



State Emergency Response Plan

Earthquake Sub-Plan

Edition 1



**Working in conjunction
with communities, government,
agencies and business**

This plan has been endorsed by the State Crisis and Resilience Council (SCRC) as a subplan to the State Emergency Response Plan.



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1 Introduction

1.1 Purpose

This State Emergency Response Plan Earthquake Sub Plan outlines the Victorian arrangements for managing an earthquake in Victoria.

1.2 Objective

The objective of the State Emergency Response Plan (Earthquake Sub-plan) is to provide sources of information and to outline the arrangements for ensuring an integrated and coordinated approach to the State's management of earthquake events, in order to reduce the impact and consequences of these events on the community, infrastructure and services.

1.3 Scope

This State Emergency Response Plan (Earthquake Sub-plan) includes:

- Description of potential risks and consequences of earthquake to the social, built, economic and natural environments;
- The policy and programs in place to mitigate these risks before, during and after an earthquake event;
- The positions with accountability and the agencies responsible for managing specific strategies;
- The multi-agency management arrangements at the national, state, regional and local levels; and
- Links to sources of information where the reader can obtain further detail.

This plan provides strategic information about the Victorian arrangements for managing the response to an earthquake event. It does not include detail about the operational activities of individual agencies.

1.4 Authorising environment

The Emergency Management Act (1986 and 2013) is the empowering legislation for the management of emergencies in Victoria. The Emergency Management Manual Victoria (EMMV) contains policy and planning documents for emergency management in Victoria, and provides details about the roles different organisations play in the emergency management arrangements.

The State Emergency Response Plan (Part 3, EMMV) identifies Victoria's organisational arrangements for managing the response to emergencies. This sub-plan is a subordinate plan of the State Emergency Response Plan and has been approved by the State Crisis and Resilience Council (SCRC).

Other relevant legislation includes:

- Victoria State Emergency Service Act 2005;
- Essential Services Act 1958;
- Planning and Environment Act 1989; and
- Local Government Act 1989;

1.5 Activation of the plan

The arrangements in this plan apply on a continuing basis and do not require activation.

1.6 Audience

The audience for this plan comprises the Victorian Government and agencies within the emergency management sector, including business and community groups with a significant role in the management of the emergency.

1.7 Linkages

This plan is a sub-plan of the State Emergency Response Plan. It reflects legislation, the arrangements in the State Emergency Response Plan, the strategic direction for emergency management in Victoria and the accepted State practice for managing emergencies. The arrangements in the State Emergency Response Plan have not been repeated unless necessary to ensure context and readability. The State Emergency Response Plan can be accessed at www.emv.vic.gov.au/policies/emmv

Where necessary specific Regional Earthquake Plans are developed, and arrangements contained within Municipal Emergency Management Plans. Regional Earthquake Plans can be found at www.ses.vic.gov.au

Arrangements for the management of secondary consequences are contained in the following:

- For flooding resulting from dam failure: State Emergency Response Plan Flood Sub Plan;
- For tsunami: State Emergency Response Plan Tsunami Sub Plan;
- For health response: State Health Emergency Response Plan Health Sub Plan; and
- For rescue response: the Victorian Urban Search and Rescue Response Arrangements.

1.8 Exercising and evaluation

This plan will be exercised within one year from the date of approval. The exercise will be evaluated and, where improvements to the emergency management arrangements in this plan are required, the plan will be amended and a revised version issued. Exercises will be conducted in accordance with the State Exercising Framework.

1.9 Review

This plan was current at the time of publication and remains in effect until modified, superseded or withdrawn.

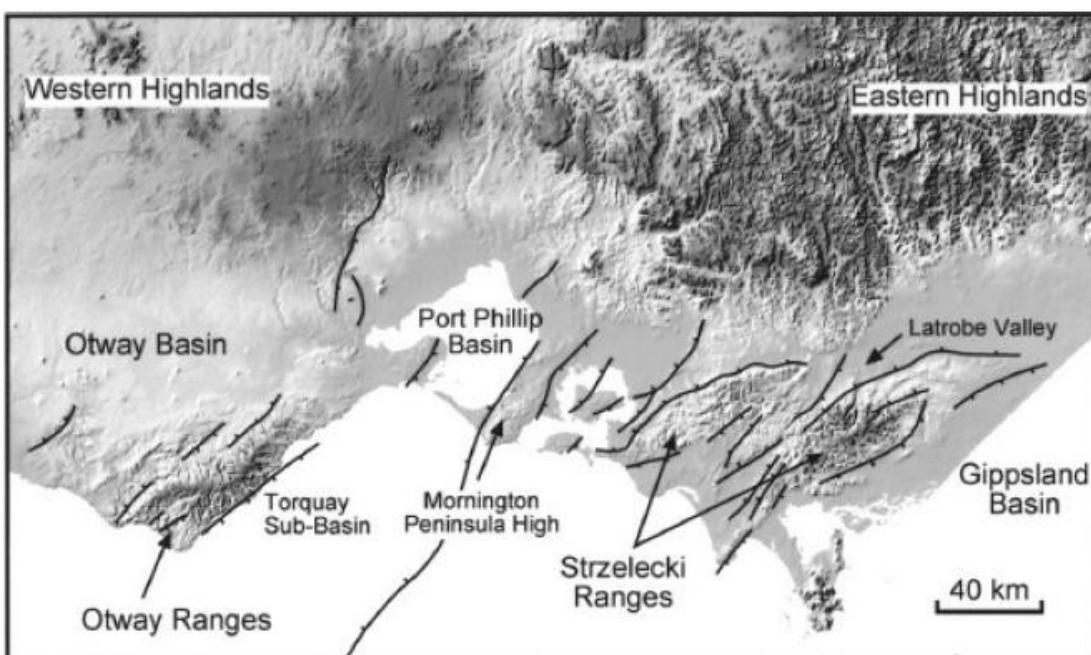
This plan will be reviewed and updated every 3 years. Consideration will be given to an earlier revision if the plan has been applied in a major emergency or exercise, or following a substantial change to the relevant legislation or arrangements.

2 The emergency context

2.1 The Earthquake Hazard

An earthquake is the shaking and vibration at the surface of the Earth caused by energy being released along a fault plane, at the edge of a tectonic plate or by volcanic activity. Earthquakes, unlike many other natural hazards, have the potential to cause catastrophic losses. Although Australia is popularly considered to have a low earthquake risk, a major earthquake could still occur under a heavily developed and populated area in Victoria. The impact of such an earthquake could have widespread consequences throughout Melbourne and surrounds. Whilst there is a low probability that this event will occur in the foreseeable future, it is important to recognise the potential for such catastrophic impacts.

