ACT GOVERNMENT

TERRITORY WIDE

RISK ASSESSMENT REPORT

Developed by Echelon Australia

June 2012

Authority

This Territory Wide Risk Assessment for the Australian Capital Territory has been prepared consistent with the National Emergency Risk Assessment Guidelines.

Endorsed

Stephen Goggs
Acting Director General, Justice and Community Safety Directorate
Chair, Security and Emergency Management Senior Officials Group

Date 12 July 2012

Recommended to the Minister for Police and Emergency Services

Mark Crosweller
Emergency Services Commissioner
ACT Emergency Services Agency

Date 11TH July 2012

I hereby approve this Plan

.....

Simon Corbell MLA
Minister for Police and Emergency Services

Date 13.7.12

Document Issue & Control

This report has been prepared by Echelon Australia specifically for reference by members of ACT Government Directorates and Agencies.

Electronic copy of the final document will be made available to the members of the Security and Emergency Management Senior Officials Group (SEMSOG).

Hard copies of the final document to be made available as follows:

Report Copy	Responsibility of	Located at
1 of 4	Emergency Services Agency (ESA)	9 Amberley Ave, Fairbairn ACT
2 of 4	ACT Policing	Winchester Police Centre, Benjamin Way Belconnen ACT
3 of 4	Justice and Community Safety Directorate (JACSD)	JACSD Library – Ground Floor, 12 Moore Street, Canberra City
4 of 4	Echelon Project Manager	Echelon Reference Library

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The Emergency Risk Management assessments contained within this report have been developed based solely on the site-specific information supplied by members of the Territory Wide Risk Assessment Working Group and have been prima facie accepted by the authors of this report and have not been independently verified for accuracy. Echelon Australia accepts no responsibility for any loss that arises out of the Emergency Services Agency having failed to bring all relevant facts to our attention or having provided inaccurate information.

Report Revision

Whenever this report is reviewed or amended, details must be recorded on this page.

Date	Revision Summary

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Executive Summary

In April 2009, the Council of Australian Governments (COAG) agreed on the urgent need for governments to re-examine Australia's arrangements for managing natural disasters and identify any further strategies aimed at building greater resilience. Disaster mitigation strategies will take into consideration recommendations arising from COAG and the National Emergency Management Committee (NEMC) formerly known as the Australian Emergency Management Committee (AEMC).

In December 2009, the ACT Chief Minister signed the National Partnership Agreement (NPA) on Natural Disaster Resilience. Through this agreement, the Australian Government contributes funding to the States and Territories for disaster resilience. This includes specific funding for States and Territories to undertake a Territory Wide Risk Assessment to assist in identifying priorities for risk mitigation in the Territory.

The ACT Emergency Services Agency (ESA) established a Territory Wide Risk Assessment Working Group (the Working Group) comprising representatives from relevant ACT Government agencies and directorates and to work on the project and develop a draft of this report. The working group is chaired by ESA, and reported to the Security and Emergency Management Senior Officials Group (SEMSOG) through the Security and Emergency Management Planning Group (SEMPG).

The project has considered the risks associated with a range of natural, technological, environmental and other hazards that, should a disaster event occur as a result of any of these hazards, would require a coordinated multi-agency response and the activation of the Emergency Coordination Centre (ECC), as well as potentially other specific operations centres, to manage the event.

It is important to note that during the project the TWRA Working Group acknowledged the existence of other hazards that may at times impact on the Territory. However this project concentrated only on those that would be significant enough to require a whole of government coordinated approach.

The Territory Wide Risk Assessment (TWRA) project has been undertaken in accordance with the principles and generic guidelines on risk management provided in the standard AS/NZS ISO 31000: 2009 – Risk Management: Principles and guidelines and the National Emergency Risk Assessment Guidelines (NERAG) 2010. These documents provide a platform to a systematic approach for identifying, analysing, evaluating and treating emergency risks to effectively determine the most appropriate strategies for managing such emergencies and mitigate the impact on the community, its social fabric and surroundings.

Key to the project was the consideration of existing emergency management arrangements and plans, such as the ACT Emergency Plan 2010 with a view to building on current strategies rather than replace or duplicate them.

The TWRA Working Group first identified all the types of hazards that could impact on the Territory. These hazards were then analysed and evaluated by the TWRA Working Group to determine how significant the impact would be by rating the level of risk from LOW to EXTREME using the Likelihood and Consequence Assessment Matrix.

As a result, a total of 23 hazards were identified within the Territory to form part of this report. These hazards were analysed according to their severity rating and resulted in one hazard being rated Low, fifteen hazards rated Moderate, four hazards rated High and three hazards rated Extreme.

The detailed analysis of each of the hazards can be found in Section 5 of this report under 'Risk Analysis and Evaluation'.

The following is a summary of the three Extreme hazards as rated by the TWRA Working Group. More information about this and all the other hazards can be found in Section 5.

RA14 – Bushfire:

It was considered by the TWRA Working Group that significant bushfire event in the ACT could result in property damage, potential fatalities potential casualties, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport, closure of roads, impact on local community, economic impact, possible evacuation, impact on livestock, impact of cultural assets, impact on water supply, exclusion zones, impact on Commonwealth assets..

RA19 – Extreme Heat:

It was considered by the TWRA Working Group that an Extreme Heat event in the ACT could result in fatalities, impact on health, significant impact on vulnerable communities, impact on energy consumption and resultant disruption to supply, impact on the provision of essential services and infrastructure, increased risk to the environment, impact on animals and increased risk of bushfire.

RA22 – Severe Storm:

It was considered by the TWRA Working Group that a Severe Storm event could result in potential loss of life, injuries, property damage, loss of infrastructure and utilities, impact on vulnerable communities, possible evacuation, impact on the environment, impact on local businesses, disruption to transport, closure of roads, impact on local community, impact on the local economy and impact on domestic animals and livestock.

For these three hazards rated extreme and others rated high, additional treatment options were considered and a treatment plan developed outlining additional measures to improve the existing arrangements, in order to be better prepared to deal with these disaster events in all stages of an emergency.

1. Introduction

In April 2009, the Council of Australian Governments (COAG) considered and agreed on the urgent need for Australia to re-examine its current arrangements and approach for managing natural and other significant disasters and to identify any further strategies aimed at building greater resilience.

The agreement determined that a new approach was needed to manage these disasters in Australia and provided a series of recommendations and reform commitments to create safer, more sustainable communities by reducing risk, damage and losses from natural disasters in the future. This approach involves a fundamental shift in focus beyond response, relief and recovery towards cost-effective, evidence-based disaster mitigation.

The Council concluded that current arrangements could be improved to ensure that Australia has a world-class national framework for natural disaster management, thus achieving safer, more sustainable communities, and reduced risk, damage and losses.

Central to the new approach is a systematic and widespread national process of disaster risk assessments and, most importantly, a fundamental shift in focus towards cost-effective, evidence-based disaster mitigation. This represents an historic move beyond disaster response and reaction, towards anticipation and mitigation.

Australia has adopted a ***comprehensive*** and ***integrated*** approach to the development of its arrangements and programs for the effective management of emergencies and disasters. This approach is:

- ***Comprehensive*** in including *all hazards* and in recognising that dealing with *risks* to community safety, caused by these hazards, requires a range of prevention/ mitigation, preparedness, response and recovery (PPRR) *programs* and other risk management treatments; and

- ***Integrated*** in making sure that the efforts of governments, all relevant organisations and agencies, and the community are coordinated and contribute to the development and maintenance of a safer, sustainable community.

The ACT Government Territory Wide Risk Assessment project aims to determine whether current arrangements provide an effective framework to meet the needs of those affected by natural disaster events.

This report makes due reference to the ACT Emergency Plan 2010 and other emergency arrangements and acknowledges the effectiveness of these current strategies as a platform to build on and enhance, where necessary, any area identified to benefit from additional resources and measures.

The Territory Wide Risk Assessment considered risks that impact on the various sections of the ACT community and/or the environment as well as the impact/ demand on social and community services and need for evacuation where such an emergency would require an organised joint operational emergency response within the meaning of the Emergencies Act 2004 (as amended).

1.1. Purpose

The ACT Government has conducted a holistic, community based Territory Wide Risk Assessment that looked at how natural, technological, environmental and other disasters could impact on the ACT in order to create a better-prepared and safer community in the event of major disasters.

The Territory Wide Risk Assessment identifies all large-scale hazards that could pose a danger to the Territory. The level of risk was then evaluated for each hazard and treatment options considered and developed.

The review has taken into account all elements of disaster management and specifically current arrangements in relation to:

- The core principles of emergency management;
- The appropriateness, effectiveness and scope of disaster mitigation programmes and arrangements;
- The appropriateness and effectiveness of, and any gaps in, disaster relief arrangements;
- The roles and responsibilities; and
- The options for improving existing arrangements.

1.2. Authority

The Territory Wide Risk Assessment Working Group was allocated the task of developing this report to draft stage only. The draft report will be referred to the Commissioner and Chair of SEMSOG for approval and referred to Cabinet for noting.

1.3. Reference & Supporting Plans/ Documents

See Appendix 7 of this document.

2. Project Management Plan

The project management plan and details of project documentation can be found at Appendix One.

3. Territory Wide Risk Assessment - Context Statement

3.1. Introduction

A key aim of the ACT Territory Wide Risk Assessment (TWRA) project is to enhance the Territory's resilience to natural and non natural disasters by establishing new, or enhancing existing, mitigation measures and related activities that contribute to safer, sustainable communities that are better able to withstand the effects of disaster events.

The assessment process considered a range of hazards that, in the event of an emergency, would require a coordinated multi-agency response.

The Territory Wide Risk Assessment project was managed through a Working Group comprising ACT emergency services and ACT Government Directorates and agencies.

The *Emergencies Act 2004* is one of the instruments for the management of emergencies in the ACT. The key objectives of this legislation are to:

- protect and preserve life, property and the environment; and
- provide for effective emergency management; and
- provide for the effective and cohesive management by the Commissioner of the operational Services; and
- recognise the value to the community of all emergency service members, including volunteer members.

Equally, the ACT Emergency Plan 2010 clearly supports these objectives in its core principles and commitment to providing effective and efficient emergency management through:

- The use of a comprehensive approach of PPRR;
- Applying an all hazards approach in managing the effects of emergencies;
- An all agency involvement where necessary; and
- Public safety and community engagement.

3.2. Scope

1. The Territory Wide Risk Assessment considered risks that impact on people, property, the economy and or the environment as well as the impact on social and community services, the need for evacuation and the level of emergency resources required that would have the potential to require a significant and coordinated multi-agency response.
2. The Territory Wide Risk Assessment excluded the Jervis Bay area.
3. The TWRA Working Group documented the process in accordance with the systematic approach as outlined within the AS/NZS ISO 31000: 2009 standard for Risk Management and as outlined in the National Emergency Risk Assessment Guidelines (NERAG) 2010.
4. Where a Lead Agency or functional area has been identified as having a legislative responsibility to plan for, and or mitigate for identified hazards, the ESA may request the particular Agency to produce current planning and mitigation documents or status reports.
5. The Emergency Services Commissioner and SEMSOG are the appropriate bodies to endorse this report.

3.3. Resources

Members of the TWRA Working Group made themselves available to attend as many scheduled workshops as possible and when necessary to provide an alternative representative to these workshops.

It is acknowledged that these members were a valuable resource to the process, and in many cases have a greater knowledge of the history of local events than response agencies that have periodic staff changes.

The Chair of the Working Group also co-opted various stakeholders to these meetings.

3.4. Identified Issues

The emergency management arrangements recognise the 'role, function and capacity' of the Territory emergency services to respond to incidents within the Territory and arrangements are in place to facilitate cooperation in emergency management with the Commonwealth and State agencies if deemed necessary.

3.5. Management Framework Overview

The TWRA Working Group was established by SEMPG, managed by ESA, and were tasked with undertaking the Territory Wide Risk Assessment and drafting this report. In drafting this report, relevant legislation, plans and standards were referred to and are listed in the Bibliography of this report.

A list of the members of the TWRA Working Group is found on Appendix 3 of this document.

3.6. Risk Evaluation Criteria

As part of evaluating the impact of potential incidents, the TWRA Working Group established the following criteria to identify events considered 'unacceptable' and where improved measures would be required to minimise impact.

It was agreed that any reasonably preventable situation resulting in:

a) Loss of life;

b) Multiple or serious injury;

c) Significant impact on the health and well being of the community;

d) Medium to long term or permanent effect on the environment;

e) Medium or long term or permanent effect on the cultural assets and values of the community;

f) Serious disruption of the whole community business activities;

g) Serious disruption of community lifelines and or services;

h) The introduction of exotic diseases or pests; or

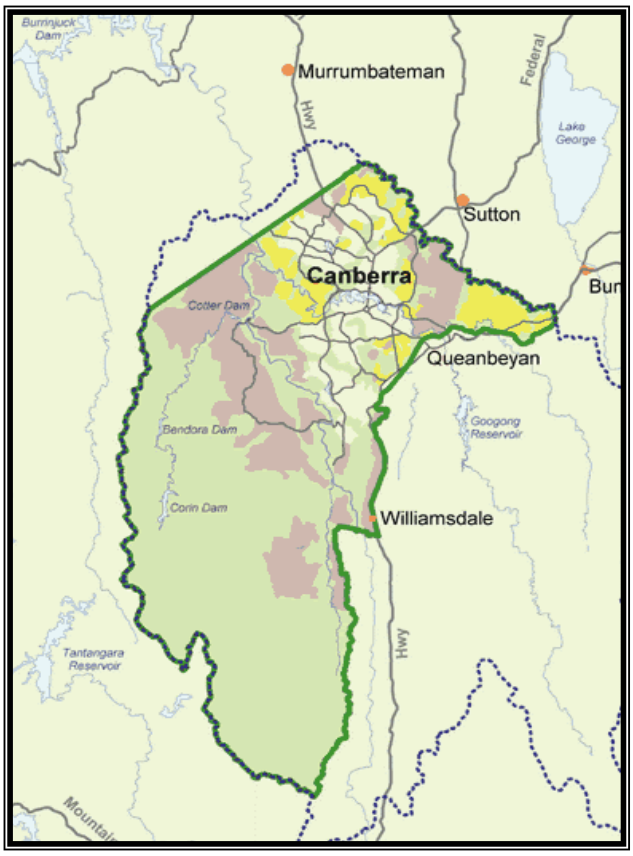
i) Severe loss or financial hardship to the community

is considered **unacceptable** by the TWRA Working Group and measures were considered and agreed to prevent or minimise this outcome.

Community & Environmental Description – Australian Capital Territory

3.7. General Profile

The Australian Capital Territory (ACT) is home to the Australian Government, including its Departments and Agencies as well as many embassies and consulates concentrated mainly in the inner area of Canberra.



The ACT is surrounded by the State of New South Wales bordering the Yass Valley to the north, Queanbeyan and Palerang to the east, Cooma Monaro to the south and the Brindabellas to the west. It is 571 metres above the Pacific Ocean level.

Located on the ancient lands of the Indigenous Ngunnawal people, Canberra's name is thought to mean 'meeting place', derived from the Aboriginal word Kamberra.

European settlers arrived in the 1830s, and the area won selection by ballot for the federal capital in 1908. Canberra's special contrast of nature and urban living was planned in 1912 by master designer, Walter Burley Griffin, a Chicago architect, who won an international design competition.

The provisional Parliament House opened in 1927 in what was at that time a treeless paddock.

Since then, Canberra has grown into a vibrant, cosmopolitan city with national attractions housing the heritage, history and national collections that make Canberra the home of the Australian story.

Canberra is surrounded by hills and nature reserves, attracting many outdoor recreational activities such as bushwalking, cycling and skiing. There are a wide range of national parks within the region. These activities and other public festivities throughout the year tend to attract many visitors who may be unfamiliar with the area.

3.8. Demographic factors

Population

Canberra is home to approximately 352,000 people with approximately 133,500 households. Key features that describe Canberra's population include a well educated population, high embassy representation, Federal Government and political overlay with international representatives (consulates), Canberra is home to a high number of overseas students and migrant refugees which highlights the communication challenges with the non English speaking residents.

Residents have high expectations of Government services. There is a small rural population, defence personnel, and the Territory is considered as a regional 'hub' for NSW residents. Also there are large tourism numbers throughout the year, significant snow traffic in winter, with many ACT residents travelling to the coast in summer.

The population of the ACT is projected to increase by approximately 50,350 persons, to an estimated total of 390,100 persons by 2019. Much of the Territory's population growth is projected to occur in the new development areas of Gungahlin and Molonglo, with these areas increasing by 20,500 and 10,300 persons respectively.

Lower level growth is projected in Belconnen, North Canberra, South Canberra, Woden Valley and Weston Creek with Tuggeranong projected to experience a small decline of around 0.1 per cent per annum. Belconnen and Tuggeranong are expected to remain the most populated districts in the ACT. Weston Creek (as well as the proposed new Molonglo development) are projected to be the least populated districts as at June 2019.

The ageing population also is expected to increase, with the percentage of people aged 65 years and over to rise from approximately 10% in 2007 to 14.3% in 2019.

While the populations of Belconnen, Weston Creek, Gungahlin and Tuggeranong are projected to age the most rapidly out of the already established areas, Weston Creek, is to become the district with the oldest population (with a median age of 41 years projected in 2019) driven by the high proportion of persons aged over 85 years in this district.

The established districts with the youngest population projected in 2019 are to be North Canberra (driven by the prominence of tertiary educational institutions in this area) and the ACT remainder with median age of 32. Molonglo (driven by the in-migration of young families) is projected to have a median age of 29 in 2019.

Community Capacity

This project seeks to engage emergency managers and the community to take measures to protect the ACT from natural and other hazards and to mitigate the effects of such hazards. Given the increasing regularity and severity of natural disasters, it is recognised that a coordinated and cooperative effort is required to enhance the Territory's capacity to withstand and recover from emergencies and disasters. A disaster resilient community is one that works together to understand and manage the risks that it confronts. Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. If all these sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector.

The risk assessment produced as a result of this project will direct the allocation of funding under the Natural Disaster Resilience Program so that additional treatment options can be implemented.

Industry

Key industry in the ACT includes Government businesses and buildings, Embassies, Consulates, education (universities), Commonwealth Defence, building industry, Cultural and Heritage sectors.

Public Buildings

Some of the key public buildings are: Parliament House, museums, galleries, Institute of Sport, Canberra Stadium, Malls, town centres airport and business parks, the three main commercial hubs, Government House, The Lodge, embassies (found within the Parliamentary triangle), universities and places of national interest/ importance.

Critical Infrastructure

In relation to utilities infrastructure, the ACT Government meets its electricity needs through the National electricity Market Transmission located in NSW via one connection to the grid with a second currently underway.

