Central Region

Emergency Response Plan

SES

Landslide Sub Plan

Published by Victoria State Emergency Service

Melbourne, August 2019.

This publication is intended to be consistent with the State Emergency Response Plan (SERP), published by Emergency Management Victoria (EMV) in 2016.

Authorised by the Victoria State Emergency Service (VICSES)
168 Sturt Street,
Southbank VIC 3006

An electronic version of the plan can be obtained at: www.ses.vic.gov.au/em-sector/vicses-emergency-plans

Version Control
Central Region
Emergency Response Plan
Landslide Sub-plan
Version 1.10 17/06/2019

Central Region Emergency Response Plan – Landslide Sub-plan Certification

The Central Region Emergency Response Plan – Landslide Sub-plan deals with response to Landslide incidents within Central area of responsibility.

The following plan is intended to provide the framework for Central Region to effectively and efficiently respond to future emergencies caused by Landslide, and will remain current until rescinded by authority of the Victoria State Emergency Service Chief Officer Operations.

_____ Date: 10 October 2019

Tim Wiebusch
Chief Officer Operations

This plan is produced by VICSES and has been adapted from the State Emergency Response Plan – Landslide Sub-plan. All information contained in this plan was current at time of publication.

VICSES would like to acknowledge the significant contribution of key stakeholders to ensure the content contained within this plan is of a high quality to support response activities.

For further details about this plan, please contact Central Region:

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State Emergency Management Priorities

The State Emergency Management Priorities are:

- Protection and preservation of life is paramount. This includes:
    - Safety of emergency response personnel.
    - Safety of community members, including vulnerable community members and visitors/tourists.
- Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.
- Protection of critical infrastructure and community assets that support community resilience.
- Protection of residential property as a place of primary residence.
- Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability.
- Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment.

Table of Contents

1. Introduction

1.1. Purpose

The purpose of this plan is to provide strategic guidance for the effective emergency management of a landslide in the Central Region.

1.2. Objective

The objective of the Central Region Emergency Response Plan – Landslide Sub-Plan is to outline the arrangements for ensuring an integrated and coordinated approach to the management of landslide events in order to reduce the impact and consequences of these events on the community, infrastructure and services.

1.3. Scope

This Central Region Emergency Response Plan – Landslide Sub-Plan plan includes:

- Description of potential risks and consequences of earthquakes to the social, built, economic and natural environments.
- Region-specific emergency management arrangements for the management of landslides. Links to sources of information where the reader can obtain further detail.

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 these emergency management arrangements.

The SERP (Part 3, EMMV) identifies Victoria's organisational arrangements for managing the response to emergencies.

Part 7 of the EMMV outlines VICSES as the Control Agency for landslide emergencies. In this role, VICSES is responsible for providing protection of life, property and the environment.

The State Landslide Hazard Plan outlines overarching arrangements for the management of landslide emergencies, but does not replace arrangements in the SERP.

This plan has been approved by VICSES Chief Officer of Operations.

Other relevant legislation includes:

- *Victoria State Emergency Service Act 2005*
- Section 5(a) and (b) of the *VICSES Act 2005* details VICSES role in landslide planning and response
- *Essential Services Act 1958*
- *Planning and Environment Act 1989*
- *Local Government Act 1989*
- *Water Act 1989*
- *Catchment and Land Protection Act 1994*

- *Meteorological Act 1955* (Commonwealth)
- *Roads Management Act 2004.*

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 in Central Region, including business and community groups with a significant role in the management of the emergency.

Although the wider community is not the primary audience, community members may find the contents of this plan informative.

1.7. Linkages

This plan reflects current legislation, the arrangements in the SERP, the State Landslide Hazard Plan, the State Emergency Relief and Recovery Plan, the strategic direction for emergency management in Victoria and the accepted State practice for managing emergencies.

The arrangements in the SERP and State Emergency Relief and Recovery Plan have not been repeated unless necessary to ensure context and readability. Both plans can be accessed at: www.emv.vic.gov.au/policies/emmv. Arrangements for the management of secondary consequences related to landslide are contained in the following:

- Flooding – State Emergency Response Plan - Flood Sub Plan
- Rescue response – Victorian Urban Search and Rescue (USAR) Response Arrangements
- Health response – State Health Emergency Response Plan.

1.8. Exercising and evaluation

This plan will be exercised within one year from the date of approval and once every three years thereafter as part of a phased cycle. 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 Australian Institute for Disaster Resilience (AIDR) Managing Exercises Handbook, available at: www.knowledge.aidr.org.au/resources/handbook-3-managing-exercises.