Victoria is located away from geologically-active tectonic plate boundaries, which lie hundreds of kilometres seaward of the eastern coastline. However, Victoria regularly experiences small earthquakes that are felt and reported. Stresses and strains develop in the Indo-Australian plate (of which Australia is a part) as it drifts northward; as sediment loads continually transfer from upper catchment areas to lower basins and coastal areas due to erosion; and as fluctuating sea levels load and unload the continental shelf.



The size of an earthquake is referred to as its magnitude. For every unit increase in magnitude, there is roughly a thirty-fold increase in the energy released. For instance, a magnitude 2.0 earthquake (M2.0) releases about 30 times more energy than a magnitude 1.0 earthquake (M 1.0), while a magnitude 3.0 earthquake (M 3.0) releases 900 times (30x30) more energy than a magnitude 1.0 (M1.0).

In Australia, seismologists (people who study earthquakes) prefer the use of the moment magnitude scale, which calculates the magnitude of an earthquake based on physical properties such as the area of movement (slip) along the fault plane.

A M 6.0 earthquake can be anticipated for all of Australia, on average, every five years and a M 5.0 earthquake once per year. The probable maximum earthquake magnitude for Australia is approximately M 7.5.

Australia is not immune from damaging earthquakes causing significant human and economic loss.

- In July 1903, a M 5.3 earthquake caused extensive minor damage in Warrnambool, Victoria.
- In 1932, a M 4.5 event caused considerable damage on the Mornington Peninsula.
- On the 28th December 1989, a M 5.6 earthquake struck Newcastle killing 13 people. This earthquake caused damage to over 35,000 homes, 147 schools, and 3,000 commercial and/or other buildings, and hospitalised 120 people.
- In 1996 a M 5.2 earthquake was centred near Mt Baw Baw, the shock was felt up to 100 km away with minor damage reported in Melbourne.
- In August 2000, a M 5.0 earthquake in Boolarra caused minor damage and was felt throughout Gippsland.
- In 2009, Korumburra experienced two earthquakes within two weeks of each other on the 6 March and then the 18 March. Both earthquakes were recorded at M 4.6.
- In June 2012, a M 5.3 earthquake occurred in the La Trobe Valley, Gippsland. The earthquake caused minor damage. The earthquake epicentre was 16 kilometres southwest of Moe and was the strongest earthquake recorded since the 1982 Wonnangatta Valley earthquake and was felt across the state including in Melbourne and as far away as Wodonga.

Highlighting the unpredictability of earthquakes, the chart below shows the number of recorded earthquakes by magnitude in Victoria over a 10 year period.

MAGNITUDE	UTC DATE	APPROXIMATE LOCATION
3.0	12/06/2016	Off Cape Liptrap, VIC. (Reported felt).
3.2	4/04/2016	S of Leongatha, VIC. (Reported Felt).
3.1	5/03/2015	SW of Moe, Vic.
3.3	20/12/2014	S of Orbost, Vic.
3.3	3/12/2014	Pakenham, Melbourne, Vic.
3.4	2/12/2014	Korumburra, Vic.
3.3	17/10/2014	S of Moe, VIC.
3.2	20/05/2014	Offshore SE of Seaspray, VIC.
3.0	22/12/2013	Boort, VIC.
3.2	22/06/2013	N of Mansfield, Vic.
3.0	21/02/2013	W of Echuca, Vic.
3.0	27/10/2012	Near Moe, Vic.
3.1	11/10/2012	Rokewood, Vic.
3.0	9/09/2012	S of Port Macdonnell, SA.
3.1	9/09/2012	S of Port Macdonnell, SA.
3.1	31/07/2012	SE of Mallacoota, Vic.
3.2	30/07/2012	SE of Mallacoota, Vic.
3.5	30/07/2012	SE of Mallacoota, Vic.
4.4	20/07/2012	Near Moe, Vic.
3.1	30/06/2012	S of Moe, Vic.
3.1	19/06/2012	SW of Moe, Vic.
3.1	19/06/2012	SW of Moe, Vic.
5.4	19/06/2012	SW of Moe, Vic.
3.1	24/03/2012	Korumburra, VIC.
3.3	12/01/2012	Offshore, S of Mt Gambier, SA.
3.1	21/10/2011	Near Korumburra, VIC.
3.1	9/09/2011	Korumburra, Victoria.
3.1	10/07/2011	S of Bright, Vic.
3.0	7/07/2011	Korumburra, Vic.
3.3	5/07/2011	Korumburra, Vic.
3.7	5/07/2011	Korumburra, Vic.
3.3	5/07/2011	Korumburra, Vic.
4.4	5/07/2011	Korumburra, Vic.
3.8	1/06/2011	Grampians National Park, VIC.
3.0	28/12/2010	SE of Seaspray, Vic.
3.3	16/10/2010	N of Morwell, VIC.
3.0	26/05/2010	Colbinabbin VIC.
3.4	19/05/2009	Near Korumburra, VIC. Nearest station TOO.
3.0	3/05/2009	Korumburra VIC. Nearest station TOO.
3.1	18/03/2009	Korumburra, VIC. Nearest station TOO.
4.6	18/03/2009	Korumburra VIC. Nearest station TOO.
3.3	9/03/2009	Korumburra VIC. Nearest station TOO.
3.2	6/03/2009	Korumburra VIC. Nearest station TOO.
3.2	6/03/2009	Korumburra VIC. Nearest station TOO.
4.6	6/03/2009	N of Korumburra VIC. Nearest station TOO.

MAGNITUDE	UTC DATE	APPROXIMATE LOCATION
3.5	5/02/2009	Bass Strait. Nearest station TOO.
3.5	12/01/2009	Near Korumburra, Victoria. Nearest station TOO.
3.2	30/10/2008	SE of Tungamah, Vic. Nearest station TOO.
3.0	30/09/2008	NW of Mallacoota VIC. Nearest station MILA.
3.7	1/03/2008	SW of Echuca VIC. Nearest station TOO.
3.1	17/02/2008	S of Mt Gambier Vic. Nearest station ARPS.
3.4	24/01/2008	SE of Anglesea VIC. Nearest station TOO.
3.0	21/08/2007	Mt Baw Baw VIC. Nearest station TOO.
3.5	8/03/2007	S of Warburton Vic. Nearest station MILA.
3.2	18/02/2007	NE of Foster VIC. Nearest station TOO.
3.0	3/01/2007	Boolarra South Vic. Nearest station TOO.
3.4	1/10/2006	N of Bordertown near Vic/SA border. Nearest station ARPS.

