Logan City Council
Local Disaster Management Plan
All Hazards Risk Assessment Report
August 2019
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Executive summary

This report has been compiled to provide an overview of the process, background reference material, preparation and results of the All Hazards Risk Assessment review facilitated by GHD for Logan City Council (LCC). The content of the report sections and appendices are summarised under each heading below.

Section 1.0. Introduction
The introduction provides a brief background of the scope for the project and details the risks identified and considered by LCC.

Section 2.0. Background
Provides some background information on the legislative context of the risk assessment process under the relevant Act, includes some relevant local characteristics, and introduces the different hazard subject matter representatives present during the Workshop and the leadership roles during hazard preparedness and response.

Section 3.0. Results
Provides a detailed breakdown of each identified hazard including the description, likelihood, consequence and overall residual risk rating, identified seasonally where time of year is a factor an analysis of the decision making summary of results for each risk in terms of risk as detailed in the Hazard Risk Register (HRR) This has been conducted using the AS/NZS/ISO 31000:2009 – Risk Management Standard and the National Emergency Risk Assessment Guidelines (NERAG).

Section 4.0. Risk Score Comparison to 2017 Assessment
Presents the risk assessment results and risk rating scores in a monthly summary for each hazard.

Section 5.0. Monthly Risk Charts
Presents the risk assessment results and risk rating scores in a monthly summary for each hazard.

Section 6.0 Queensland Emergency Risk Management Framework (QERMF)
The risk assessment was translated into the recently introduced Queensland Emergency Risk Management Framework (QERMF). The process is introduced, and the outcomes and key issues are identified, and discussed. Climate change impacts affecting the risk assessment are addressed.

Appendix A – Hazard Risk Assessment
Results for each risk are presented in a ‘reader-friendly’ format for use by Council to communicate the results of the assessment. The pages present the identified hazards, consequence scores, likelihood scores, risk scoring matrices, and the results for each risk presented graphically for residual risk ratings throughout the year.
Appendix B – Risk Register

The full risk register for each risk is included. These are the most detailed records of the assessment process. These were used as working documents for the process, including the assessment workshops. Contents of the registers include:

- Risk descriptor (summarised from the hazard definitions in Appendix C, immediate and strategic impacts on people, the environment, the economy, governance, social and community, and infrastructure. Any locations more susceptible to impact were also identified.
- Existing controls in place to both prevent and prepare for the impact, and respond and recover from an event. Comments are also supplied regarding the effectiveness of existing controls
- Current (residual) risk ratings in terms of consequence, likelihood and risk rating as per the risk scoring matrices in Appendix D. Seasonal variations affecting likelihood of an event are also noted.
- Possible risk reduction measures are listed. These are not confirmed action plans, but rather a brainstormed list of options, often derived from the identified gaps in the effectiveness of existing risk controls as well as fresh ideas for improvement.
- Any other comments that demonstrate to future reviewers what key scenarios and issues were in the forefront of the assessor’s minds during the workshop.

Appendix C – Hazard Definitions

The definitions for each identified hazard are listed as detailed and agreed prior to the assessment.

Appendix D – Risk Scoring Matrices

As per the AS/NZS/ISO 31000 standard, the risk context was established and a set of likelihood, consequence and risk rating matrices were developed in 2017 to establish a consistent basis for scoring the natural hazard risks. The Queensland Emergency Risk Framework (QERMF) Guideline has been used to adapt these further in terms of consequence and likelihood descriptors for this review.

Appendix E – Program for All Hazard Risk Assessment Workshop

The program is a document provided in advance of the workshop detailing the project and workshop overview, attendees, syndicate groups where applicable, workshop agenda and location.

Appendix F – Workshop Attendance Register

A copy of the attendance register is attached recording who attended the workshop, their names and roles.
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Appendix F AHRW Attendance Sheet
1. Introduction

GHD Pty Ltd (GHD) has been engaged by Logan City Council (LCC) to undertake a review of the Hazard Risk Assessment (HRA) in response to the amendments of the Disaster Management Act 2003 (the Act) which forms the legislative basis for disaster management activities within all levels of Government in Queensland. The HRA was originally undertaken in 2017 and utilised the processes of both the ISO 31000:2009 – Risk Management, and the National Emergency Risk Assessment Guidelines (NERAG) to establish the context, identify the risks, analyse the risks and evaluate the risks for each identified hazard.

For this 2019 review, the newly introduced Queensland Emergency Risk Management Framework (QERMF) has been applied, and this has required some adjustment to the HRA process, including hazard identification, consequence and likelihood criteria. Queensland Fire and Emergency Services (QFES) provided considerable assistance to GHD and LCC throughout this review.

Accordingly the list of hazards has been rationalised from the previous assessment to the following:

1. Severe Weather 1A Severe Storm, 1B Tropical Cyclone, 1C East Coast Low
2. Earthquake
3. Bushfire (Rural/Urban)
4. Heatwave
5. Major Urban Accident, Urban/Industrial Fire & Hazardous Material Event
7. Terrorism
8. Flash Flooding from Severe Thunderstorm
2. **Background**

2.1 **Legislative Context**

Under the Disaster Management Act 2003 Logan City Council is responsible for coordination and management of disaster and emergency events in its local government area, supported by the State through the Local Disaster Management Group (LDMG).

Under the Act, LCC must:

1. Establish a local disaster management group
2. Develop and approve a local disaster management plan
3. Have a disaster response capability
4. Develop a comprehensive approach to disaster management – Prevention/Preparation/Response and Recovery
5. Lead and facilitate local recovery

The Risk Register tables and Risk Assessment tool produced for and summarized within this report are the results of LCC responding to and meeting the requirements of the Act.

2.2 **Cooperative Leadership**

Key representatives from numerous agencies have provided input and experience during the review workshop and development of the overall hazard identification and risk assessment process. These include:

- GHD representatives
- Logan City Council and local disaster management representatives
- Utilities representatives (Logan Water, Energex and APA)
- State government agencies including Queensland Ambulance Service, Queensland Fire and Emergency Services, Queensland Police Service, Queensland Health, Queensland Department of Transport and Main Roads, Queensland Department of Agriculture and Fisheries – Biosecurity Queensland
- Red Cross
3. Hazards and Risk Assessment Results

A Hazard Risk Assessment Workshop (HRAW) was undertaken on 9 May 2019 between GHD, LCC and a range of principal stakeholders from the LDMG and supporting agencies to supplement local knowledge and experience. The purpose of the HRAW was to review, analyse and evaluate the key hazards identified by the NERAG process, as well as identify process gaps and opportunities for future risk reduction measures. The end product of the HRAW was a complete Risk Register which feeds directly into the Hazard Risk Assessment (HRA) and the Queensland Emergency Risk Management Framework (QERMF).

The following sections provide a summary of the results of the HRAW, with detailed results provided in the Risk Assessment (Appendix A) and Risk Register (Appendix B).

As described in the following section, the likelihood of a particular event may be seasonal, where the potential for a hazard to occur fluctuates up or down at different times of the year; or constant. Where the likelihood is seasonal, a discussion of the reasons for this has been provided as well as references to any supporting documentation (a full list of which can be found in Appendix E). The consequence of each hazard was discussed and agreed upon, and has been applied constantly over all months.

Detailed hazard likelihood, consequence and risk rating matrices can be viewed in Appendix D. For reference during the following summary of results section, provided here is the scoring matrix used to determine the overall risk score.
3.1 **Severe Weather Events – (A) Severe Storm, (B) Tropical Cyclone & (C) East Coast Low**

While encompassing similar weather systems and potential impacts, the three types of severe weather events discussed here can still vary in terms of the specific consequences and the times of year they are more likely to occur.

### 3.1.1 Hazard Description and Impacts

Severe weather covers three main types of events, outlined in the risk register and hazard assessment process, and include for the purpose of this hazard assessment:

A. **Severe storms**: More intense than normal thunderstorms, potentially causing significant localised damage. A severe thunderstorm produces any of the following:
   - Large hail ($\geq 2$ cm)
   - Wind gusts of 90 km/h or more
   - Very heavy rain that may lead to landslides and flash flooding (refer risk 8)
   - Tornadoes

B. **Tropical cyclones**: defined as a non-frontal low pressure system of synoptic scale developing over warm waters having organised convection and a maximum mean wind speed of 34 knots or greater extending more than half-way around near the centre and persisting for at least six hours.

