions	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TCI4	A potential flow on consequence resulting from the projected increase in average temperature is that Council could be faced with increased demand on pool facilities (e.g. increased chemical dosing, extended season and opening hours)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Insignificant	Medium
TCI5	There is a risk that an increase in average temperature may see Council faced with an increased demand for potable water and increased water quality monitoring and reporting requirements	Protect Community Structures and Lifestyle	Infrastructure & Assets	Almost Certain	Minor	High
TAI6	There is a risk that the projected Increased temperatures may cause increased algal blooms with adverse flow on effects on water quality treatment and monitoring	Maintain Public Safety	Infrastructure & Assets	Likely	Major	High

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
TDE7	An increase in temperature may cause a change in local ecology (e.g. change of profile of pests and weeds and threat to endangered species of plants and animals)	Physical and Natural Environment	Environment Management & Protection	Likely	Minor	Medium
TCI8	There is a risk that higher evaporation rates caused by the increase in average temperature will impact on river flows and subsequently reduce secure yield water supplies	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
TECS9	There is a risk that as a result of the projected increase in average temperature there could be increased incidence of heat stress/fatigue amongst Councils outdoor staff	Sound Public Administration and Governance	Corporate Services	Likely	Minor	Medium
TDI10	There is a risk that the increase in average temperatures will increase the demand on energy supply and cost and lead to increased occurrences of blackouts or brownouts	Physical and Natural Environment	Infrastructure & Assets	Possible	Minor	Medium
TBC11	There is a risk that an increase in average temperatures could impact on the region's agriculture and subsequently on the economy	Protect and Enhance Local Economy	Community Services	Likely	Minor	Medium
TCI12	There is a risk that an increase in average temperatures could cause faster degradation of infrastructure (consider new materials)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Minor	Medium

## HOT DAYS

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
HDAC1	There is a risk that an increase in hot days would impact on public safety (in particular the vulnerable) placing increased demand on public facilities usage and need for longer opening during the hot days to provide relief	Maintain Public Safety	Community Services	Likely	Moderate	High
HDCC2	There is a risk that an increase in hot days would cause some community events or activities to be postponed or ceased as public facilities become unusable due to being rendered unacceptable for use in hot days	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
HDECS3	There is a risk that an increase in hot days could impact on the outdoor workforce work schedule due to heat conditions	Sound Public Administration and Governance	Corporate Services	Likely	Moderate	High
HDAI4	There is a risk that an increase in hot days could cause more incidences of black outs or brown outs during the demand on energy leading to the interruption of business operations (water supply and sewerage services) for extended periods	Maintain Public Safety	Infrastructure & Assets	Likely	Minor	Medium

## RAINFALL

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
RCI1	There is a risk that as a result of projected rainfall patterns it could impact on river flows and subsequently result in a reduction of secure yield water supply sources within the LGA	Protect Community Structures and Lifestyle	Infrastructure & Assets	Possible	Moderate	High
RCI2	There is a risk that intense rain periods increasing in frequency as detailed in the scenario would cause more frequent and more severe damage to roads infrastructure. (Road Surface)	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Moderate	Medium
RCI3	There is a risk that as a result of an increase of intense rainfall events existing urban drainage infrastructure capacity will be surpassed with greater frequency and intensity	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RCI4	There is a risk that there could be an overload of the sewerage pumping stations due to storm water intrusion causing surcharge	Protect Community Structures and Lifestyle	Infrastructure & Assets	Unlikely	Minor	Low
RAI5	There is a risk that as a result of an increase in intense rainfall events that localised river flooding could occur more frequently leading to unsafe public areas	Maintain Public Safety	Infrastructure & Assets	Possible	Insignificant	Low
RAL6	There is a risk that flood plans and development control guidelines may become outdated given the predicted higher instances of intense rainfall events within the Local Government Area	Maintain Public Safety	Land-use Planning & Development	Possible	Minor	Medium
RECS7	There is a risk that there could be increased levels of litigation claims from property owners as a result of inappropriate drainage infrastructure	Sound Public Administration and Governance	Corporate Services	Possible	Minor	Medium
RED8	There is a risk that as a result of an increase in intense rainfall events and localised flooding, the damage to Council infrastructure may not meet the threshold for Natural Disaster Declaration or	Sound Public Administration and Governance	Emergency Management &	Possible	Minor	Medium



RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
	that State & Federal Government may withdraw disaster funding and Council would bear the costs for repairs/replacement of assets/ infrastructure themselves		Natural Disaster Preparedness			
RCI9	There is a risk of increased turbidity and poor source water quality following intense rainfall events	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RCC10	There is a risk that intense rain events could continue to flood roads and bridges and isolate communities known to become cut off	Protect Community Structures and Lifestyle	Community Services	Possible	Minor	Medium
RDI11	There is a risk that lack of rainfall could impact on road infrastructure function and maintenance (water is required to grade roads)	Physical and Natural Environment	Infrastructure & Assets	Unlikely	Insignificant	Low
RCI12	There is a risk that lack of rainfall could lead to an increased demand on town water supply; in particular villages outside Goulburn Mulwaree	Protect Community Structures and Lifestyle	Infrastructure & Assets	Likely	Minor	Medium
RBCS13	There is a risk that a reduction in rainfall could impact on the region's agriculture and impact subsequently on economy	Protect and Enhance Local Economy	Corporate Services	Likely	Minor	Medium