3 Consequences

The effects of an earthquake depend on many factors, such as the magnitude of the earthquake, its depth and the distance from the epicentre. The below summarises the possible types of damage and disruption that may result in a major earthquake.

Built infrastructure damage (e.g. buildings)

Individual buildings are likely to suffer damage. These may include homes, businesses and essential facilities such as hospitals, schools and emergency services facilities. The Newcastle Earthquake in 1989 caused damage to 35,000 homes, 147 schools and 3000 commercial and/or other buildings. This large scale damage can cause displacement and isolation in the community.

Casualties

Casualties and injuries are likely to result from large damaging earthquakes. People may also become trapped requiring rescue. Secondary public health impacts may occur if essential services are not readily available after the impact of an earthquake.

Displacement and isolation

As a consequence of damage, people can become displaced requiring temporary accommodation. The amount of time for which people would need temporary accommodation would depend on the number of family and friends that could take them in, how long it would take for building inspections to be made, how long it would take lifeline services to be back up and running, and how long it would take for residents to regain access after areas were cordoned off or had access ways destroyed/blocked.¹

Areas can become isolated requiring resupply of essential items.

Transport Access

Roads may be blocked as a consequence of debris from fallen buildings. Roads may also be shut where there is the potential for surrounding buildings to fail during aftershocks, even if no debris has yet fallen. As a result, and as observed in Christchurch, areas of a major CBD may be cordoned off for a minimum of 7 days following the event¹. Bridges and tunnels will likely be closed for inspection.

Public Transport Disruption

Public Transport Disruption may occur as a result of some rail and light rail bridges being damaged, airport runways or port infrastructure being extensively damaged.

Economic

Widespread damage and disruption will lead to direct economic impacts that will require a broad economic development strategy to be created and complemented by more specific strategies at the sectoral level across transport and ports, resources, investment attraction and facilitation, trade, innovation, regional development and small business, together with key services to sectors such as agriculture, the creative industries, extractive resources and tourism.

Assistance to business to access available information, advice and support and to encourage a return to business may be required.

Electricity and Gas

The complete failure of large power components, such as transformers or substations, may occur in the proximity of the epicentre. Almost all addresses close to the epicentre may experience at least minor power failures. Breakage of gas pipelines is likely to be widespread and concerns may arise over disruption to reticulated gas supply.

The below describes damage to the electricity network from the Newcastle 1989 earthquake:

"The Newcastle earthquake of 1989 had a significant effect on the high voltage transmission assets of the NSW electricity supply grid operated by the Electricity Commission of NSW. Multiple failures of equipment, mainly switchgear, occurred in a number of the electricity substations closest to the earthquake epicentre. These failures initiated a general and immediate shut-down of electricity supply to both industrial and domestic consumers in the affected area. The response of the Commission to this unexpected emergency was immediate and effective. Operational recovery saw high voltage supply restored to major industrial customers 1½ hours after the incident. Restoration of supply for general distribution began within 30 minutes, with all bulk supply points energised after 2½ hours. Of course, the damage then had to be assessed, plant safety assured and repairs commenced so that normal levels of reliability could be returned to the community. This phase of restoration took 3 weeks to repair most major circuits and many months to complete. In the latter stages, it was accompanied by a third phase of review which identified any areas where either the system design or the response of a power authority to any future such emergency may be improved."

Water supply

Major water facilities such as pumping stations and reservoirs may experience damage. Damage may occur across the network. In case of liquefaction, breakage of pipes is likely to be widespread and concerns over contamination may render the water not suitable to drinking.

This is supported by the experience in Christchurch 2011:

"Christchurch water and waste networks suffered extensive damage as a result of the 22 February 2011 earthquake. Approximately 50% of the city was without water for the first days following the earthquake; more than a third of households were without water for over a week. A month after the 22 February 2011 event, over 95% of occupied units (outside of the cordoned Christchurch CBD) had water, however a "boil order" was in-place for over six weeks for most of the city due to potential contamination caused by severe damage to the wastewater system. Chlorination, which was not used pre-earthquake, remains a requirement to ensure water is disinfected. Water conservation orders are in place as a result of damage to key water reservoirs and the loss of many groundwater pumping wells; all related to geotechnical problems. However, with few exceptions, water reservoirs structures and pump stations performed very well owing to pre-earthquake engineering and seismic upgrades."

Waste water

Extensive damage may occur to waste water systems can occur even without the occurrence of liquefaction.

"Due to liquefaction, parts of Christchurch are, to date (>1 year after the second event) without sewage systems, and much of the population rely on portable toilet facilities. Furthermore, leakage in waste water piping was responsible for contamination of the clean water supply immediately after the event (2010)."

Communications

Communications infrastructure may suffer damage and be overloaded. Loss of communication can be due to a variety of reasons such as the crashing of telecommunication services, website crashes, and loss of power meaning mobile phones cannot be charged or cordless home phones will not work.

The below summarises the Christchurch earthquake experience:

"Telecommunication service providers took strong steps to restore services, and most services were back (or close) to normal within a week or so (except in the CBD where immediate restoration was not possible – nor was it a priority given cessation of most CBD activity). Nevertheless, the ability to make calls immediately after the earthquake, including 111 and other priority calls, was impacted by electricity outages, cable failures in liquefaction areas and congestion."

Cordless phones immediately ceased to work where electricity failed. Some physical damage to telecommunications assets also occurred but the effects were secondary – congestion largely resulted from the sudden substantial increase in call attempts rather than to equipment failure. Battery life at cabinets and cell towers also quickly became a constraint on telecommunications performance and significant losses of cellular coverage.”

Chemical and high risk industrial plants

These are usually located away from residential zones. It is expected that high risk facilities will be designed for increased resilience to earthquake damage, thus the probability of an accident induced by an earthquake is classified as low. If, however, there were damage, it could be such as in the 1998 Longford gas explosion in Victoria.