In relation to water and sewer services, ActewAGL is the provider. Current projects to secure the availability of the service include Cotter Dam project, the Murrumbidgee to Googong water transfer and the purchase of water entitlements from Tantangarra Dam. The Government also has significant

information and communications technology assets, communications facilities, emergency services, banking and finance, hospitals and other health services, transport and main highways and bridges. Canberra based Commonwealth infrastructure includes: Parliament House and Government Department buildings. Other infrastructure includes correctional facilities in the Territory.

Essential Services

Canberra is dependent on critical NSW services to function and is reliant on interstate suppliers for gas, electricity, fuel and food. It has two public hospitals and a number of smaller private ones. Other services include police stations and courts.

Transport

Much of metropolitan Canberra was designed in the 1960s around a car-based transport and land use system with the expectation of a future trunk public transport system. Currently, cars provide the bulk of Canberra residents' accessibility needs (83% of work trips), with relatively low use of public transport, walking and cycling for work trips (7 per cent, 4 per cent and 2.3 per cent respectively). Compared with the Australian average for getting to and from work, Canberrans use their cars more, cycle more, walk about the same and use public transport less.

With the population expected to continue to increase, the ACT Government is working towards establishing a more sustainable form of transport infrastructure with plans to not only improve public transport but also continue to expand the network of "Park and Ride" facilities.

The ACT Action Plan for Accessible Public Transport is considering the needs for people with disabilities.

The car will continue to be the dominant mode of transport, perhaps for a long time. However, some people in the community are not able to use or afford to own a car, so the community cannot rely exclusively on cars. In addition, the ACT's car-based system has some negative impacts that need to be addressed.

3.9. Geographic factors

Environment

The topography of the ACT is characterised by rugged mountains in the west and south, and plains and hill country in the north, with approximately 60% of the Territory hilly or mountainous. The highest peak is Bimberi Peak at 1910 metres in the south east, and the lowest point is at 450 metres where the Murrumbidgee River crosses the ACT / NSW border in the North West.

Two rivers (Murrumbidgee and Molonglo) run through the Territory and there are ten man-made lakes. Googong and Ginninderra dams are potential flood risks to the Territory. The City was deliberately built in a valley and not on the ridges.

The total area of the ACT is 236,000 hectares (2360 km2), comprising:

- 16,000 ha urban area;
- 169,000 ha of national parks and nature reserves;
- 42,500 ha of rural lease; and
- 8,500 ha Commonwealth Land and other leases including the airport.

The ACT is entirely surrounded by the State of New South Wales. Many of the hazards that threaten the ACT will potentially have cross jurisdictional implications; emergency management arrangements in the ACT are closely aligned and integrated with NSW arrangements.

Climate

Whilst the National Capital is known for having four distinctive seasons throughout the year, these seasons still see an extreme swing in weather conditions.

The ACT has experienced extreme swings in weather conditions having recently come out of an extended 'drought' period. The highest ever recorded maximum temperature is 42.2 degrees which was recorded on 1st February 1968. The lowest recorded temperature is -10 degrees Celsius on 11th July 1961.

Warm to hot conditions are generally experienced in summer with cooler nights. January is the hottest month with a mean daily maximum temperature of 27.7 degrees Celsius. On average there are ten days where temperatures exceed 30 degrees and 2 days of 35 degrees and above. There is a period of heightened/increased storm activity in the ACT from September to March with an average of 19 thunderstorm days compared to the annual average of 23 days. Canberra experiences occasional hail storms.

Winters are cool to cold, which can experience sunny days, light winds and a considerable number of frosts. July is the coldest month with an average of 11.2 degrees as the average maximum and -0.2 degrees Celsius as the average low temperature. Winter is also a period of considerable fog activity with an average of 44 fogs per year 36 of which occur between the months of April and September.

The average annual rainfall is 629 mm with an average of 108 rain days per year. Rainfall in most years is reasonably reliable, significant droughts have been experienced in El Nino years. These years also tend to be significant fire seasons.
(Source http://www.bom.gov.au/nsw/canberra/climate.shtm)

Canberra is expected to experience an increase in hotter and drier weather. The number of days rated as high or extreme (under the old system) is expected to increase from 23 to 36 days per year. Climate change is very likely to result in higher exposure to extreme heat as the number of hot days (>35°C) and very hot days (>40°C) are projected to increase.
(http://www.actpla.act.gov.au/topics/significant_projects/planning_studies/sustainable_future/spatial_plan_research)

Authorities are beginning to plan for changes in weather patterns predicting higher temperatures, stronger winds in summer, drier average conditions, increased risk of extreme weather events and an elevated risk of bushfire.

4. Risk Identification

4.1. Natural Hazards - A National Perspective

The European colonisation of Australia – and its written history – began at Sydney Cove in 1788 with the first 1500 people arriving with the First Fleet. By 1868 population numbers had increased to 160,000 and by Federation in 1901 the population had reached 3.8 million non- indigenous and 93,000 indigenous. Today, Australia is host to almost 23 million people with the population expected to exceed 28 million by 2030.

Spread across 7.7 million Km2, the majority of the population is concentrated in the cities and mostly in the eastern states of the Country. The highest populated suburbs (as at January 2011) across Australia per State/ Territory are:

Reservoir, Victoria	45,971
Blacktown, New South Wales	38,913
Buderim, Queensland	25,201
Mount Gambier, South Australia	23,494
Canning Vale, Western Australia	23,287
Kambah, Australian Capital Territory	15,582
Devonport, Tasmania	13,946
Karama, Northern Territory	4,777

In 1994, researchers at Macquarie University, in what was later to become the insurance industry-sponsored research centre known as “Risk Frontiers”, began compiling databases on natural hazards and their impacts in Australia. It resulted in an integrated data base containing more than 5,000 hazard occurrences and information about their impact on human population and damage to the built environment resulting from nine natural perils – bushfires, landslides, floods, earthquakes, wind storms, tornadoes, tropical cyclones, hailstorms and tsunamis.

In his 2004 publication “Issues in Risk Science – Natural Hazards Risk Assessment – An Australian Perspective”, Russel Blong stated that tropical cyclones and floods together account for more that 70% of known natural hazard deaths since the European colonisation of Australia in 1788. Thunderstorms, particularly lightning, and bushfires each account for 11% to 13% of deaths, indicating that the other hazards considered have produced very few human deaths, at least in the last 200 years.

At the other end of the spectrum, deaths in earthquakes, landslides and tsunamis combined account for less than 2% of all deaths. This reinforces the view that Australia is a land of meteorological perils; a low lying, ancient continent with all its sea coast remote from the active boundaries of tectonic plates is unlikely to be dominated by geological hazards.

Table 1: Summary of deaths in natural hazards in Australia: 1788-2003.

Peril	First recorded Death	Number of Deaths	% Total Deaths
Earthquake	1902	16	0.3
Landslide	1842	95	1.6
Bushfire	1850	696	11.4
Thunderstorm	1824	774	12.7
Tornado	1861	52	0.9
Cyclone	1839	2163	35.5
Flood	1790	2292	37.6
Tsunami		0	0.0
Total		6088	100.0

Source: (R J Blong - 2004)

The National Risk Assessment Guidelines (NERAG) reports that between the 1950s and the 1990s the reported global cost of natural disasters increased 15 fold and by 1999 in Australia the annual cost of large natural disasters alone was estimated at $1.14 billion (based on data from the period 1967–1999). This upward trend of disaster costs, globally and in Australia, continued in 2008 the economic cost of the five most significant Australian events alone exceeded $2.49 billion. The cost of the recent disaster events at the beginning of 2011 is without doubt expected to exceed all previous disasters.

Events by Zone

Further statistics on the impacts of natural hazards were sourced from the Emergency Management Australia website. Disasters are listed by their Zone. Currently these are: Victoria, New South Wales, Queensland, Western Australia, South Australia, Tasmania, Northern Territory and the ACT.

The table below includes records of all natural and non-natural disasters by zone that have occurred within Australia (where information is available) since European settlement to current date.

Zone	Dead	Injured	Total Cost
Australia	12,573	2,000,401	$3,478,800,000
Australian Capital Territory	463	541	$599,700,000
New South Wales	2,818	4,522	$10,073,600,000
Northern Territory	360	1,109	$365,089,314,000
Queensland	2,678	2,461	$2,615,687,400,000
South Australia	8,001	5,091	$1,189,700,000
Tasmania	229	1,914	$908,100,000

Victoria	5,905	15,790	$14,866,000,000
Western Australia	1,471	725	$2,271,039,266
Total	**34,498**	**2,032,554**	**$3,014,163,653,266**

Source: http://www.disasters.ema.gov.au/Browse/Zones.aspx

The total cost listed in the table above is indicative of all insurance losses reported by the Insurance Council of Australia. The data may be incomplete or inaccurate.

4.2. A Local Perspective

The following table outlines a history of significant events that have occurred in the ACT and surrounding areas as a result of severe weather conditions. It describes the level of impact on the affected communities and the role of emergency services in providing assistance.

This information was sourced from Bureau of Meteorology, 'Monthly Significant Weather summaries'.

2012
February-March Widespread, heavy and persistent rainfall was recorded across southeast Australia between 27 February and 5 March 2012. Canberra Airport recorded 198 mm of rain during March, almost four times the historical average of 50.7 mm. This is the 3rd wettest March on record for Canberra Airport. The exceptional rainfall caused widespread major, moderate and minor flooding across south-eastern New South Wales as well as northern and eastern Victoria. The ACTSES responded to over 900 requests for assistance.
2011
January January 5 - A severe thunderstorm in Canberra was associated with reports of golf ball sized hail, resulting in roof damage in the Tuggeranong area with over 200 calls for assistance to the ACTSES.
2010
December 2010 Heavy rain during the last week of November and first weeks of December lead to substantial flooding during early December, with widespread evacuations of towns including Wee Waa, Coonamble, Queanbeyan and Wagga Wagga. There were 135 flood rescues and over 2800 requests for assistance to the NSWSES between November 29 and December 13. The ACTSES responded to 927 requests for assistance.
2009
January Thunderstorm with 2cm hail at Yarralumla, an inner suburb of Canberra. Heavy rain caused flooding of stormwater drains after 38mm at Curtin and 37mm at Watson. Roads were blocked when strong winds brought down trees. Lightning hit a substation in Melba causing power outages to nearby homes. The ACTSES responded to 228 requests for assistance. 20 January - Canberra Airport recorded a wind gust of 106km/hr from a thunderstorm downburst. This is the strongest winds in January since 1980 and the strongest winds in any month for over 12 years. Several trees were brought down blocking roads in Curtin. 22 January - strong winds during a dust storm on the SW Slopes, the highest gust of 100km/hr at Khancoban was the 2nd highest wind gust at that site over the past 7 years. The strong winds brought down over 80 trees in the Howlong area and caused power outages affecting over 4000 people. The NSWSES reported nearly 200 jobs. In the northern suburbs of Canberra a 2km trail of damage in Harrison, Dunlop and Palmerston was possibly caused by a tornado. The ACTSES reported over 80 jobs.
2008
August An upper cold pool of air brought light snowfalls to low levels over the Southern and Central Tablelands and the higher parts of the South West Slopes. Snow settled to a depth of about 4cm near Batlow on the South West Slopes and 2cm at Crookwell. Snow was reported on the Hume Highway near Yass disrupting traffic. There were also snow flurries in some northern Canberra suburbs with heavier falls in the Collector area on the Southern Tablelands, disrupting traffic flows on the Federal Highway. Over half a metre of snow fell in the Snowy Mountains during the first 10 days of August. September A line of storms caused strong winds over southern districts of NSW. The highest gust was 126 km/hr at Thredbo AWS, the strongest winds in NSW during September, and 104 km/hr at Cabramurra, both in the Snowy Mountains. The ACT experienced the strongest winds since December 2005 with a gust of 98km/hr at Canberra Airport. Mount Ginini in the mountains SW of Canberra recorded a similar gust. There were

many reports of falling trees causing damage to buildings with several houses unroofed. One person was injured in the suburb of Kambah when a tree pinned him to the ground. The ACTSES responded to 105 requests for assistance. October A thunderstorm, small hail and strong winds brought down trees in northern Canberra. Minor structural damage from strong winds in the Queanbeyan area caused 6 jobs for the NSWSES. December Severe thunderstorm with heavy rain and small hail in Canberra caused local flash flooding in the Deakin-Curtin area of Woden Valley. Up to 56mm recorded at Curtin (Deakin West) in about 2 hours. The ACTSES responded to 117 requests for assistance.
2007
February At Canberra a severe thunderstorm occurred in the Kambah-Weston Creek area (southwest Canberra). Flash flooding damaged many houses. The highest fall of 56mm occurred at Stirling College. At Canberra, widespread heavy hail up to 3cm in diameter covered the ground to depth of 20cm causing 1 metre high drifts in the Civic Centre. Cars were damaged and many buildings were closed due to water damage. Telecommunications were also cut. Hail caused extensive damage at the Australian National University which was closed for a day along with numerous other government buildings and several schools. More than 1,100 homes were flooded. The ACTSES responded to 289 requests for assistance. June Heavy snow between Canberra and Braidwood closed Kings Highway. Up to 15cm of snow was reported at Bungendore, east of Canberra. In the hills south east of Canberra, falls of 20-30cm were reported, closing all local roads. The weight of snow broke large branches off many trees. Falls up to 10cm were reported from higher ground of the Central Tablelands. At Michelago, south of Canberra, 10-15cm of snow closed the Monaro Highway for several hours. November On the 3rd at Canberra thunderstorms with heavy rain and local flash flooding were reported in the central business district. On the 28th at Jerangle, south of Canberra 66mm in a short period was recorded.

Earlier significant events

Earlier events that resulted in significant impact on the ACT in earlier years are noted as follows:

2005
January Heavy storms & mini cyclone struck the Territory leaving a path of destruction from Belconnen to Fyshwick. Hundreds of trees and power lines were brought down by the severe winds and resulted in 1 dead with 51 suburbs reporting significant damage.
2003
January Temperatures in the 40 degree range, strong winds and lightning strikes resulted in the most destructive fires the ACT had experienced, resulting in 4 deaths, over 500 properties destroyed and significant impact on the environment of the ACT, including its key water catchments.
1971
January Australia Day - flash flood in the Woden Valley of Canberra – 7 dead, 15 injured and 500 people affected. Significant property damage was reported.

Further information on these earlier events is found in the following Section - Hazard and History Analysis of this report.

4.3. Hazard Identification

The following table represents the initial assessment carried out by the TWRA Working Group to identify what hazards, should any of them occur, could be of such a severity that would require a coordinated multi-agency response.

The TWRA Working Group identified and agreed that the following hazards would be considered in the assessment:

Hazard	Lead Agency
Transport	
Transport Emergency - Aviation	ACT Policing
Transport Emergency – Road	ACT Policing
Transport Emergency – Railway	ACT Policing
Energy Infrastructure	
Fuel Supply Emergency (excl. energy infrastructure failure)	ESA
Infrastructure Failure – Roads and Bridges	ACT F&R
Infrastructure Failure – Building Collapse (incl. major structure collapse)	ACT F&R
Infrastructure Failure – Dam Flood	ACTSES
Infrastructure Failure/ Supply – Gas	ESDD
Infrastructure Failure – Power	ESDD
Infrastructure Failure – Communications	ESA
Infrastructure Failure – Water	ESA
Infrastructure Failure – Sewerage	ESA
Fire	
Fire – Industrial	ACT F&R
Fire - Bush	ACTRFS/ ACT F&R
Health and Environmental	
Human Infectious Disease of epidemic potential	Health Directorate (HD)
Water Supply Contamination	HD
Bio-Security Emergencies (incl. exotic/endemic animal, plant and pest emergencies)	TAMSD
Hazardous Material – (unintentional release onsite)	ACT F&R
Natural	
Extreme Heat	ACTAS/ HD
Flash Floods	ACTSES
Flood - Rivers	ACTSES
Severe Storm	ACTSES
Earthquake	ESA

4.4. Hazards History and Analysis

The following tables provide information on the characteristics of each hazard included in this report. This information was used by the TWRA Working Group to assess the level of risk posed by each of these hazards, should they occur in the Territory.

Information provided for each hazard includes:

History	Records of past events in the local area/community or elsewhere.
Intensity	How big, how fast, how powerful, how heavy.
Extent	Size of the physical area, communities or population affected.
Speed of onset	Event duration, warning time, time of year.
Vulnerabilities	What other aspects of the community not directly affected by the hazard could suffer some kind of impact?
Secondary Hazards	Other hazards that may result from the occurrence of the main hazard.

Hazard Name:	**Transport Emergency - Aviation**
Lead Agency:	**ACT Policing**
History	Canberra Airport is the 8th busiest airport in Australia. Canberra Airport can receive aircraft up to and including 747's and in the financial year ending 2009 handled 3,061,859 passengers. The Airport has two runways and services flights to and from domestic destinations, mainly in eastern Australia. There are currently no international flights. Fairbairn Airport is located alongside Canberra Airport and is capable of receiving most large military aircraft. Since 1999, there have been 12 recorded incidents within the ACT that resulted in 4 fatalities. All fatalities have occurred outside the boundary of the airports.
Intensity	The impact of an aviation incident will be dependent on the location of the incident, type of aircraft involved and number of passengers. Aviation incidents can contribute to increased hazards and damage to properties and infrastructure. Areas impacted may require evacuation and major transport routes may be disrupted.
Extent	Accidents recorded since 1999 have occurred both within the Canberra airport boundary and areas external of the airport. All fatalities were recorded external of the airport.
Speed of onset	Quickly developing situation if not immediate. Weather conditions may contribute to the impact of the incident. The duration of the incident would be dependent on the scale and location of incident.
Vulnerabilities	Dependent on the scale and location of the incident may include: o Disruption to essential services; o May place pressure on Territory health services; o Disruption to flight services in/out ACT; o Traffic delays due to road closures.
Secondary Hazards	Dependent on scale and location of incident, may include: o Disruption to local businesses/ residents potentially medium to long term; o Disruption to the economy (tourism); o Environmental impact.
Risk Statement	There is a risk that a significant transport emergency - aviation involving a passenger or freight plane could result in multiple fatalities and mass casualties, psychological impact to the community, possible damage to key infrastructure, significant property damage, environmental impact, hazmat impact, possible evacuation, establishment of exclusion zones, property fires, and have economic impact on the community.