C. **East coast lows (ECL)**: intense low pressure systems that occur off the eastern coast of Australia, in particular southeast Queensland, New South Wales, far eastern Victoria, and sometimes Tasmania. Can develop from ex-tropical cyclones as they decay and move south (during summer). Can also occur develop rapidly offshore within existing low pressure troughs at other times of the year. ECLs can produce:
   - Gale or storm force winds, even the occasional tornado
   - Heavy, widespread rainfall

Due to the slow moving (or even near-stationary) nature of ECL, these effects often last much longer than normal low pressure systems or cold fronts.

In general, severe weather events are likely to impact the Logan City community in the following ways:

- Short term displacement / homelessness and requirements for emergency accommodation
- Possibility of injury from fallen power lines and underground power, the potential loss of power for life support and emergency medical supply which may also cause food spoilage and impact the health of people on home ventilation/dialysis
- Presence of debris
- Injury to members of the community and those assisting
- Impact of power and communication loss especially on the aged, disabled and critical services i.e. hospitals
- People providing services are cut off from those with needs
- Enduring social and emotional impacts on mental health
- Degraded provision of essential and community services
- Hygiene impacts from human and social waste
- Swift water risks when event is significant
- Environmental impacts including tree damage, damage to creek banks, impact of vegetation on restricting flood waters (legislation restrictions), some destruction of fauna and flora, diminished landscape and natural amenity, reduced biodiversity
- Flooding and/or flash flooding
- Run off and siltation
- Erosion
- Destruction of pastoral land, food and seed stock, agriculture (crop loss), general industry and commercial activity
- Impact of economic loss on the community and service providers post event
- Business continuity impacts through short term business closures

### 3.1.2 Existing Controls

Preventive and preparedness controls:

- Power, communications and utilities (water & gas) providers are keeping systems well maintained and protected through maintenance/annual planning/redundancy/continuity
- Water and Energex have priority customer lists for high risk people.
- Council implementing evacuation measures in place for flood prone communities (especially high risk patients)
- Differentiation between shelters (short term) and evacuation centres (long term), with public educated when needed.
- East Coast Low short warning period (<24 hours) and the event continually monitored and tracked (intensity and direction)
- Reliance on communication and the ability to operate remotely for utilities, and for some core council functions
- A dedicated, cyclone rated evacuation centre is available (DM)
- Generators for water supply and wastewater are available at major stations, and have telemetry
- The online Disaster Dashboard is available for detailing critical information and is updated regularly
- Council has the ability to update the DTMR website regarding road closures
- Council is able to work with DTMR to coordinate and integrate road closures
- A comprehensive and rehearsed Local Disaster Management Plan exists
- There is a commitment to active Counter Disaster Planning
- SES and Volunteer Marine Rescue teams are well educated, trained and equipped, SES flood boats
- QFES swift water training and operators
- QFES motorised craft
• QFES media campaigns – e.g. “If it’s flooded forget it”
• Council depots are prepared and response plans are in place for operational work units e.g. Parks.
• Appropriate education and consultation pre-storm seasons takes place
• A Catchment Management Plan (river) is being developed
• A Bank Vegetation Management Plan (E+S) exists
• A Council Planning Scheme exists
• A small supply of emergency equipment/generators is available however deployment has been identified as an issue
• Key agencies have been consulted about their disaster mitigation plans at the Local Disaster Management Group level
• Building codes and regulations are mandatory
• Early warning systems of natural disasters are in place including BoM early radio warning, the online Disaster Dashboard, the Logan early warning system, and the BoM app
• Access to situational and awareness platform
• Wet season approach including essential services and requirements
• Tree clearing near power lines program
• Database of backup generator locations

Response and recovery controls:
• Council has an understanding of and familiarity with insurance, emergency response and Federal & State Government Assistance, however understanding in the community of these is low
• The Vegetation Management Policy (Utilities) has a tree clearing program
• Community education programmes are in place
• Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
• Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available

3.1.3 Hazard Risk Assessment

Consequence:
It was determined that the severity of Weather Events for the purpose of this exercise was Moderate. This consequence rating is applied to all three described weather events.

Likelihood:
The likelihood of a severe weather event impacting on the Logan City area differs for the specific type of event, as well as fluctuating seasonally.

The following Annual Exceedance Probability (AEP) figures were provided for each of the weather types. However, there was no indication of the severity of these, but is assumed that
the severity of these ‘nearly annual’ events (for thunderstorms and East Coast Lows) would include those of minor and insignificant consequence.

- Severe Thunderstorm 91%
- East Coast Low 88%
- Tropical Cyclone 3%

Severe Storms resulting in Moderate consequences are Likely between September and March (Queensland storm season), and Possible at other times of the year.

Tropical Cyclones resulting in Moderate consequences are Likely between November and April, and Unlikely at other times of the year.

East Coast Lows resulting in Moderate consequences were deemed to be Likely between May and August, while being Unlikely during the rest of the year.

**Overall residual risk rating:**

Based on the above likelihood and consequence ratings, the overall risk rating scores for the three types of Severe Weather are given below.

Severe Storms were determined to be Medium – 48 September through to March, and Low – 27 between April and August.

Tropical Cyclones rated Medium – 48 November to April, and Low – 27 between May and October.

East Coast Lows rated Medium – 48 between May and August, and Low – 27 between September and April.

**Variance from previous assessment:**

The consequence level was raised to Moderate, which is less likely to occur than the previously considered Minor consequence scenario. Overall, this resulted in an increased risk level.
3.2 Earthquake

3.2.1 Hazard Description and Impacts

An earthquake is the shaking and vibration at the surface of the Earth caused by rocks breaking under stress underground at regions called fault planes. In Australia, earthquakes are usually caused by underground movement along a fault plane as a result of compression in the Earth’s crust. The size of earthquakes is determined by measuring the amplitude of the seismic waves recorded on a seismograph. A formula is applied to these which converts them to a magnitude scale, a measure of the energy released by the earthquake. For the purposes of this risk assessment, the provided Earthquake AEP calculations were Richter Scale Magnitude 5.35 - 0.35%, and Magnitude 6.05 – 0.06%

Locations where an earthquake occurs and is more likely to impact on susceptible or vulnerable communities are:

- Southern Council area adjacent to Gold Coast Hinterland
- Mount Lindsay Highway
- Waterford Tambourine Road
- Motorway infrastructure
- QR rail line (Brisbane / Gold Coast rail line)

3.2.2 Existing Controls

Preventive and preparedness controls:

- National and international monitoring and alert systems (USGS, Geoscience Australia etc.) are in place, however this is not a local responsibility
- Appropriate avenues for the communication of risks through media exist
- Building regulations and codes have been considered (AS1170.4 Structural Design Actions, Part 4 Earthquake Actions in Australia)
- Integrated Disaster Management arrangements have been made as part of the LDMG
- Land use controls are in place (LCC Planning Overlay 8.2.8 Landslide hazard and steep slope overlay code)
- Specific studies have been undertaken (Landslide Hazard Assessment Report for the City of the Logan City Council – SMEC 2011)
- Business Continuity Planning is an ongoing process with risk and insurance
- Disaster Management and Emergency Management arrangements have been made via Disaster Management Act 2003 and Queensland Prevention, Preparedness, Response and Recovery Disaster Management Guideline (the Guideline)
- There is a comprehensive Local Disaster Management Plan and supporting plans including Evacuation plan and Community Engagement Framework
- Inter-agency relationships exist
- Evacuation Plans have been created and Evacuation Centres are capable
- Contributing conditions (heavy rainfall) are monitored in response only
- AGSO studies and analysis; building regulations and codes have been considered
- The Department of Transport and Main Roads have existing protocols to monitor and assess cut slopes and embankment on their network (including Pacific Motorway)
Queensland Motorways Limited responsible for Gateway Motorway and Logan Motorway and have existing protocols for monitoring and assessing cut slopes and embankments on their network.

Response and recovery controls:

- Emergency service support is available
- Local services (medical clinics, hospitals, psychology services and Salvation Army and Red Cross) are available
- Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs are available
- National and International aid programs are available
- The Local Recovery Group (LRG) is aware of and considers available activities and resources to assist environmental recovery through the LRG
- Government relief initiatives (tax breaks) are available SDRA
- Mutual support exists between regions and districts if required (additional Police, SES crews etc.)
- Full time and volunteer organisations (SES, Surf Lifesaving, Marine Rescue, etc.) are well trained
- Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
- Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available
- Resources to be allocated (LDCC) for the protection of priority infrastructure LDCC/LDMG if a priority
- Business Continuity Plans can be activated by infrastructure owners and operators

3.2.3 Hazard Risk Assessment

Likelihood:
The likelihood of an Earthquake occurring within the Logan City area was determined to be Rare. This is due to a lack of significant geological activity or fault lines occurring in the City boundaries. Due to their largely random nature, earthquakes are almost impossible to predict and there is no defined ‘season’ for them to occur, which means this likelihood is consistent over the whole year.