Hazardous material release

Hazardous materials are not exclusive to heavy industry and may be released as a consequence of building collapse. These may include carcinogenic or corrosive gases, poisonous liquids that contaminate the water table. Asbestos was used in Australia from the 1950’s until 2003 when it was banned. Asbestos may be exposed as a result of earthquake building damage in an earthquake. Irrespective of the risk, it will impose large clean-up costs and require the cordoning of many properties.

Fire following earthquake

Fire following earthquake has caused extensive damage in the past. Well known cases are the San Francisco 1906 and Tokyo 1923 earthquakes, where much of the damage was caused by fire. Extensive fire following earthquake damage is less common in present times, and will likely be localised to high risk sites as was the case for the Cosmo Oil Company fire following the 2011 Tohoku earthquake in Japan. In that event, the continued functioning of the water supply for firefighting would become critical.

Long series of strong aftershocks

A series of aftershocks are possible after an earthquake event. The Christchurch event was notable for its unusual frequency of aftershocks, with the most damaging event (M6.3 Lyttelton) occurring as an aftershock of the original event (M7 Darfield) 4 months earlier. This earthquake sequence seriously disrupted recovery activities, and although unusual, aftershocks did more damage than the main quake. This occurred because the aftershock was located directly below the CBD whereas the main shock was located to the west of the CBD at a closest distance of 30 km.

The earthquake sequence in Christchurch did evidently move away from the city only one year after the main event, and posed a serious challenge to the recovery of the Christchurch CBD.

Other impacts

Consideration should also be given to:

- Land or mud slide,
- Tsunami, or
- Floods from dam and levee failure and subsidence.

4 Community resilience

4.1 Shared and Individual Responsibility for Action

The National Strategy for Disaster Resilience, developed by the Council of Australian Governments, provides high-level guidance on disaster management to agencies with a role in emergency management.

Foremost in the Strategy is the principle of all of society taking responsibility for preparing for disasters. Examples in the context of earthquake include:

- Individuals being aware of their earthquake risk, and following advice from emergency services when responding to warnings.
- Local governments and communities including earthquake risk within their Community Emergency Risk Assessment activities, including consideration within emergency management planning and land use planning.
- Industry and businesses planning for the risk of disruption, and ensuring arrangements are in place to maintain critical services, and assist communities where possible.
- Government agencies undertaking:
 - Risk assessments to gain an appreciation of earthquake risk;
 - Engaging with the community regarding earthquake risk;
 - Working with communities to plan the management of earthquake risk;
 - Providing emergency information and earthquake warnings;
 - Ensuring an effective, well-coordinated response to an earthquake event; and
 - Helping communities to recover and learn following an earthquake and build their resilience to future events

The Victoria State Emergency Service (VICSES) has developed a Community Resilience Strategy. A key and measurable outcome of the Strategy is to increase the level of interest, and support behaviour change within our communities, so they are more aware, informed and prepared for emergencies – supporting them to understand their risk, and the relevance of taking action before, during and after emergencies. Information can be found at: www.ses.vic.gov.au

4.2 Building Codes

Australia's building codes set out data and procedures for determining earthquake loads on structures and their components, whilst detailing minimum requirements for structures. Local Government is responsible for the application of building code provisions.

4.3 Household, Business and Farm Plans

The Victorian Emergency Management Sector encourages every household, business and farm to have the written emergency plan. Information on the development of these plans can be found at www.ses.vic.gov.au

4.4 Earthquake Notifications

Earthquake notifications are provided by Geoscience Australia, who analyse and report on earthquakes within Australia and internationally. This is done on a 24/7 basis by Duty Seismologists for the purposes of earthquake warnings and to alert governments, emergency services and the general public of earthquakes in Australia and overseas.

There is no accepted method to predict earthquakes, however, some regions are more prone to earthquakes than others due to their location in proximity to earthquake faults. When an earthquake occurs, Geoscience Australia and the Victoria State Emergency Service will work together to notify the community.

Geoscience Australia monitors seismic data from the Australian National Seismic Network and stations worldwide. This is done in near real-time, 24 hours a day. Seismic data is also freely provided by overseas Governments who have national seismic networks. Geoscience Australia uses data provided by the Governments of New Zealand, Indonesia, Malaysia, Singapore and China. Data from global seismic networks are also provided by USA, Japan, Germany and France.

The seismic data is collected and analysed automatically and then immediately reviewed by Geoscience Australia's Duty Seismologist. For earthquakes that have the potential to generate a tsunami, preliminary earthquake details are computed within 15 minutes. All other earthquakes are generally computed within 30 minutes.

Earthquakes that can be located in Australia are catalogued and published on the Geoscience Australia website. The analysis includes the origin time and date of the earthquake, its location (latitude, longitude and depth) and its magnitude. Earthquakes outside Australia, but within our region, are published only for earthquakes with a magnitude of 5 or greater. Earthquakes occurring anywhere internationally with a magnitude of 6 or greater are also catalogued and published on the Geoscience Australia website.

4.5 Critical Infrastructure Resilience

Infrastructure is essential to the delivery of essential services to communities. Part 7A of the Emergency Management Act 2013 outlines the legislative arrangements for building critical infrastructure resilience. This is supported by the Victorian Critical Infrastructure Resilience Strategy available at:

www.emv.vic.gov.au/our-work/critical-infrastructure-resilience

4.6 Community Safety Advice

The Victoria State Emergency Service has developed awareness packages and key safety messages for the community regarding earthquakes, and are available at: **www.ses.vic.gov.au/get-ready/quakesafe**

5 Collaboration

5.1 Escalation and Notification

Notification of earthquake activity will be provided by Geoscience Australia directly to the Victoria State Emergency Service State Duty Officer. The Victoria State Emergency Service State Duty Officer shall acknowledge by phone to the Geoscience Australia Duty Officer and obtain all relevant earthquake details.

Upon the receipt of a warning, Victoria State Emergency Service, as the Control Agency for response to earthquakes in Victoria, has the responsibility to disseminate notifications and advice to the emergency services, affected communities and key support organisations at State, Regional and Local levels.

At the State level, the Victoria State Emergency Service State Duty Officer is responsible for providing notifications to other relevant agencies for earthquakes that:

- Have their epicentre within Victorian borders, and
- Have been identified as having the potential to cause damage within Victoria.