Hazard Name:	Transport Emergency - Road
Lead Agency:	**ACT Policing**
History	The ACT has only had a small number of road transport emergencies that have had a considerable impact on the region. Hazards impacting any of the three Highways into Canberra (Barton, Monaro or Federal Hwy) may have a significant impact on the ACT and affect access and/or egress to the region. The ACT has an established and well-designed road system and consistently records low crash rates when compared to other jurisdictions. Between March 2010 and February 2011, the ACT fatality rate (per 100 000 population) was 4.7% compared with the National average of 5.9% (Department of Infrastructure and Transport, Australian Infrastructure Statistics Yearbook 2011). Apart from the spike in 2005, the ACT fatality rate is consistently lower than the National average. (In 2005 there was a total of 7033 on road crashes, made up of 6560 property damage crashes, 418 injury crashes and 25 fatal crashes (ACT Road Safety Strategy 2007-2010). On 14 August 2010, while concrete was being placed for the deck of the Gungahlin Drive Extension Project Bridge over the Barton Highway, a portion of the temporary works supporting, amongst other things, the formwork, structural steel and freshly placed concrete collapsed onto the road below. Fifteen workers were injured, two seriously. This had a wide spread effect on the Community with traffic diversions in place for over one month. The Barton Highway did not re-open until 20 September 2010.
Intensity	Road emergencies or major accidents, particularly those resulting in fatalities can impact traffic flow for extended periods of time. In 2007 a double fatality closed both northbound lanes of the Monaro Highway with no truck/bus access for 9 hours. The impact of road closures in the ACT is usually minor as road diversions are promptly coordinated by TAMS and implemented by CARE or Traffic Technologies.
Extent	Road related emergencies or major road accidents can close roads for considerable periods of time, for example in Aug 2010 the Gungahlin Drive extension partial bridge collapse had a widespread effect on the Community.
Speed of onset	Road transport emergencies can not be predicted; however hazardous weather conditions can increase their likelihood. Poor weather can have an effect on road surfaces and severely limit driver's visibility. An analysis of ACT crash data for the last five years shows that the peak times for crashes coincide with morning and afternoon traffic volume peaks. In terms of the age profile of total casualties during this period, 37% were aged less than 30yrs old.
Vulnerabilities	A road emergency resulting in multiple injuries or fatalities can place pressure on the ACT's health services. Some road emergencies may affect infrastructure such as street lighting and traffic lights. Road closures and diversions may result in widespread traffic congestion. On going road closures and diversions may place pressure on TAMS, SES, to maintain the resources.
Secondary Hazards	Dependent on scale and location of incident, may include: o Environmental impact; o Pedestrian and Cyclists safety; o Traffic congestion/disruption to motorists; o Property damage; o Disruption to economy (economic cost of on road crashes in ACT in 2005 was approx $180 million).
Risk Statement	There is a risk that a significant transport emergency - road could result in fatalities, significant casualties property damage, damage to adjacent road infrastructure (including bridges), establishment of road closure, exclusion zones, persons being trapped, hazmat impact, environmental, psychological and economic impacts and freight and transport disruptions.

Hazard Name:	Transport Emergency – Rail
Lead Agency:	**ACT Policing**
History	There is limited rail infrastructure and services within the ACT (1 line and 1 railway Station). Country Link offers three daily services to Sydney and connections to Melbourne via Cootamundra. The Australian Railway Historical Society runs day trips to various NSW country towns throughout the year. Transport Emergencies involving rail in the ACT are rare.
Intensity	The impact of a rail incident will be dependent on the location of the incident and the numbers of passengers involved.
Extent	The location of the incident would be restricted to the immediate area of the rail infrastructure. (Lines or Station).
Speed of onset	Quickly developing situation if not immediate. Weather conditions may contribute to the impact of the incident. The duration of the incident would be dependent on the scale and location.
Vulnerabilities	Dependent on the scale and location of the incident but may include; o Possible impact to tourism; o Disruption to local businesses; o May place pressure on Territory health services.
Secondary Hazards	Dependent on the scale and location of the incident, may include; o Potential loss to freight industry and businesses; o Possible impact on nearby businesses; o Potential damage to infrastructure; o Environmental damage.
Risk Statement	There is a risk that a significant transport emergency - rail could result in loss of life, significant injuries, property damage, road closure, damage to adjacent road infrastructure (including bridges), exclusion zones, persons being trapped, hazmat impact, environmental, psychological and economic impacts and freight and transport disruptions.

Hazard Name:	Liquid Fuel Supply Emergency
Lead Agency:	**Emergency Services Agency (ESA)**
History	The ACT has not experienced a fuel shortage since the late 1980s; however, the supply situation has changed in that there is no bulk longer storage of liquid fuels in the ACT. The ACT is totally dependent on fuel being transported from NSW. Events around Australia are happening with more regularity and it is possible that a shortage will occur in the future.
Intensity	The ACT has enough fuel to last approximately 3 days. A fuel supply disruption of a greater length of time would result in rationing initially and then progress to no fuel for consumers with supply available to essential users only.
Extent	There is a risk that a disruption of the fuel supply to the ACT would result in fuel rations, disruption to businesses and essential services including the operation of acute health services, general impact on the whole community and potential civil unrest. In the winter season it would impact on the supply of heating with adverse health effects in frail and vulnerable populations. Fuel shortages would affect businesses, shops would be incurring a loss of trade, and tourist attractions would lose patronage. Trucks would not be transporting to the ACT therefore shop supplies would dwindle and eventually there could be civil unrest.
Speed of onset	The National Oil Supply Emergency Committee through the Commonwealth Department of Resources, Energy and Tourism would be provided with an indication should there be developments overseas and therefore the build up would be quite slow. If the event happened in Australia and the cause was unforeseen, then the event could escalate in less than a week.
Vulnerabilities	All members of the community would be affected in some way by a liquid fuel emergency. Emergency workers and health professionals may be restricted in their ability to attend work which would place extra pressure on those areas.

Secondary Hazards	Dependent on scale and location of incident, may include: o Civil unrest; o Property damage; o Business closures; food, tourism, leisure; o Sporting venues closed; o Food shortages; o Disruption to economy; o Disruption to schools; o Potential for isolation of properties.
Risk Statement	There is a risk that a protracted disruption of the fuel supply to the ACT would result in fuel rations, disruption to businesses and essential services, general impact on the whole community and potential civil unrest.

Hazard Name:	**Structural Collapse – Roads and Bridges**
Lead Agency:	**ACT Fire and Rescue (ACT F&R)**
History	Bridge collapse, Barton Highway. Bridge under construction collapsed injuring several workers and forcing the closure of the main highway into Canberra (from the north west). Refer also to Transport Emergency Road above.
Intensity	Both were sudden and unexpected industrial accidents.
Extent	Traffic impact for duration of closure, affected communities as traffic diverted around scene. There could also be industrial ramifications.
Speed of onset	Rapid and unexpected. Nil warning.
Vulnerabilities	Commuters, traffic delays. Disruption to Defence Academy activities.
Secondary Hazards	Dependent on scale and location of incident, may include increased traffic through suburban areas leading to increased vehicle accidents and traffic congestion. Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that a significant infrastructure failure – roads and bridges, could result in loss of life, significant injuries, property damage, road closure, damage to adjacent road infrastructure, establishment of exclusion zones, persons being trapped, significant impact on community, environmental impact, disruption to businesses, psychological trauma of local community, freight and transport disruptions and damage to utility/ communication network attached to the structure.

Hazard Name:	**Building Collapse (incl Major Structure collapse)**
Lead Agency:	**ACT Fire and Rescue (ACT F&R)**
History	Past incidents have included roof collapse of occupied building at defence college, Weston and explosion and collapse at Manuka Football Club at Forrest.
Intensity	Sudden, involved whole building in both instances. Manuka Football Club destroyed.
Extent	Extent could include major impact to immediate area, access issues in business or industrial areas and infrastructure implications. Impact could be prolonged.
Speed of onset	Could be sudden and without warning
Vulnerabilities	Impact on local medical facilities and transport industry in general if a regional or state road is involved.
Secondary Hazards	Dependent on scale and location of incident, may include: o Disruption to local businesses; o Disruption to schools and nearby community; o Incidents of this type will invariably tie up local resources for extended periods.
Risk Statement	There is a risk that a significant infrastructure failure – building collapse (including major structural collapse), could result in multiple losses of life, significant injuries, entrapments, multiple fires, loss of assets of interest, environmental impact, impact to transport routes, exclusion zones, business disruptions, community impact, large scale evacuation and displacement of people.

Hazard Name:	Infrastructure Failure – Dam Flood
Lead Agency:	**ACT State Emergency Services (ACTSES)**
History	There is no history of flooding from dams due to infrastructure failure in the ACT or surrounding areas. Nov 2010 – Cotter Dam overflows releasing large amounts of water. December 2010 – Googong Dam overflowing. Houses and business in Quenbeyan were inundated and 10 people had to be rescued. In other parts of the country, incidents include: 2008 - 10 yr old fabridam structure collapsed; the flood waters claimed the life of a 4yr old child in central QLD. May 2010 Bulli, NSW threat of dam collapse after deluge weakened ground surrounding structure. 2011 Wivenhoe Dam – water released to prevent Dam collapsing during unprecedented severe rainfall which resulted in flooding of lower lying areas.
Intensity	Googong Dam - Peak water level will be in the vicinity of 560m AHD at Kings Ave and Commonwealth Ave bridges. Travel times for the flood peak at Kings Ave Bridge for sunny day failure is 120 minutes. Corin, Bendora and Cotter Dams – Due to the isolated locations of the Corin and Bendora Dams, a dam failure could go undetected until the flood wave has travelled 30-50km down the Cotter River. This obviously reduces the flood warning and consequent response time. Indicative times for the flood peak following dam failures to the Cotter reserve playground are: Corin – 1h 58 m; Bendora – 1h 25m; Cotter - 28m.
Extent	Googong Dam (Level 1 or Level 2 emergency) - Probable consequences will result in destructive flooding in NSW and the ACT. Lives and property are at risk in rural, residential and commercial areas in ACT suburbs and districts north and south of the Molonglo River and Lake Burley Griffin, Canberra CBD and the Parliamentary Triangle. Approximately 6000 people live and work in the flood inundation areas in the ACT. Corin, Bendora and Cotter Dams (Level 1 or Level 2 emergency) – there may be destructive flooding in rural recreational areas in the ACT. Lives and property are at risk in the Cotter River Valley, at or near the Cotter Reserve and in rural recreational areas along the Murrumbidgee River to the ACT border. In NSW the Burrinjuck Dam may cut off service if Cotter River Dams fail. In event of a Googong Dam Emergency the Scrivener Dam gates shall be lowered to release water from Lake Burley Griffin to mitigate the effects of flooding.
Speed of onset	Could be sudden or there may be sufficient notice to warn those on the path of the flood waters. Indicative times are shown above.
Vulnerabilities	The primary impact will be upon work locations within the Parliamentary Circle and the CBD. Lesser impacts will be mobility with the ACT and surrounding areas and recreational areas along the Murrumbidgee River.
Secondary Hazards	Significant disruption to ACT and Federal Government normal daily business.
Risk Statement	There is a risk that an infrastructure failure involving Googong Dam, Tantangara Reservoir or the Cotter River Dams,(Corin, Bendora and Cotter Dams)could result in a surge of water with minimal warning causing loss of life, property damage, structural collapse, key infrastructures, impact on water supply and sewer service, damage to significant and cultural assets, loss of livestock, environmental, impact on businesses.

Hazard Name:	Infrastructure Failure / Supply – Gas
Lead Agency:	**Environment and Sustainable Development Directorate (ESDD)**
History	There are two pipelines, DN 250 Primary Pipeline (Gungahlin to Phillip) & DN250 Hoskinstown to Fyshwick Pipeline, in the areas. No history of failure is recorded for these pipelines, but the potential of failure still exists if the pipelines are punctured by machinery excavation/boring operation. Machine excavation and boring can penetrate the pipe wall when the penetration resistance of the pipe is exceeded. Pipeline incidents of this nature have occurred recently in the US with catastrophic effects. The ACT has gas mains and services at varying pressure throughout the city. Pressures range from 1030KPa to 210KPa, with pipe sizes from 160mm to 18mm. The network is prone to damage from third parties and there are component failures resulting in releases of gas. There have been no significant incidents reported in ACT on the gas leakage or explosion resulting from gas equipment failure. However, small and minor incidents of gas leaks happen occasionally. Recent such occurrences include a Gas main failure and subsequent leakage at Canberra Airport and Incident of fire on the site adjacent to Fyshwick TRS.
Intensity	The intensity of the incident depends on the pressure of the gas in the equipment that has failed and the surrounding environment. The pipeline failure mode is ruptured if the damage exceeds the allowable defect length of the pipe. Rupture means that full bore failure of the pipe with full pressure gas release at 14.9 MPa of the Hoskinstown 6.2MPa of the primary. In relation to the mains, it is dependent on the size and pressure of the main/service and location of the incident. However, gas fires generally have intense heat that has the potential to cause damage or fatalities, injury within the proximity of the ignition.
Extent	Incident on the high pressure gas pipeline or equipment could result in multiple fatalities due to fire, explosion and asphyxiation. Critical infrastructure such as highways, roads, buildings, etc may be impacted by the failure of the high pressure gas pipeline. Incident on medium and low pressure gas pipeline could result in emergency evacuation, restricted access to the affected area and gas release in the atmosphere. In the pipeline, if the gas is ignited, the heat radiation contour can extend up to 530m (EGP) and 300m (Hoskinstown) radius respectively from the ignition source. People within the heat radiation zone can either suffer injury (3rd degree burns) or fatality. In the mains, it would depend on the size and pressure of the main/service and location of the incident. If the gas is ignited, the heat radiation contour can extend up to 150m radius (in worse case) from the ignition source. People within the heat radiation zone could suffer injury (3rd degree burns) or fatality.
Speed of onset	When gas fire is involved the effect is instantaneous. The warning time on the high pressure gas pipelines is difficult to predict. But the deterioration in the pipe condition can be monitored by the reduction in the thickness of the pipeline with the help of intelligent pigging. The onset of fire due to gas explosion is instantaneous. Time required to contain the fire may range from a few hours to days. There is little or no warning time available. The failure is not time dependent, but it is more likely to occur in the winter period due to high demand of gas in winter. Incidents on medium pressure pipelines are fast to respond to and easy to contain.
Vulnerabilities	The pipelines and mains services supply natural gas to customers in the ACT and Queanbeyan. Incidents on high pressure gas pipelines can leave a large mass of the community without gas for days or weeks. Businesses that depend on the natural gas as a source of fuel to undertake routine operations may freeze their operations temporarily. If the incident occurs in winter resulting in failure, it may put additional constraint on the electricity distribution network as the customers switch from gas to electricity to meet their energy needs. If the pipeline is ruptured and suffers significant damage, there may be large numbers of customers affected with possible long lead time to restore gas supply. There have been large areas of up to 1000 customers affected.

Secondary Hazards	Dependent on scale and location of incident, may include: o property damage; o environmental damage; o temporary closure of services or businesses; o lack of heating or cooking (in winter can be significant); o Increased demand on other utilities (i.e. electricity).
Risk Statement	There is a risk that a significant infrastructure failure – gas, could result in impact on local businesses, impact on social and health of the community, impact on vulnerable communities, due to lack of heating and cooking facilities to residents, possible evacuations; businesses, nursing homes etc.

Hazard Name:	**Infrastructure Failure Power**
Lead Agency:	**Environment and Sustainable Development Directorate (ESDD)**
History	The ACT has no electricity generation capacity and imports its electricity through the national electricity grid and TransGrid's Transmission network. ActewAGL are responsible for distribution within the Territory. The 2003 Canberra bushfire resulted in significant damage to the electrical infrastructure and disrupted electricity supply to over 20,000 homes for up to a week. In other parts of the country, incidents include: o 2008 Melbourne VIC left 420,000 homes without power after severe windstorm; o 2009 Melbourne VIC, 500,000 households without power during heatwave; o 2009 Sydney, power failure forced closure of Sydney Harbour Tunnel and Eastern Distributor.
Intensity	Power outage events are instant and unpredictable to some level. Regular maintenance and inspections ensure that this risk in minimised. Loss of the national electricity grid or TransGrid's transmission network servicing the ACT would result in total loss of ACT. Power outages resulting from ActewAGL's network would generally be localised.
Extent	Outages can to be any area or installation that has power. In the event of an interruption to the supply the whole of the ACT can experience loss of power. The potential consequences of a sustained power outage are environmental health effects of heat stress in summer or hypothermia in winter. The safety of technology dependent people is at risk in a power outage. The hospital has about 10 hours of generator supply, so acute medical services are problematic after that time.
Speed of onset	Instant with little or no warning. More likely in summer.
Vulnerabilities	As power is essential to many aspects of daily life the vulnerabilities are wide spread. o Inability to supply water to some areas; o Heat effects for vulnerable communities; o Cold effects in some parts of the community; o Impact to Federal Government and ACT Government Agencies.
Secondary Hazards	Dependent on scale and location of incident, may include: o Disruption to local businesses; o Disruption to schools; o Food shortages; o Fuel shortages; o Disruption to economy (ie: primary producers).
Risk Statement	There is a risk that a significant infrastructure failure – power, could result in significant disruption to the community, key Government services (Commonwealth and ACT), disruption to water/sewerage treatment plants and services, disruption to water supply, impact on vulnerable communities, impact on communications, security, transport, industry and local businesses, public order, impact on environment, essential services, impact on service stations, food supplies and impact on community.

Hazard Name:	Infrastructure Failure - Communications
Lead Agency:	**Emergency Services Agency (ESA)**
History	An analysis of natural and manmade disasters shows that communications failure is a common experience, either through degradation of communication channels, loss of communication points, or overload of means of communication. The loss of electricity supply also has a major impact on communications, particularly internet based communications, but also on mobile telephone towers and local telephone exchanges. The Victorian Bush fires in 2009 saw electricity and telephone lines cut, local communications points evacuated or destroyed, and major overloading of 000 and other telephone lines. The 2011 Queensland floods also saw mobile telephone towers put out of operation, land telephone lines damaged and radio stations flooded, as well as major disruptions to electricity supply. The 2003 fires in Canberra also caused overloading of response telephone lines, local disruption to electricity and telephone lines. Communications failure can also be caused by manmade actions, such as breaks to fibre optic lines, telephone lines or incorrect setting of equipment.
Intensity	The impact on communications systems will depend on the cause. The larger the cause the greater the intensity.
Extent	Again, the intensity can usually be linked to the cause. However, small issues can have wide effects on parts of the communication network. A failure in a major telephone exchange, while in a small physical area, will have an impact over a large area. As there are a range of communications networks, failures of one network does not restrict communications. There is however a move towards a greater dependence on connected networks. For example, the ACT Government telephone network is VOIP based, so the loss of the ACT Government ICT network also results in the loss of the majority of ACT Government telephones. As all VOIP phones also need mains electricity, the loss of electricity also causes a major reduction in telecommunications.
Speed of onset	Degradation of communications normally happens very quickly in an emergency situation, either through flooding of communications channels or damage to infrastructure. In some instances preventative measures may lead to degradation of communications. Electricity supply was cut off to some areas prior to the flooding in Queensland as a safety measure.
Vulnerabilities	The loss of communications hampers response to an emergency because information about the emergency may not flow into the response agencies and information to the community may be disrupted.
Secondary Hazards	Depending on the scale and location of the incident, the loss of communications can also impact on: o Distribution of other essential services such as food and fuel as automated ordering systems may not work; o Banking and finance systems; o Potential for illegal activities; o Widespread impact on the community.
Risk Statement	There is a risk that a significant infrastructure failure – communications, could result in significant disruption to the community, key Government services (Commonwealth and ACT), impact on vulnerable communities, banking and finance, security, transport, industry and local businesses, public order, essential services, supply chain network and impact on community.