Consequence:
The potential impacts of an earthquake in the Logan City area were decided to be Moderate.

Overall residual risk rating:
Based on the above likelihood and consequence ratings, the overall risk rating score for earthquakes was determined to be Low – 33. As discussed, this score is consistent over the entire year.

Variance from previous assessment:
This represents a slight increase from the previous assessment. This is directly due to the fact that the ‘Improbable’ category of likelihood is not represented in the QERMF tool, so the lowest available category ‘Rare’ was selected instead.
3.3 Bushfire (Urban/Rural)

3.3.1 Hazard Description and Impacts

A bushfire is a general term used to describe a fire in vegetation including grass, forest and scrub fires causing significant damage within the region requiring external resources to control and that has significant impact on people, infrastructure, the environment and economy.

Impacts of bushfires which have been considered in this assessment include:

- Loss of life and serious injury
- People unwilling to leave the area
- Loss of ecosystems
- State Planning Policy – introduction of weeds and pests
- Increased erosion
- Increased runoff and decreased water quality issues
- Major infrastructure concerns for power and water supplies
- Impact on trade due to road closures due to fire and smoke
- Disruption to emergency services
- NBN/internet
- Weed proliferation
- Disease from dead animals

Additionally, the following locations and community groups have been identified as being vulnerable or more susceptible to a bushfire event:

- Special fire protection purpose buildings (such as schools, nursing homes, health facilities, hospitals, day care)
- Areas adjoining Greenbank Military Area
- Jimboomba, where roads clog
- Areas of development
- Areas of high risk with one way in and one way out
- On eastern side of motorway (M1) threatened vine species and melaleuca ivbyana and gossia gonclada
- Different language groups

3.3.2 Existing Controls

Preventive and preparedness controls:

- Residents living within or adjacent to bushfire hazard aware of the steps they need to take to mitigate their bushfire risk (in a shared responsibility approach)
- Active Local Disaster Management Plan with rehearsals as well as public education on risks and expected actions
- Responsibility taken for fuel monitoring (National Parks & forest conservation, Council controlled land, private land holders)
• Ignition sources managed (fire weather warnings, fire bans & stats of fire emergency fire, permit to burn and area closures)
• The major State agencies understand their bushfire risk mitigation responsibilities
• Council has a Bushfire Risk Overlay in the Planning Scheme
• Fire breaks and other mitigation strategies are present around residential property, subdivisions and outbuildings
• Vegetation management strategies (fire breaks and trails, I-zones) are in place
• QFES risk assessments and data is available
• Community Education programs (QFES schools)
• ABC radio/ media-local televised news accessible
• Local power company- summer preparedness and planning other natural area Council, fire resources from QPWS
• Nursing homes plans in place but not concrete, potential for confusion in an event. Use of bus companies
• Council maps do not reflect potential hazard (based on satellite, vegetation type, slope, LIDAR (not always reliable) e.g. Karawatha, and do not identify potential fire sources e.g. Greenbank Military
• More communications between council departments on each department’s role
• Animal Management Disaster plan to locate livestock and domestic pets and mitigate loss

Response and recovery controls:
• Local Recovery Group established
• Fire adequately managed (fire detection and reporting, convectional response resources, aerial attack, fire weather and incident management)
• Insurances available
• Federal & State Government Assistance available
• QFES resources available
• Local government (Council) QPS QPWS resources available
• Local power company (disconnect and reconnect)
• Telecommunications carriers capable of repair and temporary mobile phone tower capabilities
• Council LDMG/ QFES/ Department of Communities, Disability Services and Seniors resources available
• Community has access to, and know where to seek, emergency information (phone, text, ABC local radio, TV, internet)
• Communication channels with fire crews on ground
• Rural Fire Services Queensland (RFSQ), supported by SES teams and other agencies, well educated, trained and equipped
• Fire Service prioritise what to protect during an event e.g. Core industry may have priority over homes
• Priority order: 1) Life 2) Property 3) Agriculture 4) Environment

• Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)

• Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available

### 3.3.3 Hazard Risk Assessment

**Likelihood:**

Outbreaks of bushfire are more likely to occur during the drier September to December months, particularly if high amounts of vegetation growth has preceded. The likelihood of a bushfire occurring during these periods was determined to be **Possible** for September and October, increasing to **Likely** during November and December, and back to **Possible** in January (in the event of a late monsoon season producing a greater fuel load). For the months February to August, the likelihood was determined to be **Unlikely**.

The provided AEP for a bushfire was 86%, i.e. almost certain to occur annually, but this was considered to be a figure covering every minor occurrence, so the scenario of a more severe bushfire occurring every 10 years was selected as the most realistic scenario, especially considering climate change projections for heat levels, even in the next 15 years.

**Consequence:**

The potential impacts of a bushfire in the Logan City area were determined to be **Major**.

**Overall residual risk rating:**

Based on the above likelihood and consequence ratings, the overall risk rating score for bushfires increases from **Medium – 60** between February and August, to **High – 72** for September, October and January, and is ranked **High – 75** for November and December.

**Variance from previous assessment:**

This represents a significant increase in risk level from previous, and takes into consideration the climate projections presented.
3.4 Heatwave

3.4.1 Hazard Description and Impacts

Heatwaves are described as being a prolonged period of excessive heat resulting in a significant increase in mortality rates, degraded infrastructure assurance and health system pressures.

A heatwave is defined by the Bureau of Meteorology (BoM) as “three or more days of high maximum and minimum temperatures that are unusual for that location.” Heatwaves are calculated using the forecast maximum and minimum temperatures for the next three days, compared to both actual temperatures over the previous 30 days and to the ‘normal’ temperatures expected for that location.

It is noted that with climate change projections, the ‘expected temperatures’ are expected to rise, as well as the frequency of heatwave conditions exceeding these increased temperatures. The QFES Queensland State Heatwave Risk Assessment (2019) provides significant detail around this hazard.

Queensland Health currently defines a heatwave as temperatures exceeding 36 degrees for a period exceeding 2 days. This unusual and uncomfortable hot weather can impact on human and animal health and cause disruption to community infrastructure such as power supply, public transport and services.

Heatwaves are more likely to impact on isolated, vulnerable sections of the community where access to help and medical support might be limited or not readily available.

3.4.2 Existing Controls

Preventive and preparedness controls:

- Power/communications providers keeping systems well maintained and protected
- School closure protocols for extreme temperatures
- Emergency resources such as power supply (generators) for essential services (water treatment, hospitals and wastewater pump station etc.) pre-positioned
- Potable water supply is mostly gravity fed – supply would be adequate for 3-4 days.
- Bushland management of 3 layers of vegetation for wildlife

Response and recovery controls:

- Response protocols adhered to:
  - >36 degrees public services and schools when air conditioners fail
  - >40 degrees BoM mark for extreme temperature initiating community resilience plan and heat policy for outdoor staff
  - >44 degrees initiates LDMG processes regarding awareness/communication
- Community health nurses available
- Resources available through emergency service organisations
- Local services (medical clinics, hospitals) available
- Mutual support between regions and districts if required (additional Police and SES crews etc.)
- Full time and volunteer organisations (SES, etc.) well trained
• Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
• Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available
• Resources to be allocated (LDCC) for the protection of priority infrastructure

3.4.3 Hazard Risk Assessment

Likelihood:
The AEPs provided for Logan were as follows:
• Severe Heatwave 88%
• Extreme Heatwave 78%

Expected annual days of heatwave in Logan as per climate models used:
• 2019: Nil
• 2030: 17
• 2050: 43
• 2070: 81
• 2090: 116

The Bureau of Meteorology can provide data on the number of days each month with a temperature exceeding 35°C. It was determined that the likelihood achieving heatwave conditions was Likely between November and January, Possible for the months of February to April, September and October, Unlikely May and August, and Rare in June and July.

Consequence:
The consequence of a heatwave occurring in any month was determined to be Moderate.

Overall residual risk rating:
Based on the above likelihood and consequence ratings, the overall risk rating score for the months November to January was High – 66; for the months of February to April, Medium - 54 for the months of February to April, September and October, Medium - 51 May and August, and Low - 33 in June and July.