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 three years. Consideration will be given to an earlier review if the plan has been applied in a major emergency or exercise, or following a substantial change to the relevant legislation or arrangements.

2. Landslide Risk Overview

2.1. Region description

Victoria has many areas prone to landslide. Whilst there is currently no consistent state-wide landslide risk assessment for Victoria, most landslide risk assessments completed have been commissioned by local government. The risk of landslide in Central Region is relatively low compared to other parts of Victoria, due to lower altitudes and sympathetic ground works when roads and buildings have been made.

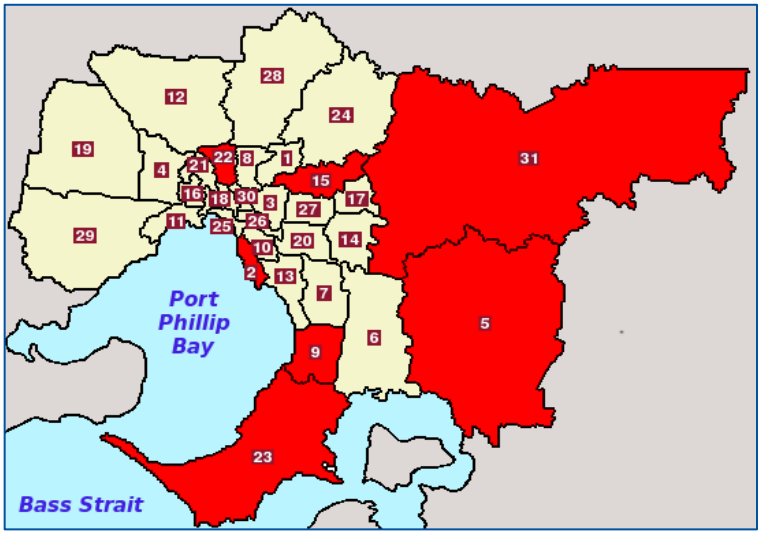
Landslides have been included in Municipal Emergency Management Plan (MEMP) discussions and the Community Emergency Risk Assessment (CERA) for a small number of Local Government Areas (LGAs). The occurrence of major landslides in Central has been limited primarily to the Yarra Ranges Shire in the past 100 years. A number of LGAs have Erosion Management Overlays (EMOs) to limit ground works in the following Municipalities and Shires

- Moreland
- Manningham
- Yarra Ranges
- Frankston
- Cardinia
- Glen Eira
- Mornington Peninsula

These locations can be accessed from the Department of Environment, Land, Water and Planning (DELWP) website, at: http://services.land.vic.gov.au/maps/pmo.jsp. It must be noted that not all land susceptible to landslides will have a planning overlay if the land use does not require one, such as farming.

The most significant assets of concern are major roads and tourist locations, namely the Mount Dandenong Tourist Road, Warburton Highway, the Maroondah Highway in Fernshaw, and the Nepean Highway in Frankston. With the exception of the Warburton Highway, most of these locations can be easily detoured by the community.