Hazard Name:	Infrastructure Failure - Water
Lead Agency:	**Emergency Services Agency (ESA)**
History	Canberra Bushfires 2003 – Damaged Stromlo Water Treatment Facility. Limited loss of infrastructure.
Intensity	The ACTEWAGL water and sewerage Emergency Plan (WSEP) establishes a range of potential risks to the ACT water supply which will determine the intensity of impact. These include disease outbreak, drought, supply shortages, natural disaster, such as bushfire, supply contaminations, power supply failure, asset failure or communication and IT failures.
Extent	Territory wide & Queanbeyan.
Speed of onset	Scenario dependant. Loss of water can be instantaneous (note: backup genset at Stromlo) or may be gradual If both Googong and Stromlo WTP fails, gravity feed from Bendora can supply 90% of ACT.
Vulnerabilities	The whole of the ACT and Queanbeyan will lose water supply. Hospitals, aged care facilities and persons on dialysis will be impacted.
Secondary Hazards	Dependent on scale and location of incident, may include: o No cooling water for refrigeration plant, office buildings would likely have to shut down; o Loss of fire fighting capability; o Hospitals, aged care facilities and persons on dialysis will be impacted; o Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that a significant Infrastructure Failure – Water, could result in significant disruption to the community, health issues, disruption to sewer services, disruption to water supply, impact on vulnerable communities, industry and local businesses, public order, essential services, food supplies and impact on community.

Hazard Name:	Infrastructure Failure - Sewerage
Lead Agency:	**Emergency Services Agency (ESA)**
History	2003 Fires. Interruption to power to the facility caused total loss of treatment capability.
Intensity	The ACTEWAGL Water and Sewerage Emergency Plan (WSEP) establishes a range of potential risks to the ACT sewerage network which will determine the intensity of impact. These include disease outbreak,, natural disaster, such as bushfire, sewerage spill, treatment plant spill, power supply failure, asset failure or communication and IT failures. The 'environmental' impact of sewerage has the risk of infectious disease outbreaks, either directly or because of flushing toilets not being operational. This is a significant risk if sewerage contaminates the urban environment, including commonly encountered water courses such as storm water drains, the lake etc.
Extent	The ACT serviced by the gravity sewerage reticulation system.
Speed of onset	Limited storage in the network, plus storage at LMWQCC and Fyshwick STP. Total storage allows for 2 days (dry weather) detention. For trunk sewers, can be instantaneous.
Vulnerabilities	Water restrictions (minimise sewage flows).
Secondary Hazards	Various impact on community and industries are identified caused by specified incidents and are specified in ActewAGL WESP.
Risk Statement	There is a risk that a significant Infrastructure Failure – Sewerage, within the ACT and surrounding area could result in an overflow affecting assets of interest, schools, businesses, create possible health issues, environmental impact, possible contamination of surrounding water stores and impact on vulnerable communities.

Hazard Name:	Fire - Industrial
Lead Agency:	**ACT Fire and Rescue (ACT F&R)**
History	Jolimont Centre siege and fire in 1993 on the main road through the city area. Fires have also occurred in the minor industrial estate on the north western edge of the ACT. Businesses accumulating stock piles of 'recyclable' materials including used transport tyres, timber, builder's rubble and timber. Refer to Hazardous Materials Incidents
Intensity	Fires are sudden and unexpected and often include the unpredictability of explosions within the compound. Fires have required the bulk of the joint effort of the ACT Government's emergency services to bring the situation under control. The north west area is a recognised fire threat area, historically the major fires to impact Canberra have come from this area.
Extent	May be localised to widespread, particularly if hazardous materials are involved. Suppression aims to keep fire to the building of origin, however the impacts (smoke, risk of explosion) may be more widespread. Major risks in industrial areas of Fyshwick, Hume and West Belconnen, but may also include specific sites such as the waste recycling centres To the south east of this area are the outer Canberra suburbs and the major electrical infrastructure for electricity coming into the ACT. A fire in this area, particularly involving tyres, could have a major impact on the electricity supply to the ACT, possibly shutting the sub-station for several days for cleaning.
Speed of onset	The onset of industrial fire may be rapid, and may move beyond area of origin rapidly depending on materials.
Vulnerabilities	Disruptions to traffic, schools, employment, all facets of community life. Disruption to business. Commuters, insurance companies, wage and salary workers with no office to work from. Plume modelling has highlighted many residential areas in the path of any potential smoke plume. Persons with respiratory illness or injury would be vulnerable in this situation. Potential evacuations may be required.
Secondary Hazards	Dependent on scale and location of incident, may include: o Smoke plume through the city; o Hazards associated with diverted traffic.
Risk Statement	There is a risk that a significant fire could result in property damage potential loss of life, potential injuries loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport, closure of roads impacting on local community, economic impact and possible evacuation.

Hazard Name:	FIRE - Bush
Lead Agency:	**ACT Rural Fire Service (ACTRFS)/ ACT Fire and Rescue (ACT F&R)**
History	The ACT has a long history of bushfires. Between 1939 and 2003, the ACT has experienced severe bushfire events when intense bushfires have burnt over thousands of hectares and in some cases, entered urban areas under the influence of high temperatures, dry conditions and strong winds. The worst of these was in January 2003 and which resulted in the loss of four lives, destroyed over 500 dwellings and incurred the highest cost of any natural disaster in the ACT, including property losses valued between $600 million and $1 billion. The most affected suburb was Duffy. The variance of topography and fuel type having a key influence of impact, severity and controllability.
Intensity	The intensity of the 2003 fires was unprecedented fuelled by strong winds and 40 degree temperatures. Intense fires occurring over a long duration have occurred in the Brindabella Ranges with shorter, faster duration fires in grassland areas affecting rural and urban assets. Both represent an ongoing risk to the Territory going forward.
Extent	Rural lease holder properties, remote villages and urban interface having significant risk. Additionally key transport corridors are subject to ongoing risk during period of elevated fire danger.
Speed of onset	During times of elevated fire danger the risk to the Territory and speed of onset increases dramatically. This then creates challenges to advise key stakeholders of changing situations. The significant risk period can vary from August to March.
Vulnerabilities	Significant rural lease holders and assets, remote villages and more significantly the urban interface including key infrastructure, assets and transport corridors.
Secondary Hazards	Dependent on scale and location of incident, may include: o Business closures; o Disruption to the economy; o Damage to key infrastructure; o Social and health impact on community; o Disruption to schools; o Potential isolation of properties, loss of natural assets; o Significant environmental damage; o Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that a significant bushfire could result in property damage, potential fatalities potential casualties, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport, closure of roads, impact on local community, economic impact, possible evacuation, impact on livestock, impact of cultural assets, impact on water supply, exclusion zones, impact on Commonwealth assets.

Hazard Name:	Human Epidemic Infectious Disease
Lead Agency:	**Health Directorate**
History	Most recent local experience – H1N1 '09 Pandemic. The ACT reported approximately 980 cases between May 2009 and November 2010. Nationally, approximately 45,000 cases were reported during the same timeframe. Significant increase in burden on health system and several H1N1 associated deaths reported. Severe Acute Respiratory Syndrome (SARS) continues to be of great concern in Asia, as does Avian Influenza. Australia has not yet experienced these issues first hand.
Intensity	Depending on virulence and spread of the disease, a communicable disease pandemic may evolve rapidly or very slowly. Communicable disease pandemics may have a very broad impact on the lives of those living in the ACT. Treatment for early interventions (such as quarantine, vaccination, diagnostic testing) are crucial in minimising the impact of such pandemics on the wider community. A communicable disease epidemic may affect a large population.
Extent	In the era of easy transport both locally and internationally, the physical area of impact is impossible to define. Measures such as those outlined in the Quarantine Act may assist in slowing the geographical spread of a communicable disease, but are ultimately unlikely to wholly prevent spread. The entire population is likely to be impacted by the emergence of a communicable disease pandemic. Some diseases impact particular populations more severely. In general, populations at greater risk of adverse health outcomes in this context include the very young, very old, pregnant, immune-compromised and indigenous peoples.
Speed of onset	National border control, Bio-security Australia and the WHO may well be able to forewarn Australia of an emerging communicable disease threat. Different communicable diseases tend to be more common in particular times of the year (e.g. the flu is more common in winter).
Vulnerabilities	The economic impact of a communicable disease outbreak is often significant, particularly in communities already at socio-economic disadvantage. Inability to work, decreased workforce participation and the potential for significant impacts on the accessibility of essential infrastructure and systems such as the education system, hospital system, GP clinics etc, tend to have a disproportionate impact on vulnerable persons within the community.
Secondary Hazards	Dependent on scale and location of incident, may include: o Potential for loss of income; o Potential for disruption to schools and hospitals; o Potential for shortages in medical and pharmaceutical supplies; o Potential for severe disruption to the economy; o Potential for isolation of individual families and properties (quarantine); o Potential for civil disturbance; o Potential for infrastructure failure as a result of workforce issues; o Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that an epidemic, pandemic or major outbreak of a person-to-person infectious disease in the ACT may cause illness and or death to affected persons, families and communities. It also has the potential to adversely impact and disrupt workplaces and cause a prolonged significant strain on the ACT health sector and a decrease in the provision of health service standards. Dependent upon the severity and communicability of the pathogen, traditional vulnerable populations within the ACT community may be particularly susceptible to increased rates of morbidity and mortality, or new vulnerable groups may arise. The local economy (incorporating government, the private sector and not for profit sector) may also be severely affected by fluctuating demand for goods and service provision, elevated absenteeism rates and disruption to the supply chains, exclusion zones, isolation/quarantine may be established, with potential impact on interstate traffic, civil and social unrest. NOTE - This risk statement considers a wide range of factors, however, are classified as disease that is transmitted person-to-person. The associated hazards are broadly defined as contaminations such as bacterial and viral pathogens. Some of the diseases that have epidemic potential are considered vaccine preventable diseases i.e. measles.

Hazard Name:	Water Contamination
Lead Agency:	**Health Directorate**
History	The 1998 Sydney water crisis. Sydney's water supply was found to be contaminated with Giardia and Cryptosporidium, leading to public health advice to boil tap water before drinking. There were no recorded cases of illness related to this contamination.
Intensity	Contamination of the ACT water supply is unlikely, due to the numerous 'critical control points' within the water treatment and management process. If, however, the water supply is tainted at or near the end of the treatment cycle, there is potential for significant flow on impact in the community. The incident may require a multi-agency response if there is large scale contamination of the ACT water supply or if contamination is deliberate.
Extent	The water supply of the ACT is sourced from several catchment areas. It is possible that a localised contamination event may impact on one geographical area rather than the whole of the ACT. However, water contamination events have the potential to impact upon the whole of the ACT, and spread widely.
Speed of onset	Although routine testing of water quality is carried out, there can be a significant lag time between the collection of samples and obtaining the results of testing. It is likely that the initial warning that contamination had occurred would come from the public – in the form of persons becoming ill or observing a change in their water supply.
Vulnerabilities	The impact of water contamination is broad and reaches across the entire community. Some segments of the community are at greater risk of suffering adverse health outcomes than others. Those at higher risk include the very young, pregnant women, the elderly and indigenous Australians.
Secondary Hazards	Dependent on scale and location of incident, may include: o Potential for disruption of hospital and health services; o Potential for disruption of local food/beverage businesses; o Potential for disruption to primary producers.
Risk Statement	There is a risk that contamination of the potable water supply could result in potential fatalities and illness to persons, anxiety to the general community, economic impact, potential for evacuation of vulnerable communities, depending on the contaminant there may be some impact to the environment.

Hazard Name:	**Bio-Security Emergency** (incl. exotic/ endemic animal, plant and pest emergencies)
Lead Agency:	**Territory and Municipal Services Directorate (TAMS Directorate)**
History	August 2007 – Equine influenza discovered in NSW. ACT response is consistent with national arrangements and requires an immediate response, including restricting movement, monitoring equines in the ACT.
Intensity	Rapid spread, significant numbers of horses affected across most jurisdictions. Visible signs are not evident until around four days after infection.
Extent	Virus can be carried on people (skin/ clothing) therefore potential is very widespread in a short timeframe. Managed by bans on movement of horses and horse transport. Affects the thoroughbred/ racing, recreational, horse/ pony club industries.
Speed of onset	Rapid spread if appropriate bio-security not in place. Experience was that the virus travelled in front of authority's ability to track and respond.
Vulnerabilities	Flow-on effects to many industries. People often 'trapped' interstate, unable to move, events involving horses are cancelled, including racing events. Equine suppliers and service groups are severely restricted – significant impact ranging from hardship caused through almost immediate collapse of supporting industries.
Secondary Hazards	Introduction (instead of eradication) of the virus in Australia. Use of vaccination to resolve immediate illness, but allows the virus to continue to exist.
Risk Statement	There is a risk that a significant bio-security event would result in significant number of animal deaths, destruction and disposal of livestock, impact on food production, need to establish animal exclusion zones and increased cost due to pest control eradication or consequence. In addition, there could be potential risks to human health from existing

	and new biological entities that cross the human and non human barrier with possible fatalities, quarantine zones and create fear anxiety and social disruption. It would also have the effect to impact at both the national and local level causing economic loss through a decline in export market viability sustainable food viability and job losses.

Hazard Name:	**Hazardous Material (unintentional release onsite)**
Lead Agency:	**ACT Fire and Rescue (ACT F&R)**
History	TDI Spill – Barton Highway -Toxic and dangerous chemical, spill after truck incident, many still suffering the effects of chemical contamination.The chemical was part of a load being transported through the ACT, on a major highway into the ACT. ANU fire in lab, unknown chemicals involved. Took quite some time to identify chemicals and chemical mixes. Mitchell Chemical Fire 2011 – potential toxic smoke plume
Intensity	High intensity. Sudden, unexpected. Typical of most emergency incidents.
Extent	Attempt to confine to the immediate area. May be localised to widespread, particularly if hazardous materials are involved. Suppression aims to keep fire to the building of origin, however the impacts (smoke, risk of explosion, water pollution) may be more widespread.
Speed of onset	Rapid and immediate onset is possible.
Vulnerabilities	All parts of the community that have some type of contact with affected areas could potentially be impacted by this. Nearby residents and businesses may be required to evacuate until considered safe.
Secondary Hazards	Possibility of chemical contamination of site, waterways, air. Also potential for health impact on people with respiratory conditions.
Risk Statement	There is a risk that the release of a hazardous material - gas, chemicals, biological and radiological, could result in significant disruption to the community , wide spread and potential long term off site environmental impairment of one or more ecosystem, potentially long term impact on human and animal health, possible evacuation, property damage and possible structural collapse. The resultant impact may affect the environment in the immediate area and potential extensive injuries/ fatalities. There may be related consequences such as gas supply interruptions to associated communities including schools, nursing homes residential and rural properties, businesses and motels.

Hazard Name:	Extreme Heat
Lead Agency:	**ACT Ambulance Service (ACTAS) & Health Directorate**
History	2009 the Australian South eastern regions experienced significant heatwave conditions with record breaking temperatures on two occasions during the same year. Temperatures in the ACT reached 40 degrees in Feb and 38.9 degrees in November of the same year (the latter equalling the Nov 1997 record). The ACTAS have received a number of heat wave alerts that have escalated to the planning phases to ensure operational staff and the community are prepared. With global warming, heat waves will always present challenges for ACTAS in the future.
Intensity	Heat waves in the past have been intense but only for short periods of time. The heat wave, however, was still enough to cause significant increase in casualty presentations for ACTAS.
Extent	A heat wave will be felt all over ACT and surrounding region. The extent of the heat wave will have a greater impact on our vulnerable communities i.e. the elderly, disabled and young. With good mitigating/preventative strategies the extent of issues caused by the heat wave can be reduced.
Speed of onset	Bureau of Meteorology has the capability to issue public heat wave warnings approx 96 hours prior to giving appropriate warning to the authorities. The speed of onset would allow for pre-emptive arrangements to be put in place by ACTAS.
Vulnerabilities	The vulnerabilities are our elderly, young and disabled communities. Potential heat damage to infrastructure may also occur. Outdoor activities (work or leisure) may have to be suspended. Other vulnerabilities are also our fleet of ambulances that can overheat particularly due to increased demand during extreme heatwave days.
Secondary Hazards	Dependent on scale and location of incident, may include: o Disruption to schools and businesses; o Increased demand on health services resources due to increased submissions; o Increased bushfire threat; o Increased demand on ActewAGL electrical assets affecting local communities (the Network has redundancy built into it to deal with increased demand); o Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that a prolonged extreme heat event could result in fatalities, health impact, significant impact on vulnerable communities, impact on energy consumption and resultant disruption to supply, impact on the provision of essential services and infrastructure, increased risk to the environment, impact on animals and increased risk of bushfire.

Hazard Name:	Flash Floods
Lead Agency:	**ACT State Emergency Service (ACTSES)**
History	Flash floods, although not common, have taken place in the ACT. Most notably was a flash flood in the Woden Valley on 26 January 1971 which killed 7 people, including 4 children, and injured 15 people. The insurance cost was approximately A$9 million. It was estimated that around 95mm of rain fell in one hour during this event. The Yarralumla Creek drainage channel peak rate of flow measured 186,891 litres per second at the Carruthers Street pluviograph near Yarra Glen at around 8:50pm. The intersection was covered to a depth of an estimated 1.83m and the floodwaters spread an estimated 183m wide, east to west across the intersection of Yamba Drive, Melrose Drive and Yarra Glen. A number of people and cars were swept in to the Yarralumla Creek drainage channel from a low level crossing at the junction of Yamba Drive, Melrose Drive and Yamba Drive was covered in fast flowing water to at least 275m south of the Hindmarsh Drive intersection where a car and the driver were swept into the Long Gully drainage channel. Recent floods have occurred in 2003 and 2010 but not to the same extent.
Intensity	Flash flooding by nature is very difficult to predict. The force of the water can be strong enough to move a bus 180 degrees. Historically, they tend to occur in La Nina years associated with very heavy rainfall events. The intensity depends on the level of rainfall/ rain rate and the particular catchment area.
Extent	Although Canberra has been designed to withstand a one in 10 year rain event (post 1971) localised rain storms can overwhelm the drainage system, despite the best planning, resulting in damage to local infrastructure, and potential death due to flash floods.
Speed of onset	As the name indicates, there is very little to no warning. The development of rain systems responsible can be tracked by BOM and provide appropriate forecasts. The moist air masses required tend to occur in summer. The events generally last for less than three hours.
Vulnerabilities	Localised damage to infrastructure and potential damage to the general community in the area.
Secondary Hazards	Dependent on scale and location of incident, may include: o Social impact on community; o Isolation of communities; o Disruption to businesses; o Impact on tourism.
Risk Statement	There is a risk that a flash flood could result in potential fatalities, property damage, potential injuries, possible evacuation, damage to infrastructure and environmental impact.