Variance from previous assessment:
This is a significant increase on the 2017 scores and is chiefly driven by the climate change projections predicting effects within the next 15 years, and increasing.
3.5 Major Urban Accident, Fire, Hazardous Materials Event

3.5.1 Hazard Description and Impacts

This was assessed in 2017 as three separate hazards, but combined into this single hazard for assessment.

A major passenger transport accident is a land based major accident involving passenger transport vehicles (road and/or rail). Fatalities number over 10 with multiple serious injuries requiring immediate medical support. Local resources are either stretched or overwhelmed in managing the incident and providing the required level of immediate and specialist care.

Due to the nature of this event, locations which are more susceptible have been identified as:

- Rail networks (primary issue)
  - Freight and interstate corridor increase with new freight port Bromelton through Logan
  - Suburban train QR
  - Gauge change

- Roads
  - M1 (freight)
  - Logan Motorway (freight)
  - Mount Lindsay Highway (freight)

- Approved B-double routes
  - Kingston Road
  - TMR routes
  - Magnesium Drive
  - Beenleigh Redland Bay
  - Brown Plains Road
  - Johnson Road

- Businesses reliant on freight

A major air transport accident is an aviation safety incident associated with the operation of an aircraft in which a person/s are fatally or seriously injured.

A hazardous materials event is an incident involving chemicals but no fire, ranging from a petrol wash away as a result of a leak from an overfilled container to a large scale industrial chemical spill.

3.5.2 Existing Controls

Preventative and preparedness Controls:

- DTMR, all incident management plans (Brisbane/Gold Coast/Logan) is the lead authority
- QFES, Local Action Plans (LAPs), Road and Rail
- Local LCC roads/QPS lead and QFR/QAS
• Rural Fire Services, supported by SES teams and other agencies, well educated, trained and equipped
• LCC liaise with QPS on signal diversion, Roadtek will also respond
• LDMG is notified, as lead agency, of changes to the Bushfire Preparedness Level (BPL)
• Hazmat incidents will be briefed by QFES or QPS to LDMG
• Messaging process
• MPFT derailment
  o Each agency have their own plans (emergency), QPS incident controller, other agencies
  o QAS triage, SES supporting fire, QR shutdown
• Air services
• QPS as lead agency (BAU) for air incidents
• Laws require hazardous loads to be placarded
• Stormwater quality controls at/near sensitive areas
• M1 has a confined stormwater system – stormwater is channelled into detention basins
• QPS all incident management plans (Brisbane/Gold Coast/Logan) is the lead authority
• QFES, supported by SES teams and other agencies, well educated, trained and equipped for Hazmat event
• Consider notifying air services by QFES, if required
• QFES / Fire & Rescue, combatting agency

Response and Recovery controls:
• Transport, evacuation, shelter in place and off-site refuge, provisioning including food and refreshments, medical surveillance and social welfare issues been established
• Federal & State Government assistance
• Rural Fire Services, supported by SES teams and other agencies, well educated, trained and equipped
• Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs available
• Summary of major existing controls Local services (medical clinics, hospitals, psychology services, Salvation Army and Red Cross) available
• Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs available
• Local Recovery Group considerate of available activities and resources to assist environmental recovery
• Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
• Secure zone established around the crash/accident site
• Response services understand high risk areas
• Local services (medical clinics, hospitals, psychology services, Salvation Army and Red Cross) available
• Mutual support between regions and districts if required (additional Police, QFES crews)
• Full time and volunteer organisations (SES, RFSQ, Marine Rescue, etc.)
• Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) Logan House Fire Services Network
• Resources to be allocated (LDCC) for the protection of people priority infrastructure and environment
• QFES / Fire and Rescue, supported by SES teams and other agencies, well educated, trained and equipped

3.5.3 Hazard Risk Assessment

Likelihood:
The likelihood of an urban incident occurring was determined to be constant throughout the year, and given a rating of Possible.

Consequence:
Given the potential impacts of any incident, the consequence for this hazard was rated at Moderate.

Overall residual risk rating:
Based on the above likelihood and consequence ratings, the overall risk rating score for hazardous material accidents was Medium – 54. This rating applies all year.

Variance from previous assessment:
No change from the previous 2017 assessment.
3.6 Bio-security & Health

3.6.1 Hazard Description and Impacts

This hazard updates the hazard assessed in 2017 covering Pandemics alone. It is recognised that these could be treated as two distinct and separate risks, with different consequences and flow on effects, but is currently included as a singular category for this assessment review, and introduces the bio-security implications not previously considered.

Pandemics are a global disease outbreak. An influenza pandemic occurs when a new influenza virus emerges and, because there is little or no immunity in the human population, it spreads rapidly from person-to-person over a wide geographical area causing serious illness in a significant proportion of those infected. This contrasts with seasonal influenza which, for most sufferers, is a self-limiting though unpleasant illness that does not endanger life. For the purposes of this risk assessment, pandemic is taken to include all influenza and general disease outbreaks, not just the seasonal flu and is assumed to be twice as bad as any similar event in the last 30 years occurring within the next 10 years.

Epidemics are a more localised occurrence in a community or region of case of an illness, specific health-related behaviour, or other health-related events clearly in excess of normal expectancy. The community or region and the period in which the cases occur are specified precisely. The number of cases indicating the presence of an epidemic varies according to the agent, size, and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence.

Exotic animal/plant disease: A transmissible disease or condition that degrades the health or productivity of a plant or animal. Potential diseases likely for Logan are:

- White Spot Virus – Logan River
- HeV – Horses Effect – Western Regional
- Equine Influenza – (occurred 2007 – 2008)
- Avian influenza – (occurred 2004)

In addition, other impacts of a bio-security or health event can potentially include:

- Mass panic
- Mass movement of populations
- Personal financial hardship due to loss of income
- Mental health and psychological impacts
- Wildlife decline

Areas more susceptible to an event include:

- Education facilities
- Aged care facilities
- Hostels and boarding houses
- Public transport
- Entertainment facilities
- Sporting facilities
- Hospices
- Major event areas
• Major work places

3.6.2 Existing Controls

In the event of a pandemic, the Queensland Department of Health becomes the lead agency, although the LDMG may be called upon.

Preventive and preparedness controls:

• Health Department becomes lead agency
• The Queensland Health Pandemic Plan (2014) is available, due for review
• International indicators and health authorities are continually monitored
• Appropriate workplace practices (free flu vaccinations at LCC) are in place
• Comprehensive and rehearsed Local Disaster Management Plan
• Integrated Disaster Management arrangements have been made
• The National and State Pandemic Plans (2014) available
• There is a stockpile of vaccination / treatments
• Government vaccination programs for old and young are available
• Business continuity plans (Health, food etc.) are in place
• There is familiarity with the Quarantine Act (in extremis) Government power to stop travel etc.
• Staff vaccination Plan
• Vector control/ eradication programs are in place
• Information from WHO - monitoring global trends
• Awareness campaigns - National and State - Hotline/website
• Salt Marsh mosquitoes –water treatment of still water -tanks, creeks and lakes occurs as required
• Lifeline, Red Cross and St Vincent’s available for support
• Commonwealth stockpile of PPE kits
• Business Continuity Plans

Response and recovery controls:

• PPE available for workers and public
• Workplace and Community Pandemic Plans activated
• Emergency service support available
• Local services (medical clinics, hospitals, psychology services, Salvation Army and Red Cross) available
• Population contact points - school, sporting events and clubs shut down
• Designated Quarantine Areas
• Community Recovery Centres/ flu clinics
• Existing local networks- check on neighbours
• Screening of incoming PAX-isolation
• State and national responses (additional Police, Military and Red Cross)
• Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
• Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available

3.6.3 Hazard Risk Assessment

Likelihood:
A flu-style pandemic was determined to be Possible between the months of May and October, which reduces to Unlikely during November to April. This trend is based on data from Queensland Health which shows that positive influenza notifications peak during the months of July to November.

Consequence:
The consequence of a pandemic event which is twice as bad as any similar event in the last 30 years was determined to be constant for the entire year, and was given a Moderate rating.

Overall residual risk rating:
Based on the above likelihood and consequence ratings, the overall risk rating score for a pandemic event as described above was Medium – 54 for the months May to October, and Medium – 51 for the months November to April.