Upon notification of an earthquake of up to M 4.3, at the State level, the State Duty Officer is responsible for notifying the relevant Victoria State Emergency Service Regional Duty Officers, the State Media Duty Officer, the Emergency Services Telecommunications Authority (ESTA) and the State Response Controller and State Control Team – including the Senior Police Liaison Officer (SPLO). At the regional level the Regional Duty Officer will notify the relevant Regional Emergency Response Coordinator and relevant Victoria State Emergency Service Units.

Upon notification of earthquakes greater than M 4.3, the Victoria State Emergency Service State Duty Officer will notify all Emergency Service Organisations (ESOs), including the Emergency Services Telecommunications Authority, via the State Emergency Management Team (SEMT) and relevant agency State Duty Officers. The State Duty Officer will also notify all Victoria State Emergency Service Regional Duty Officers of the potential for support being required from outside the impacted Region, and Regional Duty Officers will notify all Regional Emergency Service Organisations via their Emergency Management Team and relevant agency Regional Duty Officer.

The Victoria State Emergency Service Chief Officer is responsible for notifying the Emergency Management Commissioner (in accordance with Joint Standard Operating Procedure 3.16 Significant Event Notification). The Emergency Management Commissioner can assist through the State Control Centre to notify State Coordination Team and the State Emergency Management Team.

The Victoria State Emergency Service, in liaison with Geoscience Australia, will work closely with those media organisations that have been designated as Emergency Service Broadcasters under the State's Memorandum of Understanding to provide urgent community safety information in the case of damaging earthquakes greater than M 4.3.

The Victoria State Emergency Service has developed a detailed notification process for earthquake events which are documented in the Victoria State Emergency Service Standard Operating Procedures (SOP 046).

5.2 Strategic Coordination of an Earthquake Event

5.2.1 Emergency Management Commissioner

Under the Emergency Management Act 2013, the Emergency Management Commissioner has legislated management responsibilities across major emergencies, with the exception of terrorism- related emergencies. These include response coordination, ensuring effective control arrangements are established, consequence management and recovery coordination.

5.2.2 The Role of the Victoria State Emergency Service

The Victoria State Emergency Service is the Control Agency for earthquake as defined in Part 7 of the Emergency Management Manual Victoria. In this role the Victoria State Emergency Service is responsible for:

- Provision of public information and warnings to the community;
- Undertaking response planning;
- Supporting Victoria Police with evacuations;
- Provision of skilled and equipped personal to conduct rescue operations;
- Initiate initial impact assessments; and
- Provision of damage control operations to limit danger to the public following an earthquake.

5.2.3 Supporting Agency roles and responsibilities

An earthquake event requires a coordinated response from multiple supporting agencies. Roles and responsibilities of supporting agencies are listed in Appendix A. This should be read in conjunction with Section 7 of the Emergency Management Manual Victoria.

5.3 Victorian Government Management Arrangements

This section describes the management arrangements for a whole of Victorian government approach to managing a major flood emergency.

The Emergency Management Commissioner manages the State response to major emergencies through the following five key teams:

- State Coordination Team (SCOT);
- State Control Team (SCT);
- State Emergency Management Team (SEMT);
- Emergency Management Joint Public Information Committee (EMJPIC); and
- The Executive.

During a large-scale emergency, the Victorian Government's Security and Emergency Management Committee of Cabinet (SEMC) provides whole of government ministerial oversight. The State Crisis and Resilience Council (SCRC) provides SEMC with assurance that the broad social, economic, built and natural environmental consequences of the emergency are being addressed at a whole of government level. The State Crisis and Resilience Council also has responsibility for the oversight of the development of a whole of government communications strategy for the approval of Security and Emergency Management Committee.

Neither the Security and Emergency Management Committee nor the State Crisis and Resilience Council have an operational response role.

5.4 Emergency Management Team

Emergency Management Teams are formed at each activated tier of emergency response management as follows:

- State Emergency Management Team (SEMT);
- Regional Emergency Management Team (REMT); and
- Incident Emergency Management Team (IEMT).

Emergency Management Teams are collaborative forums where agencies with a diverse range of responsibilities during emergencies meet to discuss the risks and likely consequences of an earthquake and assist the Emergency Management Commissioner and controllers establish priorities and plan a 'whole of government' approach to the management of these risks and consequences.

An Emergency Management Team ensures the response and recovery agencies, other agencies, local government and service providers are coordinated in their approach.

Because the response to an earthquake event may involve a range of disparate emergencies (e.g. health emergencies, power and transport emergencies, urban fire etc), the Emergency Management Commissioner, Regional Emergency Response Coordinators and Municipal Emergency Response Coordinators chair their respective Emergency Management Team.

Once formed, an Emergency Management Team operates throughout a continuum for the response to and recovery from the earthquake event.

Not all agencies have the capability to provide a representative for Emergency Management Team at each tier. For example, a person may represent their agency at both the Regional Emergency Management Team and Incident Emergency Management Team.

Further detail can be found in the *State Emergency Response Plan*.

5.5 Consequence Management

After a damaging earthquake, the Emergency Management Commissioner appoints a Consequence Manager, responsible for assessing the likely consequences of the earthquake and working with the State Emergency Management Team and Regional Emergency Management Team to ensure a whole-of-government approach to the management of these consequences.

5.6 Reporting To Government

During an earthquake response, the Emergency Management Commissioner may request agencies to report on the impact and consequences of the event on their area of responsibility, identifying any emerging issues and actions to resolve these.

This information forms the basis of the State Emergency Management Team Situation Report, which the Emergency Management Commissioner uses to brief the Minister for Emergency Services and the State Crisis and Resilience Committee, and for the State Emergency Management Team members to brief their departmental executive and respective Minister.

5.7 Management of Spontaneous Volunteers

It is likely in the aftermath of an earthquake that self-organised volunteer community groups may emerge to assist in response and recovery efforts. Where identified, Local Government will assist to coordinate support and community liaison officers may be deployed to assist groups with logistics and risk management.

6 Capability

6.1 Regional and Municipal Earthquake Planning

6.1.1 Regional Earthquake Planning

Victoria State Emergency Service Regions will develop Regional Earthquake Plans that will include the identification of suitable Incident Control and Regional Control locations in consultation with other key emergency management agencies. The selection and placement of these sites must take into account possible access and damage limitations that could occur during major earthquakes.