Hazard Name:	Flood - Rivers
Lead Agency:	**ACT State Emergency Service (ACTSES)**
History	The Riverine flood problem in the ACT (particularly in the vicinity of the Molonglo River and tributaries east of Black Mountain) reflects the attractiveness of the flood plain for establishing Canberra. The most recent riverine flood event took place in February/March 2012.
Intensity	Major floods have occurred every 50 years. Lesser floods are more common and tend to be contained within the river channel.
Extent	The riverine floods on the Molonglo and Murrumbidgee Rivers have been incorporated as a limiter on urban expansion in Canberra's design. Therefore, their effects are generally limited to low level river crossings with an impact on outlying rural communities.
Speed of onset	Riverine floods occur after widespread heavy rain. They take some time to move down river and can take one or two days to pass. The speed at which they occur depends upon the location/distribution of the rainfall.
Vulnerabilities	Due to planning limitations and restrictions on planning, vulnerabilities to infrastructure

	and people have been minimised. The main vulnerability involves a maximum flood that exceeds the ability of Scrivener Dam to maintain the water level of Lake Burley-Griffin. In this case a severe disruption of the centre of Canberra would take place along with impacts on a number of national/cultural icons in the Parliamentary triangle.
Secondary Hazards	A number of secondary hazards are of concern. These include: o Disruption to river activities/ businesses; o Health hazards; o Disruption to business in general; o Potential impact on government business due to forced absenteeism.
Risk Statement	There is a risk that a major river flood could result in potential fatalities potential casualties, property damage, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport closure of roads impact on local community, economic impact, impact on livestock and domestic animals and possible evacuation.

Hazard Name:	**Severe Storms**
Lead Agency:	**ACT State Emergency Service (ACTSES)**
History	The ACT has a history of recurrent severe storms. They occur annually with hundreds of requests for assistance every year. From September to March there is a period of heightened/increased storm activity in the ACT. Severe thunderstorms occur in this region and in recent years such storms have been frequent, with extensive damage occurring on 2 December 2005, New Year's Eve 2006 and in February 2007. December 2005 Canberra experienced a severe storm with heavy winds and mini cyclone/ tornado impacting on more than 50 suburbs. Hundreds of trees and power lines were brought down and many houses were unroofed. One person died when a tree fell on him during the storm. The Storm left a path of destruction from Belconnen to Fyshwick and created significant traffic chaos.
Intensity	Severe storms are based on wind, rain rate, tornadoes and lightning activity. Winds over 100kph, rain rates of 50mm per hour or more, and heavy hail are common features of local severe storms. Any wind above 80kph tends to create damage from falling trees/branches, and structural damage as roofs etc are blown off.
Extent	No areas in the ACT are immune to severe storm events. Generally, one or a series of storms, with a footprint of approximately one suburb will sweep across Canberra late afternoon.
Speed of onset	Some warning may be provided from the BOM for significant storm events. Impacts usually last for a few hours but storm events may continue to form over a few days. There have been occurrences where no warning was provided.
Vulnerabilities	No area is isolated from a storm. They are unpredictable and areas across the ACT as a whole are vulnerable. Depending on the direction of the wind, some areas may be more vulnerable, resulting in more damage in some suburbs. Suburbs of different ages have differing vulnerabilities to the combination of very strong winds with heavy rain. Suburb age also determines the likelihood of mature trees falling.
Secondary Hazards	Dependent on scale and location of incident, may include: o Disruption to work and schools; o Businesses will be affected; short and long term; o Potential loss of tourism.
Risk Statement	There is a risk that a severe storm could result in potential loss of life, potential injuries, property damage, loss of infrastructure and utilities, impact on vulnerable communities, possible evacuation, impact on the environment, impact on local businesses, disruption to transport, closure of roads, impact on local community, impact on the local economy and impact on domestic animals and livestock.

Hazard Name:	Earthquake
Lead Agency:	**Emergency Services Agency (ESA)**
History	Seventy-two earthquakes occurred within 20km of the GPO in the 36 years prior to the end of 1995. The two largest earthquakes within 20km of the GPO occurred on 9 February 1961 and 25 April 1970 and had Richter magnitudes ML 3.5 and 3.0 respectively. Canberra lies within a broad North East – South West trending belt of epicentres and has experienced on average one earthquake per year for the past 50 years. The largest events recorded in this zone were of Richter magnitude ML 5.6, the same size as the December 1989 Newcastle earthquake. The most recent earthquake occurred west of Canberra on 20 April 2012 at a magnitude of 3.7.
Intensity	Earthquakes with a scale of MM VIII or above will require evacuations and extra resources. Major transport routes closed for periods ranging a few hours to days isolating some areas, retail and industrial areas within some areas will require evacuation.
Extent	Widespread significant destruction of infrastructure and assets, with long term disruption to business and government, entrapments, multiple fires, significant environmental impact, damage to health services, significant community and economic impact, large scale evacuation and displacement of people.
Speed of onset	Onset is immediate with no warning occurring at any time of the year.
Vulnerabilities	Widespread significant destruction of infrastructure and assets, with long term disruption to business and government, entrapments, multiple fires, significant environmental impact, damage to health services, significant community and economic impact, large scale evacuation and displacement of people. Essential services may also be affected such as electricity. May place pressure on local health services.
Secondary Hazards	Dependent on scale and location of incident, may include: o Major long term disruption to business; o Potential impact on government business due to forced absenteeism; o Impact on universities and embassies; o Potential for multiple fires to start; o Significant short or long term environmental impact; o Significant impact to health services; o Significant community and economic impact; o Major loss to the uninsured; o Impact to businesses/trade.
Risk Statement	There is a risk that a significant earthquake could result in multiple fatalities, significant casualties widespread significant destruction of infrastructure and assets, with long term disruption to business and government, entrapments, multiple fires, significant environmental impact, damage to health services, significant community and economic impact, large scale evacuation and displacement of people.

4.5. Vulnerable Communities

Vulnerable communities for the purpose of this study are those that, by their nature or location, would be at a greater disadvantage than the mainstream part of the community and would therefore require special attention in the event of an emergency.

In order for the emergency services to provide effective assistance, this part of the community was identified and its needs considered.

The degree of vulnerability was assessed in relation to the community's:

- proximity to the hazard (i.e. fire front, flooding river, collapsing building, etc);
- age and condition of the community (health, social);
- ability to communicate with community (to understand warnings or inform of an emergency); and
- access to the community in need during an emergency (is there only one access road, no phone contact, etc).

The applicability of the above elements to identified vulnerable communities is summarised in the following table.

4.5.1. Vulnerable Communities List

Community Description	Elements of Vulnerability				Remarks/ Action/ Recommendations
	Is it in close Proximity to hazard?	Is age or condition of community an issue?	Is ability to communicate with the community an issue?	Emergency Services access to community in need restricted?	
Tharwa and Uriarra settlements – rural area – one way access and individual rural dwellings	Yes	No	No	Yes	Bushfire Action Plans, community and agency awareness of risks.
Remote festivals and mass gatherings	Yes	Yes	Yes	Yes	Land owners conduct risk assessment and assistance may be provided by emergency services, police and other stakeholders.
Camping areas, rural recreational/ educational facilities and caravan parks	Yes	Yes	Yes	Yes	Generally located in remote areas – land managers have specific protocols for periods of high fire danger.
Child care centres and schools	Yes	Yes	No	No	Premises prepare and maintain emergency and evacuation plans, and risk assessment of facilities undertaken as part of the Elevated Fire Danger Plan for bushfires.
Special needs schools	Yes	Yes	No	No	Premises prepare and maintain emergency and evacuation plans, and risk assessment of facilities undertaken as part of the Elevated Fire Danger Plan for bushfires.
Homeless	Yes	Yes	Yes	Yes	Mainly concentrated in city area; would be managed with local public and standard public warning and street warnings.
Travelling public	Yes	No	Yes	Yes	Radio and TV warnings, information via provided via tourist information centres and social media.
Transient population	Yes	No	Yes	No	Radio and TV warnings, information provided via tourist information centres and social media.
International students	Yes	Yes	Yes	No	Managed through routine emergency procedures provided by the universities.
Migrants	No	Yes	Yes	Yes	CALD education and other multicultural forums, community radio, translation interpreter services, messages to community leaders, multicultural services.
Residential age care facilities	Yes	Yes	No	Yes	Emergency arrangements regulated by the Commonwealth.

Community Description	Elements of Vulnerability				Remarks/ Action/ Recommendations
	Is it in close Proximity to hazard?	Is age or condition of community an issue?	Is ability to communicate with the community an issue?	Emergency Services access to community in need restricted?	
Disability group homes	Yes	Yes	No	No	Well organised with own emergency management arrangements.
Medically dependent and people with disability	No	Yes	Yes	Yes	Those requiring power for medical devices are on a list maintained by the Health Directorate.
Correctional centres	Yes	No	No	No	Own emergency arrangements. Unsure if assistance is expected from emergency services.
Hospitals	Yes	Yes	No	No	Detailed emergency plans in place for each location. Depend on emergency services for assistance for internal major incidents.
People who are socially isolated in their homes	Possible	Yes	Yes	Possibly	Radio and TV warnings, information provided via social media. Outreach via NGO's and government Agencies.

5. Risk Analysis & Evaluation

5.1. Hazards

This section of the report details the comprehensive assessment conducted on each of the 23 identified hazards.

The process used for the assessment is in accordance with the International and ASNZS ISO 31000 standard for Risk Management - Principles and guidelines, as well as the National Emergency Risk Assessment Guidelines (NERAG).

The assessments of all 23 identified hazards are outlined in the following pages and include:

1. Hazard Category;
2. Name of the hazard;
3. Hazard Identification number;
4. The Risk Statement – describes how this hazard could impact on people, property, environment, etc;
5. Date when the risk statement was confirmed by the SEMSOG;
6. The consequences/impact this hazard would have on the following elements at risk:
    - people
    - social impact
    - extent of evacuation
    - property
    - demand on community services
    - impact on animals
    - impact on the environment
    - financial loss
    - emergency resources required (territory or national)
    - level of operational management (territory or national)
7. The likelihood of this incident occurring at this level;
8. The level this hazard risk was assessed at LOW, MODERATE, HIGH or EXTREME;
9. Agency support to deal with this emergency event;
10. Existing strategies in place to deal with the emergency event;
11. Review dates and endorsement details.

This information and the risk level in particular, are used to prioritise each hazard.

Hazard Category	Transport	Hazard Name	Transport Emergency - Aviation	Hazard ID	RA1

ANALYSE

Risk Statement	There is a risk that a significant transport emergency - aviation involving a passenger or freight plane could result in multiple fatalities and mass casualties, psychological impact to the community, possible damage to key infrastructure, significant property damage, environmental impact, hazmat impact, possible evacuation, establishment of exclusion zones, property fires, and have economic impact on the community.
Date Confirmed	23 May 2012

Elements at Risk

	Consequences				
People					x
Social			x		
Evacuation			x		
Property			x		
Community Services		x			
Animal			x		
Environmental			x		
Financial				x	
Resources					x
Operational Mgt					x
Overall Rating				X	

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACT Policing**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.

Existing Controls/ Mitigation strategies

Prevention	CASA; ATSB; Airport Emergency Committee; safety standards and procedures; land use planning.
Preparation	Training and exercises; Airport emergency Plan; Mass Casualty Incident Plan; Airport Fire Service and Police; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); Community Recovery Plan.
Response	Airport emergency Plan; Mass Casualty Incident Plan; Airport Fire Service and Police; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); Community Recovery Plan; MOUs with regional partners and Commonwealth assistance; USAR Sub Plan.
Recovery	Community Recovery Plan; DVI Plan; Comdisplan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Transport	Hazard Name	Transport Emergency - Road	Hazard ID	RA2

ANALYSE

Risk Statement	There is a risk that a significant transport emergency - road could result in fatalities, significant casualties property damage, damage to adjacent road infrastructure (including bridges), establishment of road closure, exclusion zones, persons being trapped, hazmat impact, environmental, psychological and economic impacts and freight and transport disruptions.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People				x	
Social		x			
Evacuation		x			
Property		x			
Community Services	x				
Animal	x				
Environmental			x		
Financial			x		
Resources			x		
Operational Mgt			x		
Overall Rating			X		

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACT Policing**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Road rules; over-dimension vehicle routes; safety codes for drivers; highly visible police presence; speed cameras; motor vehicle inspectors; traffic safety campaigns.
Existing Controls/ Mitigation strategies – Preparation	Training and exercises; Mass Casualty Incident Plan; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); TAMS Emergency Plan.
Existing Controls/ Mitigation strategies – Response	Mass Casualty Incident Plan; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); Community Recovery Plan; MOUs with regional partners; USAR Sub Plan.
Existing Controls/ Mitigation strategies – Recovery	Community Recovery Plan; DVI Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Transport	Hazard Name	Transport Emergency: Railway	Hazard ID	RA3

ANALYSE

Risk Statement	There is a risk that a significant transport emergency - rail could result in loss of life, significant injuries, property damage, road closure, damage to adjacent road infrastructure (including bridges), exclusion zones, persons being trapped, hazmat impact, environmental, psychological and economic impacts and freight and transport disruptions.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
People				x	
Social		x			
Evacuation	x				
Property			x		
Community Services	x				
Animal	x				
Environmental		x			
Financial			x		
Resources			x		
Operational Mgt			x		
Overall Rating			**X**		

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACT Policing**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	ARTC safety guidelines and maintenance programs.
Existing Controls/ Mitigation strategies – Preparation	Training and exercises; Mass Casualty Incident Plan; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); TAMS Emergency Plan.
Existing Controls/ Mitigation strategies – Response	Mass Casualty Incident Plan; HAZMAT Plan; ACT Emergency Plan; DVI Plan; Health Emergency Plan (HEP); Community Recovery Plan; MOUs with regional partners; USAR Sub Plan.
Existing Controls/ Mitigation strategies – Recovery	Community Recovery Plan; DVI Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Energy and Infrastructure	Hazard Name	Liquid Fuel Supply Emergency (excludes energy infrastructure failure)	Hazard ID	RA4

ANALYSE

Risk Statement	There is a risk that a protracted disruption of the fuel supply to the ACT would result in fuel rations, disruption to businesses and essential services, general impact on the whole community and potential civil unrest.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People	X				
Social			X		
Evacuation	X				
Property	X				
Community Services				X	
Animal	X				
Environmental	X				
Financial				X	
Resources					X
Operational Mgt				X	
Overall Rating		X			

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	CMCD
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	ACT Emergency Plan; Liquid Fuel Emergency Plan (in draft); National Liquid Fuel Emergency Plan.
Existing Controls/ Mitigation strategies – Preparation	ACT Emergency Plan; Liquid Fuel Emergency Plan (in draft); National Liquid Fuel Emergency Plan.
Existing Controls/ Mitigation strategies – Response	ACT Emergency Plan; Liquid Fuel Emergency Plan (in draft); National Liquid Fuel Emergency Plan.
Existing Controls/ Mitigation strategies – Recovery	ACT Emergency Plan; Liquid Fuel Emergency Plan (in draft); National Liquid Fuel Emergency Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Energy and Infrastructure	Hazard Name	Infrastructure Failure - Roads and Bridges	Hazard ID	RA5

ANALYSE

Risk Statement	There is a risk that a significant infrastructure failure – roads and bridges, could result in loss of life, significant injuries, property damage, road closure, damage to adjacent road infrastructure, establishment of exclusion zones, persons being trapped, significant impact on community, environmental impact, disruption to businesses, psychological trauma of local community, freight and transport disruptions and damage to utility/ communication network attached to the structure.
Date Confirmed	23 May 2012

Elements at Risk

	Consequences				
People				x	
Social			x		
Evacuation	x				
Property				x	
Community Services	x				
Animal	x				
Environmental		x			
Financial				x	
Resources			x		
Operational Mgt			x		
Overall Rating			**X**		

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	ACT F&R
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Road design; Australian standards; ACT Roads Guidelines.
Existing Controls/ Mitigation strategies – Preparation	ACT Emergency Plan; Utilities Emergency Plans.
Existing Controls/ Mitigation strategies – Response	USAR Plan; ACT Emergency Plan; DVI.
Existing Controls/ Mitigation strategies – Recovery	ACT Emergency Plan; DVI.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Energy and Infrastructure	Hazard Name	Infrastructure Failure - Building Collapse (including Major Structure Collapse)	Hazard ID	RA6

ANALYSE

Risk Statement	There is a risk that a significant infrastructure failure – building collapse (including major structural collapse), could result in multiple losses of life, significant injuries, entrapments, multiple fires, loss of assets of interest, environmental impact, impact to transport routes, exclusion zones, business disruptions, community impact, large scale evacuation and displacement of people.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People					x
Social				x	
Evacuation			x		
Property			x		
Community Services	x				
Animal	x				
Environmental			x		
Financial			x		
Resources				x	
Operational Mgt			x		
Overall Rating				X	

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	ACT F&R
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Australian Building codes; Territory Plan; Building & Engineering certification.
Existing Controls/ Mitigation strategies – Preparation	ACT Emergency Plan; USAR; DVI Plan; Mass Casualty Incident Plan; Health Emergency Plan (HEP).
Existing Controls/ Mitigation strategies – Response	ACT Emergency Plan; USAR; DVI Plan; Mass Casualty Incident Plan; Health Emergency Plan (HEP).
Existing Controls/ Mitigation strategies – Recovery	Community Recovery Plan; DVI Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Energy and Infrastructure	Hazard Name	Infrastructure Failure - Dam Flood	Hazard ID	RA7

ANALYSE

Risk Statement	There is a risk that an infrastructure failure - involving Googong, Tantangara or Cotter Dam could result in a surge of water with minimal warning causing loss of life, property damage, structural collapse, key infrastructures, impact on water supply and sewer service, damage to significant and cultural assets, loss of livestock, environmental damage and impact on businesses.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People					x
Social					x
Evacuation					x
Property					x
Community Services					x
Animal					x
Environmental					x
Financial					x
Resources					x
Operational Mgt					x
Overall Rating					**X**