Variance from previous assessment:
No change from the previous 2017 assessment.
3.7 **Terrorism**

Australians are facing the most significant ongoing threat from terrorism in our nation's history. Reflecting this, in 2014 the National Terrorism Public Alert Level was, for the first time, raised to High: a terrorist attack is likely at any time. We are opposed to terrorism and violent extremism in all its manifestations, regardless of its ideological or political inspiration. Violent extremism has no place in Australia.

The resilience and cohesion of the Australian community is our best defence against violent extremism and our greatest asset when responding to and recovering from a major terrorist attack. The community spirit shown during and following the Martin Place siege was testament to this strength and resilience. One of the things that makes Australia great is our diversity. We are determined to promote respect for the diverse religious, racial and cultural backgrounds which underpin our cohesive community, in particular within the reaches of Logan City Council.

In the event of a terrorist incident, Australia is well-positioned to respond immediately to a wide range of terrorist incidents (including multi-jurisdiction, mass-casualty attacks). Our agencies are well-placed to coordinate recovery efforts to assist the Australian community to return to everyday activities. Our Queensland Police Service (QPS) and Federal Police are highly trained and well-equipped to respond to a terrorist attack in Queensland and more broadly Australia. Our police are skilled in negotiation, tactical response, defusing explosives, crisis management and hostage recovery. In particular, the QPS General Duties (GD) police are trained as **Active Armed Defenders** allowing them to provide immediate response in the event of a terrorist act or attack locally.

For Logan City, the QPS have a dedicated Counter-Terrorism Unit that is actively engaged in the community working with key leaders across the various religious, cultural and community organisations to reduce the risk of any incident terrorist incident occurring with Logan City.

3.7.1 **Hazard Description and Impacts**

An attack by an extremist group and/or individuals. The attack is generally aimed at soft targets, are politically motivated, intended for mass casualties and destruction and intended to cause mass fear or panic. Includes cyber security/terrorism, critical infrastructure and essential services.


While increasingly the focus is on the growing number of individuals and groups prepared to commit low-preparation attacks, large scale attacks against high profile targets within Australia remain a possibility.

Susceptible or vulnerable locations for a terrorist attack are generally public places where there can be large gatherings or areas or places that will seek disruption to the community. Some of the possible locations for consideration in Logan City are:

- Logan Metro Sports Centre
- Logan Metro
- Logan Hyperdome
- Grand Plaza Browns Plains
Logan Insports
- Water towers
- Critical Infrastructure (i.e. water and sewage facilities)
- Temporary / Public Housing
- Municipal Buildings

Example scenarios
- Scenario 1. Individual or ‘Lone Wolf’ terrorist attack in a shopping centre or public place
- Scenario 2. Mass casualty terrorist attack in a public arena or gathering involving multiple casualties for maximum effect, usually orchestrated by an organised terrorist group

3.7.2 Existing Controls

Preventative and preparedness controls:
- Australia’s Counter-Terrorism Strategy 2015
- National Guidelines and Protection from Mass Gathering (National Counter-Terrorism Committee)
- Active Armed Defenders (National Counter-Terrorism Committee) National Guidelines for Protecting Critical Infrastructure from Terrorism
- Sub-plan for response arrangements for terrorist at LDMG, signed off October 2016
- National guidelines for protecting critical infrastructure from terrorism may not be met, more information needed
- Website translation for all hazards
- QPS business and liaison group, sharing of information to reduce risk
- City Safe CCTV (fixed and portable)
- QPS General Duties Active Armed Defender training to first responders (now equipped) 2016 – 2017 (30 June) in Logan District – immediate resolution (Note: QAS has completed AAD training to all officers)
- QPS liaison officer / District Duty Officer (DDO)
- QPS event management system (VOIP)
- Local Disaster Management Coordination to link to DDO and RDO (Regional District Officer)
- Indicators on behavioural change and radicalisation or interval (including training on awareness indicators and early reporting)
- Training and exercises annually
- Determined by the type of incident
- Community services
- SCADA systems/ICT cyber security cell
- Community program for reputation
- Temporary housing (funded by State and Commonwealth)
Response and recovery controls:

- Consultation with Emergency Management Australia (EMA)
- Local and District services (medical clinics, hospitals, psychology services, Salvation Army and Red Cross) are available and meet on regular basis
- Insurances (Health, Life, Vehicle, House and Contents), Government emergency assistance programs available
- Local Recovery Group considerate of available activities and resources to assist environmental recovery
- Mutual support between regions and districts if required (additional Police, (SES) crews etc.)
- Full time and volunteer organisations (SES and Marine Rescue etc.) are well trained
- Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
- Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available
- Resources to be allocated (LDCC) for the protection of priority infrastructure
- QPS have ability to hand control to ADF in response to a terrorism incident, e.g. Tag East

3.7.3 Hazard Risk Assessment

**Likelihood:**
The often random nature of terrorism means that it is impossible to predict, and thus has a constant rating throughout the year. The likelihood of a terrorist event occurring in Logan was determined to be **Likely**.

**Consequence:**
The result of a terrorist event occurring was given a **Major** consequence.

**Overall residual risk rating:**
Based on the above likelihood and consequence ratings, the overall risk rating score for terrorism occurring in the Logan City area was determined to be a constant **High – 72** for the whole year.

**Variance from previous assessment:**
This represents a rise in risk from **Medium** in 2017, and reflects a similar rise in perceived risk experienced at other local authorities in the region.
3.8 Flash Flooding from Severe Thunderstorm

3.8.1 Hazard Description and Impacts

A general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters from the unusual and rapid accumulation or runoff of surface waters from any source.

For the purpose of this risk assessment, the source of flood waters comes typically from creeks. Flooding from river sources is also included here, however the consequences and risk reduction/mitigation strategies are consistent with creek; the only difference being that the likelihood is considered less for any given month. This means that creek flooding is assessed as the higher risk.

The Logan and Albert River Floodplain Management Study and Plan (LARFMSP) produced by Engeny identified several densely urbanised suburbs as containing concentrations of vulnerable communities which are likely to suffer a greater impact during a flood event. These suburbs were:

- Logan Central
- Kingston
- Slacks Creek
- Loganlea
- Waterford West
- Beenleigh
- Eagleby

Additionally the LARFMSP identified the following flood risk hotspot suburbs based on the flood exposure assessment:

- Waterford West
- Kingston
- Loganlea
- Beenleigh
- Slacks Creek


The flood risk assessment presented in this report is high level in nature. A more detailed description of the nature of flood risk due to regional scale flood events emanating from the Logan and Albert Rivers is provided in the Logan and Albert River Floodplain Management Study and Plan (Engeny, 2017). The report includes an assessment and mapping of:

- Historical and design flood events;
- Flood risk exposure;
- At risk critical infrastructure;
- Isolation and evacuation;
- Flood travel times;
- Demographics and vulnerable communities;
• Current flood response and flood warning systems;
• Flooding hotspots; and
• Flood risk management opportunities.

For a more detailed understanding of the nature of flooding across LCC (including riverine, local creek and overland flow), please refer to LCC’s online flood information and flood hazard overlay located here:


Landslides

A landslide is the movement of rock, debris or earth down a slope. Landslides can be triggered by flash flooding. They range from a single boulder in a rock fall or topple to tens of millions of cubic metres of material in a debris flow.

They result from the failure of the materials which make up the hill slope and are driven by the force of gravity. Landslides are known also as landslips, slumps or slope failure. Some of the most common types of landslide in Australia are earth slides, rock falls and debris flows. Sudden and rapid events are the most dangerous because of a lack of warning and the speed at which material can travel down the slope as well as the force of its resulting impact. Landslides in Australia have caused fatalities, environmental degradation and millions of dollars damage to buildings, roads, railways, pipelines, communication networks and agricultural land. Extremely slow landslides might move only millimetres or centimetres a year and can be active over many years. Although this type of landslide is not a threat to people they can cause considerable damage to property.

Locations where an earthquake occurs and is more likely to impact on susceptible or vulnerable communities are:

• Southern Council area adjacent to Gold Coast Hinterland
• Mount Lindsay Highway
• Waterford Tambourine Road
• Motorway infrastructure
• QR rail line (Brisbane / Gold Coast rail line)

Lake Dennis

As part of the flash flooding risk, the failure impact of the dam structure at Lake Dennis was considered. This was the subject of a Failure Impact Assessment Report (GHD, November 2015), which determined that:

• The failure impact rating of the dam is confirmed as Category 1 under the Guidelines for Failure Impact Assessment of Water Dams (DEWS, 2012). This is because it affects between 2 and 100 people (in this case 11.6 people)
• There is a very small incremental potential loss of life (<0.001 persons) in the event of the failure of Lake Dennis for any of the flood events assessed.