Regional earthquake emergency plans will cover:

- Regional risk assessment,
- Sources of incident intelligence,
- Public information,
- Location of Incident Control Centres,
- Incident management and regional control arrangements,
- Rescue arrangements,
- Engineering advice and services arrangements,
- Consequence management,
- Resource arrangements for within the region,
- Traffic management plans,
- Planned staging areas,
- Relief Centres, and
- Cross boundary arrangements (intra and inter State).

6.1.2 Municipal Earthquake Planning

Where an earthquake hazard is identified through the emergency risk management process as a high risk to a community, the Victoria State Emergency Service will provide advice and support to local government councils to ensure the Municipal Emergency Management Plan (MEMP) contains arrangements concerning the preparedness for, and response to, an earthquake event based on all-hazards and all-agency response.

6.2 Dam Safety

The Department of Environment, Land, Water, and Planning has a regulatory role in ensuring that water authorities, who manage water storages, address safety issues (including dam breach events) and that owners of private dams are licensed, with safety provisions included in their licences. If a dam failure emergency was to occur it will be managed in accordance with arrangements for the management of flooding downstream of dams within the State Emergency Response Plan Flood Sub Plan.

7 Managing an Earthquake Event

7.1 Concept of Operations

At the State tier, the Victoria State Emergency Service will act the Control Agency for the response to an earthquake event. Other agencies will support operations as detailed in this Plan. The Emergency Management Commissioner may vary this arrangement in consultation with Victoria State Emergency Service and the State Response Controller.

Control and coordination of an earthquake event should be carried out at the lowest effective level. The State Response Controller shall consult with the Regional Controller and the State Control Team to determine the most appropriate structure to manage the event.

There may be multiple consequential emergencies resulting from an earthquake (e.g. fire, building collapse, hazmat, flooding). Incident Controllers shall therefore be appointed from appropriate support agencies to lead incident control at the incident site based on the dominant consequential emergency (e.g. a building collapse).

Controllers at all times will ensure the occupational health safety of emergency service personnel; this includes ensuring that adequate risk treatments are implemented in the event of secondary earthquake impacts.

As the Control Agency for earthquake, the Victoria State Emergency Service has the responsibility to issue warnings to the potentially affected community and to other agencies.

7.2 Strategic Response Planning

Soon after the receipt of advice of damaging earthquake Emergency Management Commissioner, Victoria State Emergency Service and all agencies with responsibilities in the management of an earthquake event will collectively plan for the integrated management of the impact and consequences at the State and Regional tiers through the State, Regional and Incident Emergency Management Teams. Actions may include:

- Establishing the control structure for managing the event.
- Providing consistent emergency warnings and information to the community.

- Implementation of evacuation and emergency relief plans.
- Ensuring functionality of communications networks
- Confirming agencies at all tiers are activated and appropriate arrangements are in place.
- Identifying the likely consequences of the earthquake and any interdependencies that may affect planning.
- Confirming agencies have adequate resources in place to fulfil their responsibilities and are planning for sustainment and surge capacity, including identification of need for inter-state or international assistance.
- Identifying mass gatherings and large public events that maybe at-risk, and arrangements to ensure the safety of individuals attending.
- Confirming agencies with call taking responsibilities have resources in place and back up arrangements to cope with the expected call load.
- Positioning of Emergency Management Liaison Officers from key support agencies to the State Control Centre and Regional Control Centres, where appropriate.
- Arranging for regular meetings of the State, Regional and Incident Emergency Management Teams.
- Providing whole-of-government situation reports to relevant Government Ministers.

7.3 Community Information

The Victoria State Emergency Service will lead the community information and media management function to ensure the provision of timely and accurate information to the community.

The Victoria State Emergency Service may establish an information line: 1300 842 737, for public enquiries regarding the response to an earthquake.

Earthquake information and community emergency warnings will be disseminated through emergency broadcasters including commercial and ABC radio in accordance with the Emergency Broadcasting Practice Note and the agreed MOUs. Messages may be sent utilising the Standard Emergency Warning Signal (SEWS). Multiple methods will be used to disseminate information to the community.

Adjoining states will be consulted over public information messages and the use of Emergency Alert if impact has occurred in a border area.

7.4 Initial Impact Assessment

Immediate reconnaissance of affected areas will be managed by the Incident Controller responsible for that area. Rapid reconnaissance is required to establish the extent of damage and a likely estimate of the casualty numbers so a response can be planned.

Impact assessment should include data on people (casualties, injuries, displacement), property (residences, businesses) and essential community infrastructure (roads, bridges, water, sewerage, telecommunications).

The State Response Controller will ensure that arrangements are in place for Initial Impact Assessment data to be incorporated into the operational response. Information collected may be derived from several sources, for instance multiple agency Incident Management Systems may be used for smaller type events whilst large events may require the use of dedicated Initial Impact Assessment Coordinator teams (located within Incident Control Centres and the State Control Centre to collate collected data).

Intelligence gathered will be used to inform situational awareness, incident action planning and recovery planning.

The Incident Controller will:

- Ensure that Initial Impact Assessment data is collected, collated and passed on to the appropriate agencies in timely manner; and
- Ensure systems are put in place to manage the collection and collation of Initial Impact Assessment data and that they are determined by the level of operation and severity of the incident.

Aftershocks may continue to affect the community and these should be taken into consideration. After the impact of an earthquake, secondary hazards include:

- Landslides and rock falls,
- Fault ruptures,
- Tsunami,
- Hazardous material releases,
- Dam failure,
- Fire, and
- Liquefaction (conversion of soil or land into liquid).

7.5 Rescue

The Incident Controller will task Urban Search and Rescue resources, through the appropriate agencies as detailed in the Victorian Urban Search and Rescue (USAR) Response Arrangements.

7.6 Medical Response

In aftermath of an earthquake, the Department of Health and Human Services has a support function and coordinates the health response from their State Emergency Management Centre (SEMC).

The State Health Emergency Response Plan (SHERP) outlines the arrangements for coordinating the health and medical response to emergencies. The State Health Emergency Response Plan is a sub-plan of State Emergency Response Plan and is referenced in the Emergency Management Manual Victoria Part 8 Appendix 10 and located at: www.health.vic.gov.au/sherp/

The State Health and Medical Commander is responsible for directing health and medical resources, and the Health Commander is responsible for directing the pre-hospital response in an emergency and represent several agencies in the State Emergency Management Team. These agencies may include:

- Department of Health and Human Services,
- Ambulance Victoria,
- first aid providers,
- medical providers (including general practitioners),
- health services (public and private hospitals), and
- residential and aged care services.