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACTSES**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Design standards and quality control during construction; routine inspections; remedial works where deficiencies are identified.
Existing Controls/ Mitigation strategies – Preparation	Cotter & Googong Dams Dam Safety Emergency Plan (DSEP); maintenance and dam failure and flood exercises; Flood Plan; ACT Emergency Plan.
Existing Controls/ Mitigation strategies – Response	DSEP; Water Supply & Sewerage Emergency Plan; Crisis Management Plan; Stock pile of critical materials; ACT Flood Plan; NSW Flood Plan; Emergency Plan for Googong Dam failure emergency; ACT Emergency Plan; Health Emergency Plan (HEP); COMDISPLAN; DVI Plan
Existing Controls/ Mitigation strategies – Recovery	ACT Emergency Plan; Health Emergency Plan (HEP); NDRRA Plan; Community Recovery Plan; DVI Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Energy and Infrastructure	Hazard Name	Infrastructure Supply Failure - Gas	Hazard ID	RA8

ANALYSE

Risk Statement	There is a risk that a significant infrastructure failure – gas, could result in impact on local businesses, impact on social and health of the community, impact on vulnerable communities, due to lack of heating and cooking facilities to residents, possible evacuations; businesses, nursing homes etc.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People			x		
Social			x		
Evacuation		x			
Property				x	
Community Services				x	
Animal	x				
Environmental	x				
Financial				x	
Resources				x	
Operational Mgt				x	
Overall Rating			X		

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Lead Agency/ Position	**ESDD**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Safety and Operating Plan, Safety Management Studies, High Pressure Facility Reviews, High Risk Area Reviews, High Risk Valving, HAZOPs, Gas Awareness Programs, Fail Safe equipment installation, Jemena Asset Maintenance Programs; Industry and Engineering standards; DBYD; ongoing review of capacity of network.
Existing Controls/ Mitigation strategies – Preparation	Incident Management Strategy, Critical infrastructure listing with emergency services; Jemena Annual Simulation exercises; ACT Emergency Plan; Training; ActewAGL Emergency Management Plan.
Existing Controls/ Mitigation strategies – Response	Incident Response Centre, 60 minute response KPIs; ActewAGL Emergency Response Procedure; ACT Emergency Plan; Health Emergency Plan (HEP); Community Recovery Plan; Jemena Emergency Management Plan; Jemena Response Plan.
Existing Controls/ Mitigation strategies – Recovery	ActewAGL Disaster Recovery; ACT Recovery Plan; Jemena Recovery Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Health and Environmental	Hazard Name	Infrastructure Failure - Power	Hazard ID	RA9

ANALYSE

Risk Statement

There is a risk that a significant infrastructure failure – power, could result in significant disruption to the community, key Government services (Commonwealth and ACT), disruption to water/ sewerage treatment plants and services, disruption to water supply, impact on vulnerable communities, impact on communications, security, transport, industry and local businesses, public order, impact on environment, essential services, impact on service stations, food supplies and impact on community.

NOTE: vulnerable communities are not on the priority list for urgent reconnection of electricity.

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
People				x	
Social					x
Evacuation	x				
Property					x
Community Services					x
Animal			x		
Environmental			x		
Financial					x
Resources					x
Operational Mgt					x
Overall Rating					**X**

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ESDD**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Transgrid maintenance & Security; DBYD program; BCPs (all agencies); capacity for generators.
Existing Controls/ Mitigation strategies – Preparation	ActewAGL Emergency Management Plan; ACT Emergency Plan; BCPs; Health Emergency Plan (HEP) (vulnerable Communities).
Existing Controls/ Mitigation strategies – Response	ActewAGL Emergency Plan – Electricity Network; stockpile of critical materials; COMDISPLAN; ACT Emergency Plan; Communications Plan; Health Emergency Plan (HEP).
Existing Controls/ Mitigation strategies – Recovery	Reconstruction of lost ActewAGL energy assets; MOUs with other States; COMDISPLAN.

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Energy Infrastructure	Hazard Name	Infrastructure Failure - Communications	Hazard ID	RA10

ANALYSE

Risk Statement

There is a risk that a significant infrastructure failure – communications, could result in significant disruption to the community, key Government services (Commonwealth and ACT), impact on vulnerable communities, banking and finance, security, transport, industry and local businesses, public order, essential services, supply chain network and impact on community.

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
People			x		
Social					x
Evacuation	x				
Property					x
Community Services					x
Animal	x				
Environmental	x				
Financial					x
Resources					x
Operational Mgt					x
Overall Rating				X	

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ESA**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Telecommunication providers, emergency plan and maintenance program; DBYD campaign; installation standards; Australian standards; 000 contingencies with other States.
Preparation	ACT Emergency Plan; BCPs; training and exercises.
Response	ACT Emergency Plan; UHF network radios for emergency services; commercial businesses BCPs; ACT & Commonwealth Governments BCPs; 000 contingencies with other States.
Recovery	BCPs for Government and businesses.

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Energy Infrastructure	Hazard Name	Infrastructure Failure: Water	Hazard ID	RA11

ANALYSE

Risk Statement	There is a risk that a significant infrastructure Failure – water, could result in significant disruption to the community, health issues, disruption to sewer services, disruption to water supply, impact on vulnerable communities, industry and local businesses, public order, essential services, food supplies and impact on community.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People				x	
Social				x	
Evacuation	x				
Property					x
Community Services					x
Animal		x			
Environmental	x				
Financial				x	
Resources				x	
Operational Mgt			x		
Overall Rating				X	

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	ESA
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Robust design of the network, including redundancy. Regular maintenance of the network and facilities. Asset replacement programme; duplication of major facilities including components within major facilities.
Existing Controls/ Mitigation strategies – Preparation	Water Supply & Sewerage Emergency Plan; annual review & exercises; Emergency agency training and exercises; ACT Emergency Plan; Health Emergency Plan (HEP).
Existing Controls/ Mitigation strategies – Response	Water Supply & Sewerage Emergency Plan; stockpile of critical materials; Health Emergency Plan (HEP); ACT Emergency Plan.
Existing Controls/ Mitigation strategies – Recovery	Reconstruction of lost ActewAGL assets; BCPs.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

	Energy Infrastructure	**Hazard Name**	**Infrastructure Failure: Sewerage**	**Hazard ID**	**RA12**

ANALYSE

Risk Statement	There is a risk that a significant Infrastructure Failure – Sewerage, within the ACT and surrounding area could result in an overflow affecting assets of interest, schools, businesses, create possible health issues, environmental impact, possible contamination of surrounding water stores and impact on vulnerable communities.
Date Confirmed	23 May 2012

Elements at Risk

	Consequences				
People			x		
Social			x		
Evacuation	x				
Property					x
Community Services	x				
Animal		x			
Environmental			x		
Financial				x	
Resources				x	
Operational Mgt			x		
Overall Rating			**X**		

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ESA**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.

Existing Controls/ Mitigation strategies

Prevention	Regular inspection & maintenance; robust design of network; asset replacement programme; duplication of major components in major facilities. detention facility with 2 days (dry weather) capacity; review of design criterion for critical assets.
Preparation	Water Supply and Sewerage Emergency Plan annual review & exercises; ACT Emergency Plan; Health Emergency Plan (HEP); BCPs.
Response	Water Supply and Sewerage Emergency Plan; Stockpile of critical materials; ACT Emergency Plan; Health Emergency Plan (HEP).
Recovery	Reconstruction of lost ACTEW assets; Health Emergency Plan (HEP).

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Fire	Hazard Name	Fire: Industrial	Hazard ID	RA13

ANALYSE

Risk Statement

There is a risk that a significant fire could result in property damage potential loss of life, potential injuries, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport, closure of roads impact on local community, economic impact and possible evacuation.

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
People				x	
Social			x		
Evacuation			x		
Property			x		
Community Services		x			
Animal		x			
Environmental			x		
Financial				x	
Resources			x		
Operational Mgt		x			
Overall Rating			X		

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACTF F&R**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – **Prevention**	Dangerous Goods legislation; strategic bushfire management plans in urban edges; fire safety standards; input in development applications; Workcover requirements; EPA regulations on storage; lease conditions; reactive safety inspections; bushfire operation plans for interface areas; industry emergency arrangements requirements; insurance industry requirements.
Preparation	Fire detection systems; insurance; training and exercises; Hazmat capabilities; ACT Emergency Plan; MOUs with various agencies; HAZMAT Plan; Fire Brigade SOPs; Pre incident planning.
Response	Active fire detection and suppression systems; Hazmat capabilities; ACT Emergency Plan; MOUs with various agencies; HAZMAT Plan; Fire Brigade SOPs; Pre incident planning; traffic management; media liaison; fire investigation; Evacuation Policy.
Recovery	Fire investigation; EPA; Workcover; AFP; Coroner.

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Fire	Hazard Name	Fire: Bush	Hazard ID	RA14

ANALYSE

Risk Statement	There is a risk that a significant bushfire could result in property damage, potential fatalities potential casualties, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport, closure of roads, impact on local community, economic impact, possible evacuation, impact on livestock, impact of cultural assets, impact on water supply, exclusion zones, impact on Commonwealth assets.					
Date Confirmed	23 May 2012					
		Consequences				
Elements at Risk	People				x	
	Social				x	
	Evacuation				x	
	Property					x
	Community Services				x	
	Animal					x
	Environmental				x	
	Financial				x	
	Resources					x
	Operational Mgt					x
	Overall Rating					**X**
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Moderate	Moderate	High	Extreme	Extreme
	Likely	Low	Moderate	High	High	Extreme
	Possible	Low	Moderate	Moderate	High	High
	Unlikely	Low	Low	Moderate	Moderate	High
	Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position		**ACTRFS / ACTF&R**
Support Agencies; Functional Authority		All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies	Prevention	Procedures that minimise the risk of ignition while working in fire-prone areas (ActewAGL; TAMS). Assets are designed to minimise risk of fire, where practicable; building codes, approval and processes; Bushfire Operation Plan; SBMP; elevated fire danger ratings; fuel reduction program; bushfire research; investigation of cause and prosecutions for illegal fire lighting.
	Preparation	Education strategies (Farm Fire Wise programs); community fire units and volunteer fire units; fire awareness day campaign; training and exercises; information via website and social media; MOUs with interstate agencies, weather forecasting and total fire ban declarations; elevated fire danger ratings; TAMS and other agencies fire response plans; media liaison; Elevated Fire Danger Plan; staffing of fire towers; contract aircraft; emergency warning systems; Health Emergency Plan; Recovery Plan and Mass Casualty Incident Plan; ACT Emergency Plan.
	Response	ACT Emergency Plan; Elevated Fire Danger Plan; Bushfire Operations Plan; ESA capability - response to and management of incidents and engagement of other agencies and volunteers; staffing of fire towers; contract aircraft; arrangements for national support; animal rescue trailers; emergency warning systems; information via website and social media and media liaison; communication network and facilities; DVI; Health Emergency Plan (HEP); Recovery Plan and Mass Casualty Incident Plan; community briefing; COMDISPLAN; Evacuation Policy.

		Recovery	ActewAGL emergency Plans; TAMS (Parks service recovery arrangements); ESA post incident analysis and debriefing; recovery plan; DVI Plan; ACT Emergency Plan; ACT Community Recovery Plan; Evacuation Policy; evacuation and recovery centres; DRCC Operational Plan; NDRRA.

REVIEW	**Date of Assessment**		**Conducted by:**	
	Approved by		**Review Date**	

Hazard Category	Health and Environmental	Hazard Name	Human Epidemic Infectious Disease	Hazard ID	RA15

ANALYSE

Risk Statement

There is a risk that an Epidemic, Pandemic or major Outbreak of a person-to-person infectious disease in the ACT may cause illness and or death to affected persons, families and communities. It also has the potential to adversely impact and disrupt workplaces and cause a prolonged significant strain on the ACT health sector and a decrease in the provision of health service standards. Dependent upon the severity and communicability of the pathogen, traditional vulnerable populations within the ACT community may be particularly susceptible to increased rates of morbidity and mortality, or new vulnerable groups may arise. The local economy (incorporating government, the private sector and not for profit sector) may also be severely affected by fluctuating demand for goods and service provision, elevated absenteeism rates and disruption to the supply chains. Exclusion zones, isolation/ quarantine may be established, with potential impact on interstate movement, civil and social unrest.

NOTE - This risk statement considers a wide range of factors, however, that are classified as disease that is transmitted person-to-person. The associated hazards are broadly defined as contaminations such as bacterial and viral pathogens. Some of the diseases that have epidemic potential are considered vaccine preventable diseases i.e. measles.

Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People					x
Social					x
Evacuation				x	
Property	x				
Community Services					x
Animal		x			
Environmental		x			
Financial					x
Resources					x
Operational Mgt					x
Overall Rating					**X**

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**Health Directorate**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	**International / National Level:** International and national level surveillance and reporting mechanisms for rapid detection of outbreaks of novel pathogens. International coordination of outbreak response through the World Health Organisation (WHO) via mechanisms such as the International Health Regulations (IHR2005). International funding of pandemic research. Existing national border control and quarantine measures. **ACT** : Local surveillance and reporting mechanisms for rapid detection and control of outbreaks of novel pathogens.

		Preparation	**International / National Level**: Early detection including existing disease surveillance systems. National stockpiles of PPE, medical equipment, anti-virals and other medications. National arrangements for procurement of pandemic vaccination. National level actions from the Australian Health Management Plan for Pandemic Influenza (AHMPPI) includes allocations for ALERT Phase. **ACT**: Early detection including existing disease surveillance systems. Maintenance of State and local stockpiles of PPE, medical equipment, anti-virals and other medications. Territory plans include ACTHMPPI, HEP and PHEMP. Regular exercising of pandemic preparedness across relevant agencies. Formal operational reviews of previous epidemic /pandemic responses and implementation of lessons learnt. Public health promotion campaigns to increase community awareness and increased resilience to epidemic infectious disease, and vaccination, if available, in public health promotion activities.
		Response	**International / National Level:** National level actions from the Australian Health Management Plan for Pandemic Influenza (AHMPPI). Response phases include all actions for DELAY;CONTAIN; SUSTAIN; and PROTECT phases. Actions for epidemic would be coordinated by the office of Health Protection. **ACT:** response will mirror the national response phases through the ACTHMPPI. Key operational mechanisms could include activation of the PHEOC, HECC and ECC and the ACTHMPPI and Public Health Emergency Plan. Deployment of state and local stockpiles of PPE, medical equipment, antiviral and other medications. Initiation of control measures such as isolation, quarantine and social distancing. Closure of schools and cancellation of mass gatherings.
		Recovery	**International / National Level**: National level actions from the Australian Health Management Plan for Pandemic Influenza (AHMPPI) including all actions from the RECOVER phase. Actions for epidemic would be coordinated by the Office of Health Protection. **ACT**: Recover and restore the health system and return to ALERT phase as quickly as possible. Enhanced vigilance for a subsequent wave. Increased vigilance for cases and increased monitoring of the virus (to look for genetic mutations).Activation of the ACT Community Recovery Plan and the DRCC Plan. Re-supply and restocking of the ACT health sector. Undertake operational review.

REVIEW	**Date of Assessment**		**Conducted by:**	
	Approved by		**Review Date**	

Hazard Category	Health and Environmental	Hazard Name	Water Supply Contamination	Hazard ID	RA16

ANALYSE

Risk Statement

There is a risk that contamination of the potable water supply could result in potential fatalities and illness to persons, anxiety to the general community; economic impact; potential for evacuation of vulnerable communities; depending on the contaminant there may be some impact to the environment

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
People				x	
Social			x		
Evacuation	x				
Property	x				
Community Services					x
Animal		x			
Environmental				x	
Financial				x	
Resources				x	
Operational Mgt				x	
Overall Rating				X	

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**Health Directorate**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Vast quantities of diluted water; controlled access to assets; regular security patrols of key assets; manned facilities have good perimeter lighting and fencing; pressure zones within the network; source water protection programme; multiple points of supply; capacity in network to supply water for approx 2 to 5 days depending on demand; water restrictions; routine water quality sampling.
Existing Controls/ Mitigation strategies – Preparation	ActewAGL procedures for responding to contamination events; exercises are conducted; public health emergency arrangements and alerts; immediate notification to Health of incident; ACT Emergency Plan.
Existing Controls/ Mitigation strategies – Response	ActewAGL procedures; routine water quality sampling & testing; special procedures for water quality sampling; Health Emergency Plan (HEP); ACT Emergency Plan.
Existing Controls/ Mitigation strategies – Recovery	ActewAGL decontamination of network, restoration of supply.

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Health and Environmental	Hazard Name	Bio-Security Emergencies: (includes exotic/endemic animal, plant and pest emergencies)	Hazard ID	RA17

ANALYSE

Risk Statement	There is a risk that a significant bio-security event would result in significant number of animal deaths, destruction and disposal of livestock, impact on food production, need to establish animal exclusion zones and increased cost due to pest control eradication or consequence. In addition, there could be potential risks to human health from existing and new biological entities that cross the human and non human barrier with possible fatalities, quarantine zones and create fear anxiety and social disruption. It would also have the effect to impact at both the national and local level causing economic loss through a decline in export market viability sustainable food viability and job losses.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People				X	
Social					X
Evacuation				X	
Property	X				
Community Services					X
Animal					X
Environmental		X			
Financial				X	
Resources				X	
Operational Mgt					X
Overall Rating					X
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	TAMS Directorate
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.

Existing Controls/ Mitigation strategies		
	Prevention	Surveillance and monitoring procedures for bio-security identified risks; procedures to investigate, identification and reporting on bio-security issues; appropriate skills and resources according to nationally recognised standards and protocol. Animal Diseases Act; Commonwealth Quarantine Act 1908.
	Preparation	Animal disease sub-plan to identify the responsibilities for control and coordination; some training provisions; initial response mechanisms such as response teams and equipment.
	Response	Protocol outlined in ACT subplans and national response guidelines; terms of MOUs or inter-jurisdictional agreements- Ausvetplan and Animal Diseases Subplan; Health Plans.
	Recovery	Provision of monitoring and surveillance to meet national and international standards verifying eradication of freedom status for the bio-security risk or hazard.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Health and Environmental	Hazard Name	Hazardous Materials Emergency - (unintentional release on site)	Hazard ID	RA18

ANALYSE

Risk Statement

There is a risk that the release of a hazardous material - gas, chemicals, biological and radiological could result in significant disruption to the community, wide spread and potential long term off site environmental impairment of one or more ecosystem, potentially long term impact on human and animal health, possible evacuation, property damage and possible structural collapse. The resultant impact may affect the environment in the immediate area and potential extensive injuries/ fatalities. There may be related consequences such as gas supply interruptions to associated communities including schools, nursing homes residential and rural properties, businesses and motels.