## FIRE WEATHER

RISK ID	RISK IMPACT DESCRIPTION	IMPACTED CRITERION	FUNCTIONAL AREA	LIKELIHOOD	CONSEQUENCE	RISK RATING
FWED1	There is a risk that as a result of an increase in fire events Council's contribution to RFS expenses may increase (Strategic Planning Consideration)	Sound Public Administration and Governance	Emergency Management & Natural Disaster Preparedness	Possible	Insignificant	Low
FWAD2	There is a risk that public safety could be in jeopardy in areas which are under Councils care and/or control during on the days where the FFDI is >50	Maintain Public Safety	Emergency Management & Natural Disaster Preparedness	Rare	Major	Medium
FWAI3	There is a risk of an increased likelihood of uncontrolled wild fire damaging critical infrastructure ( electricity sub stations, telecommunications exchanges, water and sewerage infrastructure)across the LGA impacting on the services to the community	Maintain Public Safety	Infrastructure & Assets	Unlikely	Moderate	Medium
FWAE4	There is a risk that an increase in Fire weather days could lead to increased fuel levels and risk of wild fire impacting on public safety including isolation of communities, damage to infrastructure and the economy	Maintain Public Safety	Environment Management & Protection	Possible	Moderate	High

## APPENDIX 6 – RISK ASSESSMENT IMPACT MATRIX

### Scenario for Temperature (T)

Temperature Risk Impact Matrix							
T		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	(E)	(CS)	(L)	(D)	(C)
A	Maintain public safety	X					
B	Protect and enhance the local economy						
C	Protect existing community structures and the lifestyle enjoyed by the people of the region	X					
D	Sustain and enhance the physical and natural environment		X				
E	Ensure sound public administration and governance	X					X

## Scenario for Hot Days (HD)

Hot Days Risk Impact Matrix (HD)							
HD		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	(E)	(CS)	(L)	(D)	(C)
<b>A</b>	Maintain public safety	<b>X</b>					
<b>B</b>	Protect and enhance the local economy						
<b>C</b>	Protect existing community structures and the lifestyle enjoyed by the people of the region						<b>X</b>
<b>D</b>	Sustain and enhance the physical and natural environment						
<b>E</b>	Ensure sound public administration and governance						<b>X</b>

## Scenario for Rainfall (R)

Rainfall Risk Impact Matrix (R)							
R		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	(E)	(CS)	(L)	(D)	(C)
A	Maintain public safety	X					
B	Protect and enhance the local economy						
C	Protect existing community structures and the lifestyle enjoyed by the people of the region						
D	Sustain and enhance the physical and natural environment		X				
E	Ensure sound public administration and governance	X					

## Scenario for Fire Weather (FW)

Fire Weather Impact Matrix (FW)							
FW		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	(E)	(CS)	(L)	(D)	(C)
<b>A</b>	Maintain public safety					<b>X</b>	
<b>B</b>	Protect and enhance the local economy						
<b>C</b>	Protect existing community structures and the lifestyle enjoyed by the people of the region						
<b>D</b>	Sustain and enhance the physical and natural environment					<b>X</b>	
<b>E</b>	Ensure sound public administration and governance	<b>X</b>					

## Scenario for Wind (W)

Wind Impact Matrix (W)							
FW		Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
		(I)	(E)	(CS)	(L)	(D)	(C)
A	Maintain public safety					X	
B	Protect and enhance the local economy						
C	Protect existing community structures and the lifestyle enjoyed by the people of the region						
D	Sustain and enhance the physical and natural environment						
E	Ensure sound public administration and governance	X					



## APPENDIX 7 – GOULBURN MULWAREE COUNCIL FUNCTIONAL AREA DISTRIBUTION

	Infrastructure and Assets	Environment Management & Protection	Community Services	Land-use Planning and Development	Emergency Management & Natural Disaster Preparedness	Corporate Services
	(I)	(E)	(CS)	(L)	(D)	(C)
Directorate	Assets & Infrastructure	Planning & Environmental Services	Planning & Environmental Services	Planning & Environmental Services	Assets & Infrastructure	General Manager
Department	Roads & Bridges; RMS Contract works; Quarries; Project Design and Mgt; GIS & Tech Services; Water Supply; Sewerage Services, Asset Mgt Stormwater and Flood Management; Parks Gardens and Cemeteries; Facilities Maintenance; Plant Fleet & Depots; Aquatic Centre Mgt	Regulatory; Building control compliance;	Community Relations; Community & Cultural; Economic Development; Tourism	Land Management; Planning; Environmental; Waste Mgt; Inspections;	Emergency services;	Policy development; Finances; Rates and charges; Human Resources; Media Relations; Governance Crown Reserves;

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