In response to mass fatalities, Victoria Police will manage the disaster victim identification process and will administer the handling and investigation of deceased persons and their subsequent removal on behalf of the State Coroner.

7.7 Restricting Access

To ensure public safety, it may be necessary to restrict access to affected areas. Victoria Police will coordinate the restriction of access to these areas as directed by the Incident Controller. Traffic management will be conducted in accordance with the Joint Standard Operating Procedure for Traffic Management (Joint Standard Operating Procedure 3.10).

7.8 Evacuation

Evacuation is a risk management strategy, which may be used as a means of mitigating the effects of an emergency on a community. It involves the movement of people to a safer location. However, to be effective it must be correctly planned and executed.

In Victoria, evacuation is largely voluntary. The Incident Controller makes a recommendation to evacuate and it is the choice of individuals as to how they respond to this recommendation. However, in particular circumstances legislation provides some emergency service personnel with authority to remove people from areas or prohibit their entry e.g. Coroners Act 2008 (sections 37(2), 37(3) & 38(1)).

Evacuation operations should be consistent with Evacuation Guidelines contained in Appendix 9 of the Emergency Management Manual Victoria and Joint Standard Operating Procedure on Evacuation (JSOP 3.12).

7.9 Damage Control

In the immediate aftermath of a significant earthquake there may be some scope for action to be taken to limit danger to the public through identifying and mitigating immediate damage to built infrastructure. Damage control operations will be directed from the relevant Control Centres. The activity will only be undertaken when it does not conflict with rescue and recovery priorities. Damage control tasks may include the removal of dangerous debris and shoring up of structures to reduce danger to the public.

Damage control operations will not include any restoration or reconstruction tasks.

7.10 Engineering Advice

Engineering advice will be required to undertake the following:

- Assess built infrastructure stability (e.g. buildings, bridges);
- Support urban search and rescue activities, and
- Support damage control to limit risks to public safety.

In the first instance, Incident Controllers should seek engineering advice through the relevant Municipal Council.

7.11 Debris Removal

Local Government, relevant statutory authorities and individual landowners/householders will arrange for the removal of debris from sites affected by storm damage. Victoria State Emergency Service is not responsible for removing debris.

7.12 Emergency Relief

State Emergency Relief and Recovery Plan provides the overall arrangements for management of emergency relief. Incident Controllers are responsible for ensuring that relief arrangements have been considered and implemented where required under the State Emergency Response Plan however the decision to recommend the opening of an emergency relief centre rests with the Local Government in consultation with the Incident Controller.

If the Regional Emergency Response Coordinator becomes satisfied that the event exceeds the capacity of the council to perform this function, a request to the Department of Health and Human Services to coordinate emergency relief at the regional level will be made. To ensure a smooth transition of responsibility, a Council should notify the Department of Health and Human Services as soon as it becomes apparent an event will exceed its capacity. This does not replace the requirement for the Regional Emergency Response Coordinator to monitor the emergency relief situation.

7.13 Recovery

Recovery activities will be undertaken in accordance with the State Emergency Relief and Recovery Plan (see www.emv.vic.gov.au/policies/emmv), and will commence during the response phase. As such, there needs to be high levels of understanding and cooperation between response and recovery organisations at each operational level (State, regional, municipal). The response function will continue at least until the following conditions are met:

- All rescues have been accomplished;
- All injured have been attended to; and
- Displaced people have been provided with shelter, and essential services.

Emergency Management Victoria supported by the Australian Red Cross is responsible for relief and recovery at the State level, and the Department of Health and Human Service supported by the Australian Red Cross is responsible for coordinating relief and recovery at the regional level. At the local level Municipal Councils are responsible for coordinating relief and recovery.

8 Appendix A – Roles and Responsibilities of Supporting

Ambulance Victoria	<ul style="list-style-type: none">Provide Health Commander(s) to the Emergency Management Team/Incident Management Team under the State Health Emergency Response Plan.Continue response to emergency medical '000' calls in altered environmentSupport relocation/evacuation of health and aged care facilitiesTreat sick and injured people, including the provision of pre-hospital care and transport
Australian Red Cross	<ul style="list-style-type: none">Support Victoria Police with the registration of evacueesSupport relief and recovery operations
Bureau of Meteorology (BOM)	<ul style="list-style-type: none">Provide weather forecasts for earthquake affected areas
Country Fire Authority (CFA)	<ul style="list-style-type: none">Support incident managementProvide access to Incident Control Centre facilitiesSupport the Initial Impact Assessment processSupport Victoria Police with evacuationsProvide skilled and equipped personnel to assist with damage control operations to limit danger to the public following an earthquakeProvide resources for pumping floodwater out of buildings and from low-lying areasUndertake response to hazmat incidentsAssist with mappingSupport the deployment of the State USAR response team
Department of Education and Training (DET)	<ul style="list-style-type: none">Provision of on-site assistance and support for management of local issues involving studentsManagement of closure and evacuation of schools and early childhood servicesSupport the Initial Impact Assessment processProvision of support for school communities through allied health and welfare staff.