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
People				x	
Social		x			
Evacuation			x		
Property		x			
Community Services			x		
Animal		x			
Environmental			x		
Financial			x		
Resources			x		
Operational Mgt			x		
Overall Rating			**X**		

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACT F&R**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.

Existing Controls/ Mitigation strategies

Prevention	Dangerous Goods legislation; Pipeline Construction and Risk Prevention in compliance to AS2885; fire safety standards; Workcover requirements; EPA regulations on storage; lease conditions; reactive safety inspections; industry emergency arrangements requirements; insurance industry requirements; education programs, land owner liaison, integrity dig-ups, gas pipeline patrols and classification for asset risks.
Preparation	Fire detection systems; insurance; training and exercises; hazmat capabilities; ACT Emergency Plan; MOUs with various agencies; HAZMAT Plan; Fire Brigade SOPs; Pre incident planning; Gas Pipelines and Distribution Networks Emergency Response Plan; simulations and 24/7 response processes.
Response	Active fire detection and suppression systems; hazmat capabilities; ACT Emergency Plan; MOUs with various agencies; HAZMAT Plan; Fire Brigade SOPs; Pre incident planning; Health Emergency Plan (HEP); Public Health Emergency Management Plan (PHEMP); traffic management; media liaison; fire investigation; evacuation policy; Gas Pipelines and Distribution Networks Emergency Response Plan; EGP Emergency Response Action Plan.
Recovery	Fire investigation; EPA plan; Workcover; AFP; Coroner.

REVIEW

Date of Assessment		**Conducted by:**	
Approved by		**Review Date**	

Hazard Category	Natural	Hazard Name	Extreme Heat	Hazard ID	RA19

ANALYSE

Risk Statement

There is a risk that a prolonged extreme heat event could result in fatalities, impact on health, significant impact on vulnerable communities, impact on energy consumption and resultant disruption to supply, impact on the provision of essential services and infrastructure, increased risk to the environment, impact on animals and increased risk of bushfire.

Date Confirmed	23 May 2012

Elements at Risk

	Consequences				
People				x	
Social		x			
Evacuation	x				
Property				x	
Community Services				x	
Animal				x	
Environmental			x		
Financial			x		
Resources			x		
Operational Mgt			x		
Overall Rating				x	

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACT Ambulance and Health Directorate**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.

Existing Controls/ Mitigation strategies

Prevention	Extreme Heat Management Plan (EHMP); community education; training and awareness programs.
Preparation	ACT Emergency Plan; Extreme Heat Management Plan; Health Emergency Plan (HEP); Health advisory information and media releases; TAMS closure of park areas.
Response	ACT Emergency Plan; Extreme Heat Management Plan; Health Emergency Plan (HEP); health advisory information and media releases.
Recovery	Community Recovery Plan; Health Emergency Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Natural	Hazard Name	Flash Floods	Hazard ID	RA20

ANALYSE

Risk Statement	There is a risk that a flash flood could result in potential fatalities, property damage, potential injuries, possible evacuation, damage to infrastructure and environmental impact.
Date Confirmed	23 May 2012

Elements at Risk	Consequences				
People				x	
Social			x		
Evacuation		x			
Property		x			
Community Services	x				
Animal			x		
Environmental		x			
Financial			x		
Resources			x		
Operational Mgt			x		
Overall Rating			X		

Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	ACTSES
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
Existing Controls/ Mitigation strategies – Prevention	Flood channels in place; Infrastructure and Urban design; community education; BOM warnings; TAMS maintenance of infrastructure.
Existing Controls/ Mitigation strategies – Preparation	ACT Emergency Plan; Flood Plan; Storm Plan; BCPs; BOM warning arrangements.
Existing Controls/ Mitigation strategies – Response	ACT Emergency Plan; Flood Plan; Storm Plan; BCPs.
Existing Controls/ Mitigation strategies – Recovery	Community recovery plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Natural	Hazard Name	Flood - Rivers	Hazrd ID	RA21

ANALYSE

Risk Statement	There is a risk that a major river flood could result in potential fatalities, potential casualties, property damage, loss of infrastructure and utilities, environmental impact, impact on local businesses, disruption to transport closure of roads impact on local community, economic impact, impact on livestock and domestic animals and possible evacuation.
Date Confirmed	23 May 2012
	Consequences

	Elements at Risk	People				x	
		Social				x	
		Evacuation				x	
		Property				x	
		Community Services			x		
		Animal				x	
		Environmental			x		
		Financial				x	
		Resources				x	
		Operational Mgt					x
		Overall Rating				**X**	
			Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
	Likelihood	Almost Certain	Moderate	Moderate	High	Extreme	Extreme
		Likely	Low	Moderate	High	High	Extreme
		Possible	Low	Moderate	Moderate	High	High
		Unlikely	Low	Low	Moderate	Moderate	High
		Rare	Low	Low	Low	Moderate	Moderate

TREAT	**Responsible Agency/ Position**		**ACTSES**
	Support Agencies; Functional Authority		All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.
	Existing Controls/ Mitigation strategies	**Prevention**	Urban & Infrastructure design; community education; early warning.
		Preparation	ACT Flood Plan; ACT Emergency Plan; early warning; training and exercises; BCPs.
		Response	ACT Emergency Plan; ACT Flood Plan; BCPs.
		Recovery	Community Recovery Plan; BCPs.

REVIEW	**Date of Assessment**		**Conducted by:**	
	Approved by		**Review Date**	

Hazard Category	Natural	Hazard Name	Severe Storm	Hazard ID	RA22

ANALYSE

Risk Statement: There is a risk that a severe storm could result in potential loss of life, potential injuries, property damage, loss of infrastructure and utilities, impact on vulnerable communities, possible evacuation, impact on the environment, impact on local businesses, disruption to transport, closure of roads, impact on local community, impact on the local economy and impact on domestic animals and livestock.

Date Confirmed: 23 May 2012

Elements at Risk

	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
People				x	
Social				x	
Evacuation			x		
Property			x		
Community Services				x	
Animal			x		
Environmental			x		
Financial				x	
Resources				x	
Operational Mgt			x		
Overall Rating				X	

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

TREAT

Responsible Agency/ Position	**ACTSES**
Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the ACT Emergency Plan.

Existing Controls/ Mitigation strategies

Prevention	Community education; building codes; warning messages to public.
Preparation	ACT Storm Plan; ACT Emergencies Act; ACT Flood Plan; ACT Emergency Plan; training and exercises; BCPs; Health Emergency Plan; MOUs with NSW SES.
Response	ACT Storm Plan; ACT Emergencies Act; ACT Flood Plan; ACT Emergency Plan; BCPs; AIIMS principles; Health Emergency Plan (HEP); TAMS emergency plans; ActewAGL; working with BOM; ESA emergency warnings; MOUs with NSW SES; National Emergency Warning System (NEWS).
Recovery	ACT Recovery Plan; Community Recovery Plan.

REVIEW

Date of Assessment		Conducted by:	
Approved by		Review Date	

Hazard Category	Natural	Hazard Name	Earthquake	Hazard ID	RA23

ANALYSE	Risk Statement	There is a risk that a significant earthquake could result in multiple fatalities, significant casualties widespread significant destruction of infrastructure and assets, with long term disruption to business and government, entrapments, multiple fires, significant environmental impact, damage to health services, significant community and economic impact, large scale evacuation and displacement of people.					
	Date Confirmed	23 May 2012					
			Consequences				
	Elements at Risk	People					x
		Social					x
		Evacuation					x
		Property					x
		Community Services					x
		Animal					x
		Environmental					x
		Financial					x
		Resources					x
		Operational Mgt					x
		Overall Rating					**X**
			Insignificant	Minor	Moderate	Major	Catastrophic
	Likelihood	Almost Certain	Moderate	Moderate	High	Extreme	Extreme
		Likely	Low	Moderate	High	High	Extreme
		Possible	Low	Moderate	Moderate	High	High
		Unlikely	Low	Low	Moderate	Moderate	High
		Rare	Low	Low	Low	Moderate	Moderate

TREAT	Responsible Agency/ Position	**ESA**	
	Support Agencies; Functional Authority	All emergency services and agencies undertaking a role within a functional area as detailed in the Emergency Plan.	
	Existing Controls/ Mitigation strategies	Prevention	Dam design standards and Water and Sewerage Network design standards. Australian Building codes; Territory Plan; Building & Engineering certification; ACT Emergency Plan.
		Preparation	ActewAGL Emergency Procedures; ACT Emergency Plan; USAR; DVI Plan; Mass Casualty Incident Plan; Health Emergency Plan (HEP); COMDISPLAN; MOUs.
		Response	ActewAGL emergency procedures; ACT Emergency Plan; USAR; DVI Plan; Mass Casualty Incident Plan; Health Emergency Plan (HEP); AUSTRAUMAPLAN; COMDISPLAN; BCPs; MOUs; Commonwealth crisis arrangements.
		Recovery	Rebuild of network and facilities; Community Recovery Plan; DVI Plan; NDRRA; MOUs; DRCC.

REVIEW	Date of Assessment		Conducted by:	
	Approved by		Review Date	

6. Treatment

Treatments are the strategies in place that assist the relevant lead agency and individual agencies to manage a particular emergency. Existing treatment strategies, also referred to as Existing Control/Mitigation/Treatment strategies, have been identified and included within the individual hazard risk assessments. in

7. Monitor and Review

The Emergency Risk Management Project is a continuous process. Monitoring and reviewing are integral parts of the process. Risks and the effectiveness of the treatment strategies need to be monitored to ensure risk levels reflect the positive impact of those strategies.

The Territory Wide Risk Assessment Working Group is committed to monitoring and reviewing the Emergency Risk Management Report taking into consideration:

- Changes to context;
- Changes to legislative requirements;
- Changes to stakeholder involvement;
- Changes to hazards, the community and the environment;
- The emergency risk management project; or
- Actual emergencies arising from risks.

It is pertinent to mention that in different sections within this document, such as the risk assessments and the treatment plan, there are specified monitoring and reviewing timeframes to be noted by the TWRA Working Group and the respective lead agencies.

8. Appendices

Appendix No.	Title
1	Project Plan
2	Management Framework
3	Members of the Working Group for the Territory Wide Risk Assessment Project
4	Summary of Assessment - Risk
5	Summary of Assessment - Priority
6	Summary of Assessment - Agency
7	Hazard Specific Supporting Plans
8	Likelihood and Consequence Descriptors
9	Definitions
10	Abbreviations

Appendix 1 Project Plan

The following steps were taken to complete the study and prepare this report.

Stage	Milestones & Activity Measures	Responsible Agency/ Organisation
1	o Working Group established o Process context and limitations developed o Community profile developed o Sources of risk identified o Elements at risk identified o Historical information analysed	TWRA Working Group & Echelon
2	o Development of Territory specific risk statements o Risk statements analysed(likelihood & consequence) o Assessments reviewed against risk criteria	TWRA Working Group & Echelon
3	o Stakeholder consultation confirm existing treatment and mitigation strategies o Determine additional treatment options and mitigation strategies	TWRA Working Group & Echelon
4	o Selection of additional/proposed treatment options o Development of Treatment Plan	TWRA Working Group & Echelon
5	o Working Draft document prepared o Draft considered by SEMPG	Echelon TWRA Working Group
6	o Endorsed by Chair of SEMSOG and Cabinet o Draft recommended to Minister for approval	SEMSOG
7	o Final TWRA Report produced	

Process Documentation (Evidence of Process)

At each of the TWRA Working Group meetings, minutes were taken by the Echelon Consultant outlining the content of the meeting, those present, the decision making and direction setting process.

Preliminary Meeting	Introductory meeting.
Meeting 1	Setting the Context.
Meeting 2	Hazard Identification and Risk Statements.
Meetings 3 & 4	Risk Analysis/ assessments, vulnerable communities.
Meetings 5 & 6	Risk Treatment existing mitigation strategies and additional

	treatment options.
Meetings 7 & 8	Risk Treatment – Selection of Treatment Options and Treatment Plan development.
Meeting 9	Finalise Treatment Plan.
Meeting 10	Presentation of first Draft Report to TWRA Working Group for review. Amendments as per feedback from TWRA Working Group representatives.
Internal Consultation	Report considered by SEMPG and SEMSOG for consideration. Report recommended to the Minister for Police and emergency Services for Authorisation and provided to Cabinet for noting.
Authorisation	Final TWRA Report produced and provided to SEMPG/SEMSOG for consideration and Cabinet for endorsement.

Appendix 2 Management Framework

ACT Emergency management framework as outlined in the ACT ESA Emergency Plan (2010)

Emergency arrangements for a significant incident with no Emergency Controller Appointed

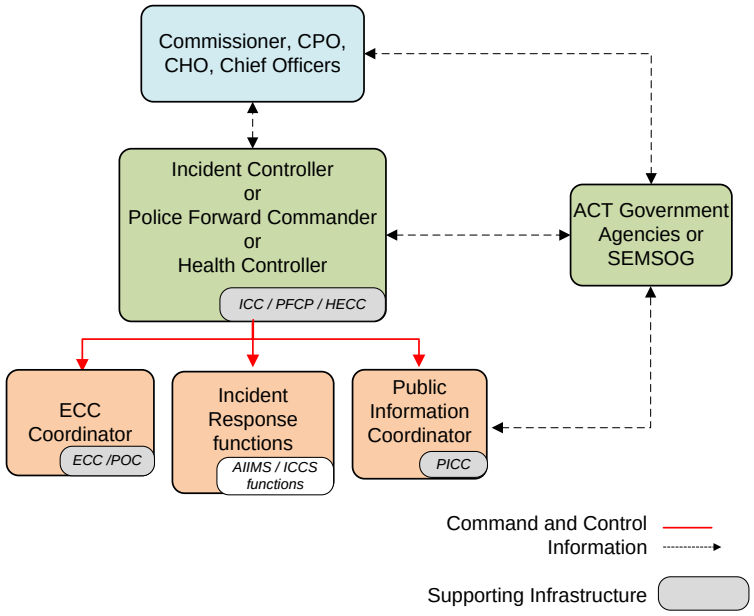
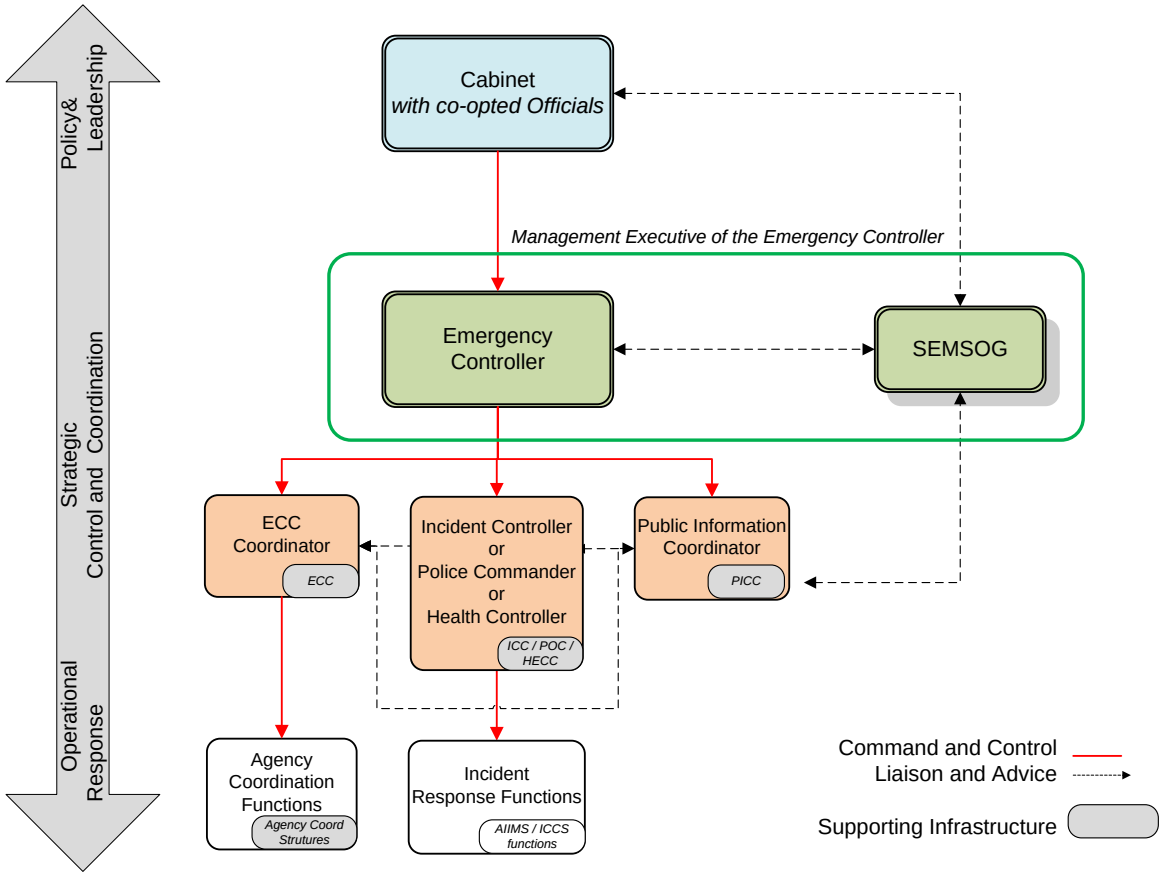


Figure 4 - Emergency arrangements for an emergency with an Emergency Controller appointed



Appendix 3 Members of the TWRA Working Group

Project Leader/ Chair

Position	Agency
Emergency Management Officer	ACT Emergency Services Agency

TWRA Working Group Members

Position	Agency
Risk Analyst	ACT Emergency Services Agency
Manager, Community Recovery and Emergency Planning	Community Services Directorate
Assistant Manager, Community Recovery and Emergency Planning	Community Services Directorate
Emergency Management and Planning	ACT Policing
Policy Officer, Security and Emergency Management Branch	Justice and Community Safety Directorate
Policy Team Leader, Security and Emergency Management Branch	Justice and Community Safety Directorate
Senior Manager, Security and Risk	Territory and Municipal Services Directorate
Manager, Security and Emergency Preparedness	Territory and Municipal Services Directorate
Manager, Preparedness and Response	Health Directorate
District Officer, Operational Planning	ACT Fire and Rescue
Deputy Chief Officer	ACT State Emergency Service
Manager Operations	ACT Rural Fire Service
Operations Manager	ACT Ambulance Service
Director Environment Protection and Water Regulations	Environment and Sustainable Development Directorate

Observers

Observers
ACT Insurance Agency (ACTIA)
External Contributors
Actew, Jemina
Facilitator
Echelon Australia

Appendix 4 Summary of Assessment - Risk

This is the table used to rate the 23 hazards in terms of the likelihood of the hazard occurring and if it did occur, how bad it would be (consequences).