Accordingly, this risk is not sufficient to govern the risk score applied as part of this all hazards risk assessment.
3.8.2 Existing Controls

Preventive and preparedness controls:

- External flood warning system (EA’s Logan Early Warning Service) is available
- Some flood studies and mapping (response mapping critical assets) have been undertaken, more are required
- Land use controls (such as zoning and the removal of existing buildings) and building restrictions (such as establishing minimum floor levels and raising buildings) in relation to development on flood-prone land are in place, however can be continually improved
- Power (Energex) / gas (APA) / communications providers keep systems well maintained and protected
- Darryl Ross (water) has a register of high risk people
- Evacuation measures are in place for flood prone communities (especially high risk patients)
- Differentiation between shelters (short term) and evacuation centres (long term), with public educated when needed.
- There is a typical warning period of three- four days and the event is continually monitored and tracked (intensity and direction) for severe weather and river systems, but not for creeks
- There is reliance on communications and an ability to operate remotely,
- There is a dedicated, cyclone rated, evacuation centre
- Generators for water supply and wastewater are available and both have telemetry
- The Disaster Dashboard website is available detailing critical information and is updated regularly
- The DTMR website details road closures. Disaster Dashboard website, 131940 integrated. Engineers undertake inspections once waters recede
- Is the DTMR currently working with Councils to coordinate and integrate road closures
- The Local Disaster Management Plan is rehearsed with annual exercises
- There is a commitment to active Counter Disaster Planning
- SES and Volunteer Marine Rescue teams are well educated, trained and equipped
- Council site preparation plans (incl. vehicles etc.) are available, however some plans can be improved (transport planning during floods may be needed)
- There is appropriate education and consultation pre-storm season, however this can be improved
- A Catchment Management Plan is being developed
- A Bank Vegetation Management Plan (Energex) is available, ratified by council
- A Council Planning Scheme is available
- A review of evacuation centres, transport of the vulnerable, and evacuated personnel and medical assistance needs is in progress (good data is a challenge)
- A small supply of emergency equipment/generators is available
- Key agencies (LDMG) have been consulted about their disaster mitigation plans
- Building codes and regulations have been considered
- Early warning systems, including BoM early radio warning of approaching natural disasters are available including Logan’s Early Warning System, EA’s, BoM app, media and Facebook
- Land use controls are in place (LCC Planning Overlay 8.2.8 Landslide hazard and steep slope overlay code)
- Specific studies have been undertaken (Landslide Hazard Assessment Report for the City of the Logan City Council – SMEC 2011)
- The Department of Transport and Main Roads have existing protocols to monitor and assess cut slopes and embankment on their network (including Pacific Motorway)
- Queensland Motorways Limited responsible for Gateway Motorway and Logan Motorway and have existing protocols for monitoring and assessing cut slopes and embankments on their network.

Response and recovery controls:
- There is an understanding of/familiarity with insurance, emergency response and Federal & State Government Assistance
- Measures for the early movement of frail, disabled and those requiring electronic medical support to safe respite centres are being developed
- Designated Disaster Response Chaplains are available (SES, Red Cross and LCC Peer Support Program – Converge Employee Assistance Provider, United Church, Seventh Day Adventist, St Johns)
- Existing social networks (Neighbourhood Watch, Multilink and Access (new arrivals and refugees refer to LCC website) are available

3.8.3 Hazard Risk Assessment

**Likelihood:**

The likelihood of a flooding event in the Logan City area has been identified as being **Likely** during the months of September to March. This is due to these months being more likely to seeing higher rainfall, and river flooding requiring intense, prolonged rain. The likelihood of flooding drops to **Possible** during the drier months April to August.

**Consequence:**

The consequence of river flooding has been identified as **Moderate**.

**Overall residual risk rating:**

Based on the above likelihood and consequence ratings, the overall risk rating score for river flooding is **High – 66** between September and March, and **Medium – 54** between April and August.

**Variance from previous assessment:**

No change from the previous 2017 assessment.
4. Risk Score Comparison to 2017 Assessment

The following section includes charts generated from the previous Section 3 showing the risk rating for each hazard investigated, for each month of the year.

Overall rises in risk level were noted for Severe Weather, Bushfire, Heatwave and Terrorism.

The combination of other previous hazards with other hazard events (e.g. Landslides, Major Air Accidents, Hazardous Material Event, Bio-security), did not lead to any overall change or effect from previous hazard risk levels.
4.1 Hazard Consequence Ratings – Comparison to 2017

It was determined that the scenarios for Severe Weather, Bushfire, Heatwave and Terrorism are of higher consequence than previous.
4.2 Hazard Likelihood Ratings – Comparison to 2017

Despite the higher consequence scenarios considered for Bushfire and Heatwave, the likelihood value did not change. However the higher consequence scenario for Severe Weather is considered less likely than the lower consequence scenario which was almost certain to occur.
4.3 Hazard Risk Ratings – Comparison to 2017

Overall rises in risk level were noted for Severe Weather, Bushfire, Heatwave and Terrorism.
5. **Monthly Risk Charts**

The following section includes charts generated from the previous Section 3 showing the risk rating for each hazard investigated, for each month of the year.
5.1 Hazard Risk Ratings – January

<table>
<thead>
<tr>
<th>Hazard Event</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
<td>80</td>
</tr>
<tr>
<td>02 - Earthquake</td>
<td>30</td>
</tr>
<tr>
<td>03 - Bushfire (Rural and Urban)</td>
<td>70</td>
</tr>
<tr>
<td>04 - Heatwave</td>
<td>90</td>
</tr>
<tr>
<td>05 - Major Urban Accident, Fire, HazMat Event</td>
<td>65</td>
</tr>
<tr>
<td>06 - Biosecurity &amp; Health Event</td>
<td>50</td>
</tr>
<tr>
<td>07 - Terrorism</td>
<td>80</td>
</tr>
<tr>
<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td>80</td>
</tr>
</tbody>
</table>

Risk Rating:
- **LOW (0-40)**
- **MEDIUM (41-64)**
- **HIGH (65-82)**
- **EXTREME (83-91)**
5.2 Hazard Risk Ratings – February

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
<td>80</td>
</tr>
<tr>
<td>02 - Earthquake</td>
<td>30</td>
</tr>
<tr>
<td>03 - Bushfire (Rural and Urban)</td>
<td>60</td>
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<tr>
<td>04 - Heatwave</td>
<td>50</td>
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<tr>
<td>05 - Major Urban Accident, Fire, HazMat Event</td>
<td>60</td>
</tr>
<tr>
<td>06 - Biosecurity &amp; Health Event</td>
<td>50</td>
</tr>
<tr>
<td>07 - Terrorism</td>
<td>80</td>
</tr>
<tr>
<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td>70</td>
</tr>
</tbody>
</table>

Risk Rating:
- LOW (0-40)
- MEDIUM (41-64)
- HIGH (65-82)
- EXTREME (83-91)
5.3 Hazard Risk Ratings – March

![Graph showing hazard risk ratings for various events]

- **Risk Rating**
  - LOW (0-40)
  - MEDIUM (41-64)
  - HIGH (65-82)
  - EXTREME (83-91)

- **Hazards**
  - 01 - Severe Weather
  - 02 - Earthquake
  - 03 - Bushfire (Rural and Urban)
  - 04 - Heatwave
  - 05 - Major Urban Accident, Fire, HazMat Event
  - 06 - Biosecurity & Health Event
  - 07 - Terrorism
  - 08 - Flash Flooding from Severe Thunderstorm
5.4 Hazard Risk Ratings – April

<table>
<thead>
<tr>
<th>No.</th>
<th>Hazard Description</th>
<th>Risk Rating</th>
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</thead>
<tbody>
<tr>
<td>01</td>
<td>Severe Weather</td>
<td>LOW (0-40)</td>
</tr>
<tr>
<td>02</td>
<td>Earthquake</td>
<td>LOW (0-40)</td>
</tr>
<tr>
<td>03</td>
<td>Bushfire (Rural and Urban)</td>
<td>HIGH (65-82)</td>
</tr>
<tr>
<td>04</td>
<td>Heatwave</td>
<td>LOW (0-40)</td>
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<tr>
<td>05</td>
<td>Major Urban Accident, Fire, HazMat Event</td>
<td>LOW (0-40)</td>
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<td>06</td>
<td>Biosecurity &amp; Health Event</td>
<td>LOW (0-40)</td>
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<tr>
<td>07</td>
<td>Terrorism</td>
<td>EXTREME (83-91)</td>
</tr>
<tr>
<td>08</td>
<td>Flash Flooding from Severe Thunderstorm</td>
<td>LOW (0-40)</td>
</tr>
</tbody>
</table>
5.5 Hazard Risk Ratings – May