Department of Health and Human Services (DHHS)	<p>Response</p> <ul style="list-style-type: none"> • Through the State Health Emergency Response Plan coordinate deployment of medical personnel under the direction of the State Health and Medical Commander • Provide advice on public health consequences via Chief Health Officer to Incident Controller • Support the Initial Impact Assessment process • Coordinate emergency relief and recovery at Regional level • Control agency for incidents involving retail food contamination, food/drinking water contamination, human illnesses/epidemics, radiological substances and biological materials • Support service delivery to affected individuals, groups and/or communities • Provision of advice in relation to potable water quality in an earthquake emergency <p>Recovery</p> <ul style="list-style-type: none"> • Coordinate relief and recovery planning at Regional levels • Coordinate provision of psychosocial support at incident sites and across the community • Coordinate the provision of emergency financial assistance to eligible community members • Support councils and community recovery committees in recovery planning and managing recovery activities • Provide support, advice, information and assistance to affected individuals, communities, funded agencies and municipal councils • Assist with provision of temporary accommodation
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<p>Department of Economic Development, Jobs, Transport and Resources (DEDJTR)</p>	<p>Preparedness</p> <ul style="list-style-type: none"> • Assist Victoria State Emergency Service to identify infrastructure at-risk of earthquake damage for incorporation into planning and intelligence • Develop awareness in agricultural industries regarding environmental emergencies and risk management planning • Develop awareness amongst animal owners and agencies regarding planning for and responding to animal welfare needs in an emergency <p>Response</p> <ul style="list-style-type: none"> • Provide advice about the disposal and rehabilitation of livestock • Provide advice on potential animal welfare issues and arrangements in place for their management • Coordinate the provision of emergency animal welfare services as per the Victorian Emergency Animal Welfare Plan • Support the Initial Impact Assessment process • Facilitate the provision of skilled personnel to provide engineering advice regarding damaged transport infrastructure • Provide information regarding the status of the transport network and associated infrastructure • Facilitate the provision of transport capabilities when requested to support evacuation, passenger transport and logistics purposes • Responsible for marine pollution response <p>Recovery</p> <ul style="list-style-type: none"> • Assess losses of agricultural assets and livestock, and needs of affected persons and communities • Advise individuals, communities and government agencies on re-establishment of rural enterprises or alternative strategies for economic relief • Administer specific relief subsidies • Advise councils on the disposal of dead or maimed stock. • Advise distribution bodies on needs for donated fodder.
<p>Emergency Services Telecommunications Authority (ESTA)</p>	<ul style="list-style-type: none"> • Provide facilities for Emergency Management Liaison Officer (EMLO)
<p>Environment Protection Authority (EPA)</p>	<ul style="list-style-type: none"> • Assess the environmental impact of the emergency • Determine practical measures to protect the environment • Advise emergency services on the properties and environmental impacts of hazardous materials • Ensure that appropriate disposal methods are adopted for detritus and waste • Implement the Community Environmental Trauma Protocol when required
<p>Joint Australian Tsunami</p>	<ul style="list-style-type: none"> • Monitor and report earthquakes that have the potential to generate a tsunami • Responsible for issuing Tsunami Watches and Warnings for Australia including Victoria through Bureau of Meteorology
<p>Warning Centre (JATWC)</p>	<ul style="list-style-type: none"> • Provide information where available to Victoria State Emergency Service regarding earthquake risk • Earthquake notifications will be provided directly to the Victoria State Emergency Service Duty Officer • Monitor and report earthquakes of magnitude 3.5 or greater

Geoscience Australia (GA)	<ul style="list-style-type: none"> Provide information where available to Victoria State Emergency Service regarding earthquake risk Earthquake notifications will be provided directly to the Victoria State Emergency Service Duty Officer Monitor and report earthquakes of magnitude 3.5 or greater
Melbourne Water Corporation	<ul style="list-style-type: none"> Provide skilled personnel to provide engineering advice regarding damaged structures Support the Initial Impact Assessment process Implement crisis and incident management plans when assets fail to perform their function (water supply and sewerage) Provide information on impact to water assets or services Provision of emergency works to alleviate flooding and clearance of Melbourne Waters drainage assets after flooding has occurred
Metropolitan Fire Brigade (MFB)	<ul style="list-style-type: none"> Support incident management Provide access to Incident Control Centre facilities Support initial impact assessment process Support Victoria Police with evacuations Provide skilled and equipped personnel to assist with damage control operations to limit danger to the public following a tsunami Undertake response to hazmat incidents Undertake urban fire suppression Assist with mapping Support the deployment of the State USAR response team

Municipal Councils	<p>Preparedness</p> <ul style="list-style-type: none"> • Ensure Municipal Emergency Management Plans are appropriate to response to an earthquake event • Assist with and contribute to earthquake education programs <p>Response</p> <ul style="list-style-type: none"> • Provision of resources as available and needed by the community and response agencies • Support the Initial Impact Assessment process • Provision of engineering advice • Provision of facilities for emergency services staging areas • Assist with the delivery of public information • Co-ordination of the provision and operation of emergency relief (includes catering, emergency relief centres, emergency shelters and material needs) • Assist with debris removal • Assist with the provision of plant and skilled operators • Support to VicRoads for partial/full road closures and determination of alternative routes <p>Recovery</p> <ul style="list-style-type: none"> • Provision of information services to affected communities (e.g. using information lines, newsletters, community meetings and websites) • Provision and staffing of Recovery/Information Centre(s) • Formation and leadership of Municipal/Community Recovery Committees • Post-impact assessment — gathering and processing of information • Survey and determination regarding occupancy of damaged buildings • Environmental health management — including food and sanitation safety, vector control, such as removing dead animals (domestic, native or feral) from waterways • Oversight and inspection of rebuilding/redevelopment services • Provision and management of community development services • Provision and/or co-ordination of volunteer helpers • Provision of personal support services (e.g. Counselling, advocacy) • Co-ordination of clean up activities, including disposal of dead animals (domestic, native and feral) • Provision/co-ordination of temporary accommodation • Repair/restoration of infrastructure (roads, bridges, sporting facilities, public amenities)
Parks Victoria	<ul style="list-style-type: none"> • Control agency for waterway pollution within its operating area • Support agency for emergency earthquake situations within its parks and reserves • Support incident management • Rehabilitation of flora and fauna affected by an emergency within its parks and reserve • Clearing and restoration of roads, bridges and other assets within its parks and reserves • Close and evacuate at risk camping grounds in National Parks

VICROADS	<ul style="list-style-type: none"> • Manage road closures and diversions • Undertake traffic management planning • Provide information to the Emergency Management Team and the community about road closures • Provide skilled personnel to provide engineering advice regarding damaged structures • Support the Initial Impact Assessment process • Assist with the communication of warnings and information provision to the public through the use of variable message signs • Provide engineering assistance and advice • Clear debris from VicRoads managed roads • Assist with the provision of plant and skilled operators
Victoria Police	<ul style="list-style-type: none"> • Coordinate evacuation in consultation with Incident Controller • Coordinate USAR resources in consultation with Incident Controller • Coordinate registration of evacuees – with support from the Australian Red Cross • Coordinate public enquiry system for disaster victims • Coordinate disaster victim identification • Assist with media management • Traffic management planning • Support Initial Impact Assessments
Victorian Water Authorities (other than Melbourne Water)	<ul style="list-style-type: none"> • Provide skilled personnel to provide engineering advice regarding damaged structures where available • Support the Initial Impact Assessment process • Implement crisis and incident management plans when assets fail to perform their function (water supply and sewerage) • Provide information on impact to water assets or services



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