The risk criteria are centred on two parameters, consequence and likelihood. Each risk is assigned credible consequence levels and for each of these consequence levels likelihood ratings are determined. Combined, the likelihood and consequence ratings are used to determine the risk. The outcome must be a set of risk ratings which reflects the team's assessment of the risk level.

	RISK MATRIX					
		Consequences				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Likelihood	**Almost Certain**	Moderate	Moderate	High RA20	Extreme RA19; RA22	Extreme
	Likely	Low	Moderate	High	High	Extreme RA14
	Possible	Low	Moderate RA4	Moderate RA2; RA5; RA13	High	High RA9; RA15; RA17
	Unlikely	Low	Low	Moderate RA8; RA12; RA18	Moderate RA6; RA10; RA21	High
	Rare	Low	Low	Low RA3	Moderate RA1; RA11; RA16	Moderate RA7; RA23

Appendix 5 Summary of Assessment - Priority

This list is a summary of all the 23 hazards that have been assessed in the previous pages in order of highest risk rating (extreme) to lowest (low).

Rating Priority	Hazard Id.	Hazard Name	Reference Page
EXTREME	RA19	Extreme Heat	65
EXTREME	RA22	Severe Storm	68
EXTREME	RA14	Fire - Bush	58
HIGH	RA9	Infrastructure Failure- Power	53
HIGH	RA15	Human Epidemic Infectious Disease	60
HIGH	RA17	Bio-Security Emergencies (includes exotic/endemic animal, plant and pest emergencies)	63
HIGH	RA20	Flash Floods	6
MODERATE	RA2	Transport Emergency - Road	46
MODERATE	RA5	Infrastructure Failure - Roads and Bridges	40
MODERATE	RA13	Fire - Industrial	57
MODERATE	RA7	Infrastructure Failure - Dam Flood	51
MODERATE	RA23	Earthquake	69
MODERATE	RA6	Infrastructure Failure - Building Collapse (including Major Structure Collapse)	50
MODERATE	RA10	Infrastructure Failure - Communications	54
MODERATE	RA21	Flood - Rivers	67
MODERATE	RA1	Transport Emergency - Aviation	44
MODERATE	RA11	Infrastructure Failure - Water	55
MODERATE	RA16	Water Supply Contamination	62
MODERATE	RA8	Infrastructure Failure/Supply - Gas	52
MODERATE	RA12	Infrastructure Failure - Sewerage	56
MODERATE	RA18	Hazardous Material (unintentional release of on-site)	64
MODERATE	RA4	Liquid Fuel Supply Emergency (excludes energy infrastructure failure)	48
LOW	RA3	Transport Emergency - Railway	47

Appendix 6 Summary of Assessment -Agency

This is a list of the 23 hazards and the individual directorates or agencies responsible for responding to these.

ACT Policing

HAZARD ID	HAZARD	RISK RATING
RA1	Transport Emergency - Aviation	Moderate
RA2	Transport Emergency - Road	Moderate
RA3	Transport Emergency - Rail	Low

Chief Minister and Cabinet Directorate (CMCD)

HAZARD ID	HAZARD	RISK RATING
RA4	Liquid Fuel Supply Emergency (excludes energy infrastructure failure)	Moderate

Emergency Services Agency (ESA)

HAZARD ID	HAZARD	RISK RATING
RA5	Infrastructure Failure – Road and Bridges	Moderate
RA6	Infrastructure Failure – Building Collapse	Moderate
RA10	Infrastructure Failure - Communications	Moderate
RA11	Infrastructure Failure - Water	Moderate
RA12	Infrastructure Failure - Sewerage	Moderate
RA23	Earthquake	Moderate

ACT State Emergency Service (ACTSES)

HAZARD ID	HAZARD	RISK RATING
RA20	Flash Floods	High
RA21	Flood – Rivers	Moderate
RA22	Severe Storm	Extreme
RA7	Dam Flood	Moderate

ACT Rural Fire Services (ACTRFS) and ACT Fire and Rescue (ACT F&R)

HAZARD ID	HAZARD	RISK RATING
RA14	Fire - Bush	Extreme

ACT Fire and Rescue (ACT F&R)

HAZARD ID	HAZARD	RISK RATING
RA13	Fire – Industrial	Moderate
RA18	Hazardous Material (unintentional release of)	Moderate

Environment and Sustainable Development Directorate (ESDD)

HAZARD ID	HAZARD	RISK RATING
RA8	Infrastructure Failure - Gas	Moderate
RA9	Infrastructure Failure - Power	High

Health Directorate (HD)

HAZARD ID	HAZARD	RISK RATING
RA15	Human Epidemic Infectious Disease	High
RA16	Water Supply Contamination	Medium

ACT Ambulance Service (ACTAS)/ HD

HAZARD ID	HAZARD	RISK RATING
RA19	Extreme Heat	Extreme

Territory and Municipal Services Directorate (TAMSD)

HAZARD ID	HAZARD	RISK RATING
RA17	Bio-Security Emergencies (includes exotic/endemic animal, plant and pest emergencies)	High

Appendix 7 Hazard Specific Supporting Plans

This is a list of existing plans available to manage different emergency situations and incidents. These plans have been included as existing treatment strategies used for the 23 hazards identified in this report (refer to Section 7, page 44).

National Plans

Name of Plan	Agency Responsible	Specific Risk Assessment No.
COMDISPLAN (Commonwealth Disaster Plan)	EMA	All
AUSVETPLAN (Australian Veterinary Emergency Plan)	Primary Industries Ministerial Council	RA17
AHMPPI (Australian Health Management Plan for Pandemic Influenza)	Dept of Health and Ageing	RA15

Territory Plans

Name of Plan	Agency Responsible	
ACT Emergency Plan	ESA	All
ACT Strategic Bushfire Management Plan	ESA	RA14

Sub Plans

Name of Sub Plan	Agency Responsible	
ACT Storm Plan (under development)	ACTSES	RA22
ACT Flood Plan	ACTSES	RA7, RA20, RA21
Elevated Fire Danger Plan	ACTRFS	RA14
Extreme Heat Management Plan	ACTAS/HD	RA19
HAZMAT Plan	ACT F&R	RA18
USAR Plan	ACT F&R	RA5, RA6, RA23
ACT Liquid Fuel Supply Emergency Plan (under development)	CMCD	RA4
ACT Health Management Plan for Pandemic Influenza (ACTHMPPI)	HD	RA15
Public Health Emergency Plan	HD	RA15
Animal Disease Plan (under development)	TAMSD	RA17
Counter Terrorism and Emergency Management Plan	AFP	NA
Canberra International Airport – Airport Emergency Plan	AFP	RA1

Supporting Plans

Name of Supporting Plan	Agency Responsible	
Community Recovery Plan	CSD	All
Mass Casualty Incident Plan	ACTAS	All

Community Communication and Information Plan	CMCD	All
Disaster Victim Identification Plan	AFP	All
Infrastructure Recovery Plan	ESA	RA8, RA9, RA12
Health Emergency Plan (HEP)	HD	RA15

Appendix 8 Likelihood and Consequence Descriptors

The following tables provide the definitions for the likelihood and consequence ratings on the Risk Matrix table found on page 71 and were used for each assessment of the hazards in Section 7.

Rating	Likelihood Description
Almost Certain	Expected to occur, many recorded incidents, strong anecdotal evidence, great opportunity, reason, or means to occur; may occur or be exceeded once every 1 to 5 years.
Likely	Will probably occur; consistent record of incidents and good anecdotal evidence; considerable opportunity, reason or means to occur; may occur or be exceeded once every 20 years.
Possible	Might occur; a few recorded incidents in each locality, some anecdotal evidence within the community; some opportunity, reason or means to occur; may occur or be exceeded once every 100 years. Will generally be close to or exceed past records of severity.
Unlikely	Is not expected to occur; isolated recorded incidents in this country, anecdotal evidence in other communities; little opportunity, reason or means to occur; may occur or be exceeded once every 250 years. Will almost always break previous records of severity.
Rare	May only occur in exceptional circumstances, some recorded events on a worldwide basis, may only or be exceeded once every 500 years or more. Can approach the theoretical upper limits of severity.

Consequence Descriptors

	Insignificant	Minor	Moderate	Major	Catastrophic
Area No. 1: **PEOPLE –** Fatalities/Injuries.	No fatalities. No injuries. No treatment required.	No fatalities. Injury to one or more persons requiring non hospital medical treatment.	No fatalities but large number of injuries. Medical treatment required.	Small number of fatalities and large number of injuries/large number hospitalised.	Significant number of fatalities and/or significant number of severe injuries. Significant number hospitalised.
Area No. 2: **SOCIAL IMPACT -** Number of people impacted.	No measurable impact to the community.	Some impact but no lasting effects.	Some impact with no long-term effect or small impact with long-term effect.	Some impact with long-term effects.	Significant impact and/or permanent damage.
Area No. 3 **EVACUATION**	Small number moved from area – no persons displaced.	Moderate number of residential homes AND/ OR small number of businesses/ industry/ government properties.	Moderate number of residential homes AND/OR small number of key businesses. Industry/government properties.	Large number of residential homes AND/OR small number of key businesses/ Industry/government properties.	Large number of residential homes AND/OR large number of key businesses/Industry/government properties that provide essential services.

	Insignificant	Minor	Moderate	Major	Catastrophic
Area No. 4: PROPERTY - Impact/Damage.	Small number of residential homes.	Small number of public and private business / industry.	Government sector, key business / industry, schools, factories.	Hospitals, Nursing Homes, major road/air/rail facilities, emergency service centres.	Key Infrastructure/Utilities – Water, electricity, sewerage, gas, communications.
Area No. 5: COMMUNITY SERVICES - Loss/Damage.	Other products & services.	Pharmaceutical supplies, key retail outlets, key industry.	Transportation Services: public & private.	Essential Services: Energy, gas, fuel supplies; communication.	Essential Services: Medical/Health and Food/Water.
Area No. 6: ANIMALS – Fatalities/Injuries.	No fatalities. No relocation.	Displacement with short term return – 24 hours to 48 hours.	Some injuries with displacement and return - 48 hours to 1 week.	Deaths/Significant injuries and humane destruction, return from relocation with 1 week to 1 month return.	Significant deaths/large number severe injuries and humane destruction, relocation with no likelihood of return.
Area No. 7: ENVIRONMENT – Loss/Damage.	No measurable impact.	Some impact but no lasting effects.	Some impact with no long-term effect or small impact with long-term effect.	Some impact with long-term effects.	Significant impact and/or permanent damage.
Area No. 8: FINANCIAL IMPACT – Cost/Damage.	Financial loss < 0.1% of the government sector's revenues to be managed within standard financial provisions, inconsequential disruptions at business level.	Financial loss 0.1-0.3% of the government sector's revenues requiring activation of reserves to cover loss, disruptions at business level leading to isolated cases of loss of employment.	Financial loss 0.3-1% of the government sector's revenues requiring adjustments to business strategy to cover loss, disruptions to selected industry sectors leading to isolated cases of business failure and multiple loss of employment.	Financial loss 1-3% of the government sector's revenues requiring major changes in business strategy to (partly) cover loss, significant disruptions across industry sectors leading to multiple business failures and loss of employment.	Unrecoverable financial loss > 3% of the government sector's revenues, asset destruction across industry sectors leading to widespread business failures and loss of employment.
Area No. 9: RESOURCES - Availability	Lead Agency only - coordinated and obtained within the Local area.	Lead Agency only – coordinated and obtained from outside the Local area.	Multi-Agency: Coordinated and obtained from within the Local area.	Multi-Agency: Coordinated and obtained from interstate.	Multi-Agency: Coordinated and obtained at National or State level.
Area No. 10: OPERATIONAL MANAGEMENT	Managed by Service Officer at Local level.	Managed by Service Senior Officer as Incident Controller at local level.	Managed by CO/DCO Lead Service as Incident Controller at through ECC.	Appointment of an Emergency Controller level through ECC.	Management at National or State level.

Appendix 9 Definitions

ACT

Means the Australian Capital Territory.

Agency

Means a government agency or a non-government agency. (Source: Emergency Management Australia Glossary)

Control

Means the overall direction of the activities, agencies or individuals concerned. Control operates horizontally across all agencies/organisations, functions and individuals. Situations are controlled. (Source: Emergency Management Australia Glossary).

Disaster

Means an occurrence, whether or not due to natural causes, that causes loss of life, injury, distress or danger to persons, or loss of or damage to property.

Elements at risk

Means the population, buildings, infrastructure, community services, assets, animals, environment economy and other public services exposed to sources of risk.

Emergency

an actual or imminent event that requires a significant and coordinated response. Examples of such events include:

- fire, flood, storm or earthquake;
- accident or explosion;
- epidemic or animal disease; or
- shortage of electricity, gas, fuel or water.

Emergency Risk Management

A systematic process that produces a range of measures that contributes to the well being of communities and the environment.

Event

Means the occurrence or chance of a particular set of circumstances.

Hazard

A source of potential harm.

Likelihood

A chance of something happening. It is used as a general description of probability and may be expressed qualitatively or quantitatively.

Loss

Means a negative consequence or adverse effect, financial or otherwise.

Mitigation

Means measures taken in advance of, or after, a disaster aimed at decreasing or eliminating its impact on society and environment. (Source: COAG Review into Natural Disasters in Australia, August 2002).

Preparedness

In relation to an emergency includes arrangements or plans to deal with an emergency or the effects of an emergency. (Source: Emergency Management Australia Glossary).

Residual Risk

Means the risk remaining after risk treatment, following implementation.

Resilience

Means the capacity of a system, community or society, potentially exposed to hazards, to adapt by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organising itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Response

Means actions taken in anticipation of, during, and immediately after, an emergency to ensure its effects are minimised and that people affected are given immediate relief and support.

Risk

Means the effect of uncertainty on objectives. For emergency risk assessments the effect is usually a negative deviation from the expected and is characterised by hazardous events and the likelihood of particular consequences.

Risk Analysis

A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences (In emergency risk management the systematic use of available information to study risk).

Risk Assessment

Means the overall process of risk identification, risk analysis and risk evaluation.

Risk Treatment

Measures that modify the characteristics of hazards, communities or environments.

Stakeholders

Means the people and organisations that can affect, be affected, of perceive themselves to be affected by a decision or activity.

Vulnerability

Means the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards.

Appendix 10 Abbreviations

Emergency management related acronyms

ACT	Australian Capital Territory
ACTAS	ACT Ambulance Service
ACT F&R	ACT Fire and Rescue
ACTHMPPI	ACT Health Management Plan for Pandemic Influenza
ACTIPAC	ACT Influenza Pandemic Advisory Committee
ACTRFS	ACT Rural Fire Service
ACTSES	ACT State Emergency Service
ADF	Australian Defence Force
AEMC	Australian Emergency Management Council
AFP	Australian Federal Police
AHMPPI	Australian Health Management Plan for Pandemic Influenza
AIIMS	Australasian Inter-service Incident Management System
ARTC	Australian Rail Track Corporation
AQIS	Australian Quarantine and Inspection Service
ATSB	Australian Transport Safety Bureau
BCP	Business Continuity Plan
BOM	Bureau of Meteorology
CALD	Culturally and Linguistically Diverse
CASA	Civil Aviation Safety Authority
CBRN	Chemical, Biological, Radiological and Nuclear
CCIP	Community Communication and Information Plan
CCTV	Closed-Circuit Television
CI	Critical Infrastructure
CIAC	Critical Infrastructure Advisory Council
CMD	Chief Minister's Department
CMCD	Chief Ministers and Cabinet Directorate
COAG	Council of Australian Governments
CPO	Chief Police Officer
DACC	Defence Aid to the Civil Community
DBYD	Dial Before You Dig
DFACA	Defence Force Aid to the Civilian Authorities
DHCS	Department of Disability, Housing and Community Services
DISCEX	Discussion Exercise
DSEP	Dam Safety Emergency Plan
DVI	Disaster Victim Identification
EC	Emergency Controller
ECC	Emergency Coordination Centre
EGP	Eastern Gas Pipeline
EI	Equine Influenza
EID	Epidemic Infectious Disease
EM	Emergency Management
EMRSS	Emergency Management Risk and Spatial Services
ERP	Environment Recovery Plan

EPA	Environment Protection Authority
ESA	Emergency Services Agency
ESDD	Environment and Sustainable Development Directorate
HAZMAT	Hazardous Materials
HD	Health Directorate
HECC	Health Emergency Coordination Centre
HEP	Health Emergency Plan
HERP	Health Emergency Response Plan
HMPPI	Health Management Plan for Pandemic Influenza
IC	Incident Controller
ICMEX	Investigation and Consequence Management Exercise
ICT	Information and Communication Technology
IED	Improvised Explosive Device
IMT	Incident Management Team
JOPG	Joint Operation Coordination Group
LGA	Local Government Area
LMWQCC	Lower Molonglo Water Quality Control Centre
MJEX	Multi-jurisdictional Exercise
MOU	Memorandum of Understanding
MSE	Master Schedule of Events
NCA	National Capital Authority
NCIRC	National Critical Infrastructure Resilience Committee
NCC	National Crisis Committee
NCTC	National Counter Terrorism Committee
NCTH	National Counter Terrorism Handbook
NCTP	National Counter Terrorism Plan
NSC	National Security Committee of Cabinet
NDRP	Natural Disaster Resilience Program
NDRRA	Natural Disaster Relief and Recovery Arrangements
NEMC	National Emergency Management Council
NEWS	National Early Warning System
PARS	Preparedness and Response Section
PC	Police Commander
PFCP	Police Forward Command Post
PHEMP	Public Health Emergency Management Plan
PICC	Public Information Coordination Centre
POC	Police Operations Centre
PPE	Personal Protective Equipment
PSCC	Protective Security Coordination Centre
PSM	Protective Security Manual
QCC	Queanbeyan City Council
RFS	Rural Fire Service

RICE	Response, Isolation, Containment and Evacuation
SEMB	Security and Emergency Management Branch – JACS
SEMC	Security and Emergency Management Committee
SEMPG	Security and Emergency Management Planning Group
SEMSOG	Security and Emergency Management Senior Officials Group
SES	State Emergency Service
SEWS	Standard Emergency Warning System
SCOT	Standing Committee on Transport
SOGs	Standard Operating Guidelines
SOPs	Standard Operating Procedures
TAG	Tactical Assault Group
TAMSD	Territory and Municipal Services Directorate
TC	Territory Controller
TCC	Territory Crisis Centre
TISN	Trusted Information Sharing Network
TSWG	Transport Security Working Group
TWRA	Territory Wide Risk Assessment
UHF	Ultra High Frequency
USAR	Urban Search and Rescue
VOIP	Voice Over Internet Protocol
WHO	World Health Organisation
WS&S	Water Supply and Sewerage

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