Risk Rating

Hazards

LOW (0-40)
MEDIUM (41-64)
HIGH (65-82)
EXTREME (83-91)
5.6 Hazard Risk Ratings – June

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
<td>LOW (0-40)</td>
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<tr>
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<td>07 - Terrorism</td>
<td>HIGH (65-82)</td>
</tr>
<tr>
<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td>MEDIUM (41-64)</td>
</tr>
</tbody>
</table>
### 5.7 Hazard Risk Ratings – July

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
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</tr>
<tr>
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<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td></td>
</tr>
</tbody>
</table>
5.8 Hazard Risk Ratings – August

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
<td>50</td>
</tr>
<tr>
<td>02 - Earthquake</td>
<td>30</td>
</tr>
<tr>
<td>03 - Bushfire (Rural and Urban)</td>
<td>80</td>
</tr>
<tr>
<td>04 - Heatwave</td>
<td>55</td>
</tr>
<tr>
<td>05 - Major Urban Accident, Fire, HazMat Event</td>
<td>50</td>
</tr>
<tr>
<td>06 - Biosecurity &amp; Health Event</td>
<td>60</td>
</tr>
<tr>
<td>07 - Terrorism</td>
<td>90</td>
</tr>
<tr>
<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td>50</td>
</tr>
</tbody>
</table>
5.9 Hazard Risk Ratings – September

The diagram shows the risk ratings for various hazards in September. The risk ratings are color-coded as follows:

- **LOW (0-40)**
- **MEDIUM (41-64)**
- **HIGH (65-82)**
- **EXTREME (83-91)**

The hazards included in the diagram are:

- 01 - Severe Weather
- 02 - Earthquake
- 03 - Bushfire (Rural and Urban)
- 04 - Heatwave
- 05 - Major Urban Accident, Fire, HazMat Event
- 06 - Biosecurity & Health Event
- 07 - Terrorism
- 08 - Flash Flooding from Severe Thunderstorm
5.10 Hazard Risk Ratings – October

The chart represents the risk ratings for various hazards as of October. The hazards are categorized as follows:

- 01 - Severe Weather
- 02 - Earthquake
- 03 - Bushfire (Rural and Urban)
- 04 - Heatwave
- 05 - Major Urban Accident, Fire, HazMat Event
- 06 - Biosecurity & Health Event
- 07 - Terrorism
- 08 - Flash Flooding from Severe Thunderstorm

The risk ratings are color-coded and fall into the following categories:

- LOW (0-40)
- MEDIUM (41-64)
- HIGH (65-82)
- EXTREME (83-91)
5.11 Hazard Risk Ratings – November

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Weather</td>
<td>LOW (0-40)</td>
</tr>
<tr>
<td>Earthquake</td>
<td>MEDIUM (41-64)</td>
</tr>
<tr>
<td>Bushfire (Rural and Urban)</td>
<td>HIGH (65-82)</td>
</tr>
<tr>
<td>Heatwave</td>
<td>EXTREME (83-91)</td>
</tr>
<tr>
<td>Major Urban Accident, Fire, HazMat Event</td>
<td>LOW (0-40)</td>
</tr>
<tr>
<td>Biosecurity &amp; Health Event</td>
<td>MEDIUM (41-64)</td>
</tr>
<tr>
<td>Terrorism</td>
<td>HIGH (65-82)</td>
</tr>
<tr>
<td>Flash Flooding from Severe Thunderstorm</td>
<td>EXTREME (83-91)</td>
</tr>
</tbody>
</table>
5.12 Hazard Risk Ratings – December

![Hazard Risk Ratings Chart]

**Hazard Risk Ratings**

- **LOW (0-40)**
- **MEDIUM (41-64)**
- **HIGH (65-82)**
- **EXTREME (83-91)**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Severe Weather</td>
<td>60</td>
</tr>
<tr>
<td>02 - Earthquake</td>
<td>30</td>
</tr>
<tr>
<td>03 - Bushfire (Rural and Urban)</td>
<td>70</td>
</tr>
<tr>
<td>04 - Heatwave</td>
<td>60</td>
</tr>
<tr>
<td>05 - Major Urban Accident, Fire, HazMat Event</td>
<td>50</td>
</tr>
<tr>
<td>06 - Biosecurity &amp; Health Event</td>
<td>40</td>
</tr>
<tr>
<td>07 - Terrorism</td>
<td>80</td>
</tr>
<tr>
<td>08 - Flash Flooding from Severe Thunderstorm</td>
<td>70</td>
</tr>
</tbody>
</table>
6. Queensland Emergency Risk Management Framework (QERMF)

6.1 Introduction

For this review of the all hazards risk, the Queensland Emergency Risk Management Framework was adopted. This was developed by Queensland Fire and Emergency Services to be used within disaster management planning at all levels of Queensland’s Disaster Management Arrangements (QDMA) – Local, District and State. Logan City is the first in Queensland to use the framework.

The key differences the Framework has made to the previous process are as follows:

- More data has been provided regarding the probabilities and severity of various hazards in terms of actual exceedance probabilities (AEP)
- Likelihood and consequence scoring criteria aligned with QERMF
- ‘Exposed elements’ identified for each hazard, and assessed for vulnerability
- Lead agencies provided assessments of their disaster event mitigating controls and treatments, including capability, capacity, and capacity gaps
- QERMF tool/templates populated for each hazard, identifying risk levels by each exposed element
- Risk appetite exercised for each exposed element, risks are accepted, or if not, planning is nominated to mitigate, or transfer the risk (where Logan LDMG does not have the capability or capacity to mitigate)
Key documents regarding QERMF can be found as follows:

- [https://www.disaster.qld.gov.au/dmg/Prevention/Pages/3-5.aspx](https://www.disaster.qld.gov.au/dmg/Prevention/Pages/3-5.aspx)

### 6.2 QERMF Outcomes and Key Issues

The QERMF assessment puts a focus on exposed elements, and the effectiveness of the treatments and controls in place to mitigate impacts on these elements.

The assessment is not intended as a one-off, but as a living assessment and action plan to be managed and assessed as part of the LDMG responsibilities.

At this stage, the full investigation into the existence and effectiveness of mitigations and controls has not been undertaken. However, in the initial process of establishing this framework, the following issues have been identified.

It should be noted that subsequent reviews of the QERMF tool spreadsheets by QFES have resulted in changes to the risk definitions and risk levels to align with the State Risk Assessments issued since the workshop was undertaken. These subsequent alterations have been made in the Logan QERMF tool spreadsheets, but have not been adjusted in the body of this report. Key variations to this report are summarised as follows:

- Risk 1 altered to consider Severe Weather events of a more frequent nature and associated flooding (i.e. not Severe Tropical Cyclone)
- Risk 8 altered to cover Severe Tropical Cyclones that, albeit less likely, have a larger more regional impact, and a different set of impacts to Risk 1 (i.e. thinner resources, evacuations of populations etc.). The Likelihood is reduced from the previous Risk 8, down to Unlikely
- Risk 4 – Heatwave: increased from Likely, to Almost Certain.

#### 6.2.1 National Broadband Network (NBN)

There is uncertainty as to the effects of the NBN network replacing fixed lines, such that landline telephone communication is not possible during a power outage. Mitigations such as battery backup and unmonitored medical alarms are the responsibility of the customer to ‘opt-in’ and pay accordingly. More information is needed about how well the community is informed around potential issues.

#### 6.2.2 LCC Flood Mapping, GIS and Stormwater Catchment Management

Ongoing Flood Mapping and Stormwater Catchment Management Plan preparation to be undertaken.

As much of Council’s service delivery is location-based, access to spatial data and the ability to ‘see’ what’s on the ground without the need to be physically at that location is a key enabler of improved efficiency and responsiveness. In combination with base data (e.g. road and property boundaries, contours) and aerial imagery, access to reliable building footprints data would provide value for Council in many different areas including disaster management and response. Using that data in combination with other information, such as demographic data, can assist with a range of analysis and impact assessment activities and lead to improved decision making.
6.2.3 Critical Infrastructure Locations
Limited information known about critical infrastructure locations for telecommunication and electricity sub stations.
Other infrastructure where the identification locations would assist are the Radio Towers for QFES, QAS, QPS and SES.

6.2.4 Rapid Response Plan
There are feasibility issues around utilising LDCC/LDMG facilities to coordinate response.
Other issues affecting a rapid response are as follows:
- Ability to stand up LDMG
- Ability to communicate with internal and external stakeholders
- Ability to communicate with members of community
- Local capacity quickly exceeded
- Lack of access to impacted areas
- Large scale structure damage assessments

6.2.5 Logan City Business Continuity Planning
The current Logan City BCPs are ‘inward-focussed’ and its capacity to assist the LDMG in a declared event is not fully known. Testing of the BCPs as part of an LDMG exercise would identify gaps.

6.2.6 School Closure Protocols
There is little information and assurance regarding the scope and capability of school closure protocols for various hazards

6.2.7 Evacuation Centres, Shelters and Temporary Housing
Availability, capacity and capabilities of evacuation centres, shelters and temporary housing is ever-changing. As well as the actual structures, this applies to the staff of each facility, and their awareness of the role in any emergency. They are managed by various agencies. A review of the current arrangements would assist, as well as the framework in place to maintain the availability of suitable venues.

6.2.8 Aged Care Facilities
LDMG/LCC has no real way of effectively dealing with each of these organisations. Attempts to elicit information, visit and educate have proven unsuccessful, with generally little to no buy-in from management and staff (e.g. meeting on site, management and staff not present, only residents, who are there only to state the problems). Level of administration required to effectively manage the region's facilities is not there, especially as so many are exposed for any hazard.

6.2.9 Logan Water
The following are in place, but unknown in terms of scope, or effectiveness to assist in emergency scenarios:
- Water and Wastewater Incident Management Plan & Toolkit
• Logan Water Drinking Water Quality Management Plan
• WWTP site based Management Plans for Loganholme, Beenleigh, Jimboomba and Flagstone

Typical trigger for notification and activation of the DMG is based around whether additional resources (beyond Logan Water BAU) are required for managing.

6.2.10 Logan City Planning

It has been noted that growth in certain areas tends to proceed and outstrip any preparation or allowance for emergency services and infrastructure (i.e. responds after growth has occurred)

6.2.11 Logan Hospital

It is currently assumed that the Queensland Health procedures specific to Logan Hospital are in place, and assessed as effective. Assurance of this would assist.

6.2.12 State-wide Assessments

During the course of developing the QERMF assessments, State-wide assessments were supplied by QFES with the instruction that these spreadsheets were to be used as the basis for the Logan assessments to be added. As mentioned at the start of this section, this altered some hazard definitions and risk levels, but also introduced some other exposed elements, agencies responsible, and mitigations treatments and controls.

In many cases, these assessments had not had capabilities, capacities, or effectiveness levels stated or assessed, so are unaddressed, and not actions are as yet assigned.

Areas highlighted at a state levels to be addressed include

• Powerlink and TransLink ability to supply power from other parts of the network
• Energex ability to respond and requirements for assistance from Ergon during restoration efforts
• Telecommunications representatives measures to mitigate seismic events effects on communication towers and associated infrastructure
• Built in redundancy for NBN fibre optic infrastructure, and whole-of-network communications
• Mitigation strategies for seismic effects on water supply via Seqwater and local suppliers, including Queensland health advice for affected reticulation networks
• Seismic effects on local wastewater treatment plants, dams, water reservoirs, bulk fuel and gas supply, local and state roads, buildings, purpose-built shelters, hospitals, various industries, national parks and species of concern
• Effects of heatwaves on Seqwater supply dams, public transport infrastructure for stations and stops (waiting and parking areas), loading of petroleum and gas products, sewage overflows, footpaths, cycleways and bridges
• Provision of cool public spaces for refuge in a heatwave, Queensland Health plans and strategies for heat stress and mental health, workers in significant industries, forestry, and sporting events
• Mitigation of heatwave effects on endangered species
6.3 Climate change impacts

Impacts associated with natural hazards need to consider the relationship with climate variables to understand current and future implications of climate change on people and infrastructure. The level of risk associated with a changing climate will not arise directly from the changes in the climate, but usually from a “cause-and-effect” chain. This is mapped out by considering the change in the climate variable (i.e. rainfall, temperature, wind etc.), the impacts on the vulnerable population or assets, and the risks to the objectives or operation of the community or infrastructure.

6.3.1 Climate variables

The Intergovernmental Panel on Climate Change (IPCC) has developed four scenarios for global climate projections that relate to how the world may respond to the challenge of a changing climate, the need to continue to produce and use energy and resources, and the global greenhouse gas emissions that may occur. These scenarios incorporate diverging tendencies based on alternative economic, globalisation and environmental pathways. Projections are then developed at national and regional levels (in Australia these are developed by CSIRO and the Bureau of Meteorology) to help understand how the climate is projected to change over time. For the purposes of the HRA, a more extreme (high emissions) scenario was used to develop projections over 20-year intervals from 2030 to 2090.

These projections were consulted during the 2017 Hazard Risk Assessment Workshop for the severe weather event, earthquake, landslide, bushfire, heatwave and flooding hazards. Since then, the longpaddock website (www.longpaddock.qld.gov.au/qld-future-climate) has further refined the projections to higher resolutions, meaning that the grid on which projection calculations are based have been downscaled such that they are specific to a region such as Logan. At the 2019 Risk Assessment Workshop, these projections were utilised.

6.3.2 Factors influencing overall risk

Projections of a changing climate carry a level of uncertainty, and are subject to change over time as climate variables fluctuate. There are also a number of factors which influence the overall risk outcome, notably how climate variables work together to create different extreme weather events and natural hazards, and how this can affect the frequency and extremity of these events. Consequences of the risk will also depend on the vulnerability of people, organisations and infrastructure; increased sensitivities to a particular climate variable and the ability to be resilient and adapt to the risk should be considered when determining risk.

6.3.3 Climate uncertainty and adaptive planning

Although the climate projections represent the presently accepted forefront of climate change science, there is still a high level of uncertainty that exists regarding the climate changes that may actually eventuate. This uncertainty becomes more pronounced as the timescale of the projection is extended. Several areas of uncertainty exist which influence the accuracy of climate change projections, including:

- Scenario uncertainty, due to the uncertain future emissions and concentrations of greenhouse gases and aerosols, resulting from uncertainties regarding the current and future activities of humans
- Response uncertainty, resulting from limitations in our understanding of the climate system and its representation in climate models
- Natural variability uncertainty, stemming from unperturbed variability in the climate system
• Uncertainties regarding the assignment of probability distributions to regional climate change projections
• Uncertainties associated with projecting climate change at small spatial scales, particularly for coastal and mountainous areas.

Accordingly, a key principle toward adapting to a future with an uncertain climate may be to adopt ‘adaptive management’, i.e. implementing incremental changes and adaptation measures based on climate and scientific monitoring and prescribed responses. Some adaptation options for infrastructure that may be deemed appropriate in response to the most extreme climate projections may require large-scale engineering or other works, the need (or otherwise) for which will depend on the extent of climate change that actually transpires over time, as opposed to the conditions that were modelled.

The notion of planning for future uncertainty may result in multiple plausible futures being considered through the development of several potential future scenarios that consider different economic, demographic and climatic futures. The benefits of an adaptive scenario planning approach for developing strategies and plans is that are more robust, flexible and minimise risk in response to deep uncertainty.

6.3.4 Flood Reports and Information

The flood risk assessment presented in this report is high level in nature. A more detailed description of the nature of flood risk due to regional scale flood events emanating from the Logan and Albert Rivers is provided in the Logan and Albert River Floodplain Management Study and Plan (Engeny, 2017). The report includes an assessment and mapping of:

• Historical and design flood events;
• Flood risk exposure;
• At risk critical infrastructure;
• Isolation and evacuation;
• Flood travel times;
• Demographics and vulnerable communities;
• Current flood response and flood warning systems;
• Flooding hotspots; and
• Flood risk management opportunities.

For a more detailed understanding of the nature of flooding across LCC (including riverine, local creek and overland flow), please refer to LCC’s online flood information and flood hazard overlay located here:


Appendices
Appendix A Hazard Risk Assessment
Appendix B Risk Register
Appendix C Hazard Definitions
Appendix D Risk Scoring Tables
Appendix E Program for AHRW
Appendix F  AHRW Attendance Sheet