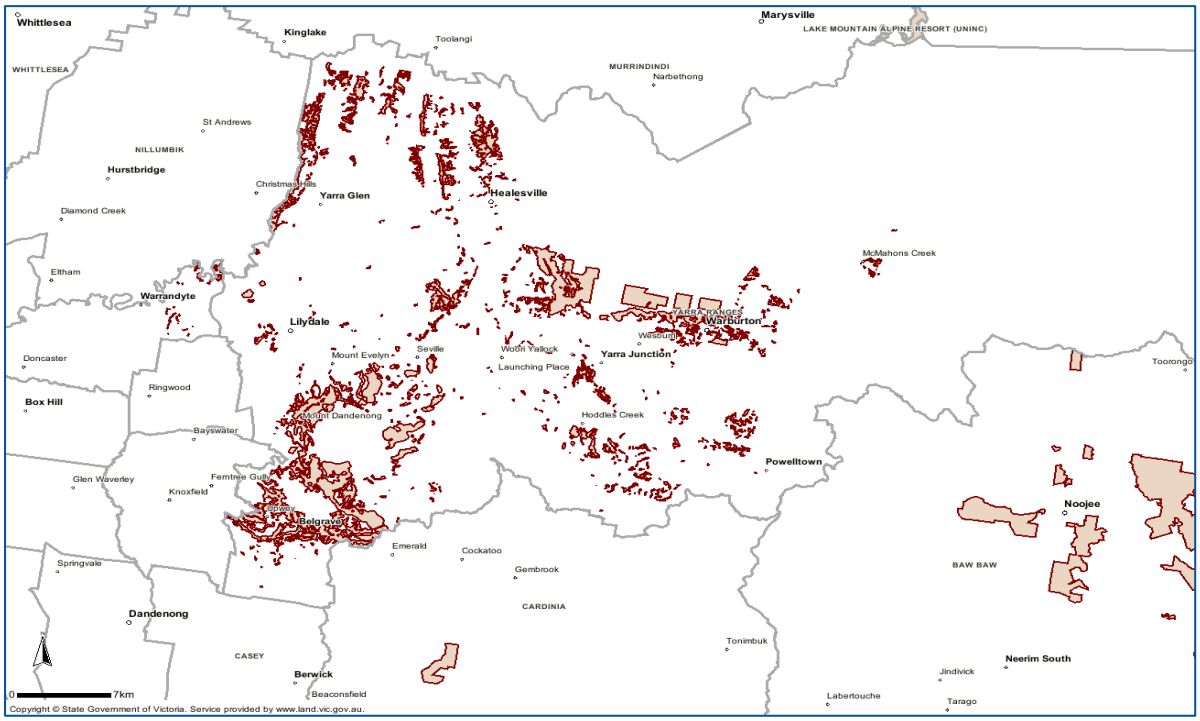
The following map shows the areas identified in the overlays highlighted in red:



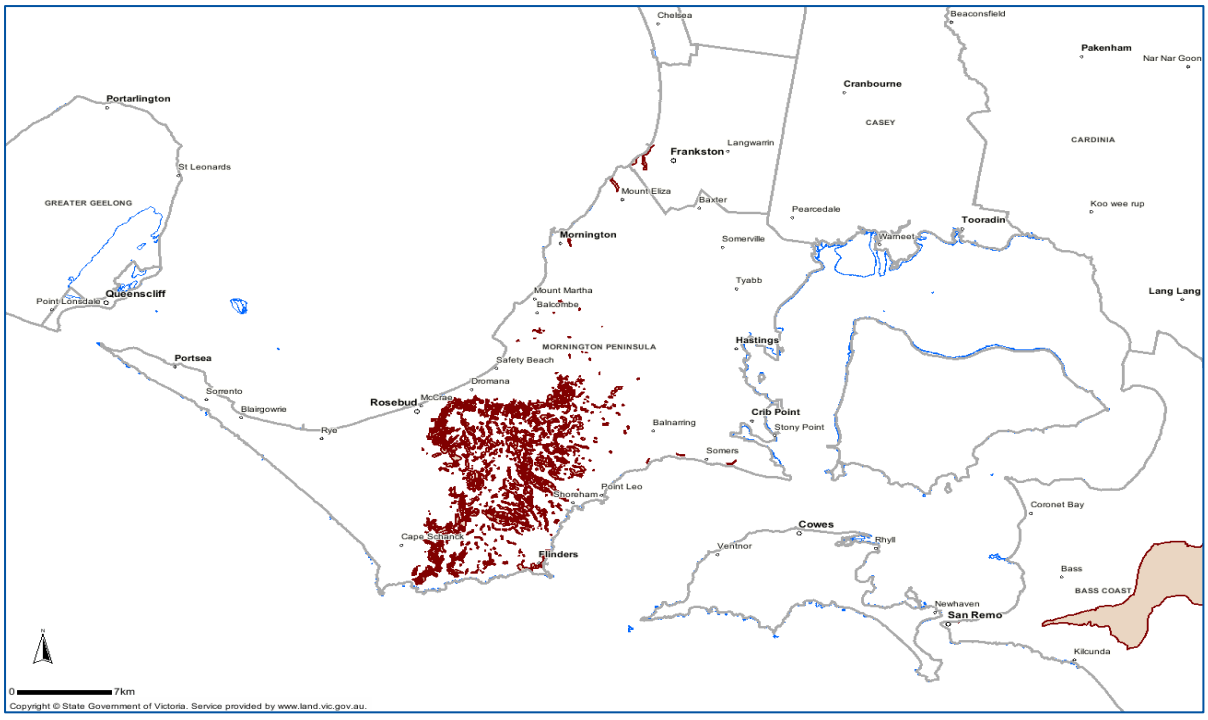
2.2. Municipalities detail

The maps below detail EMO locations, with areas of concern highlighted in red.

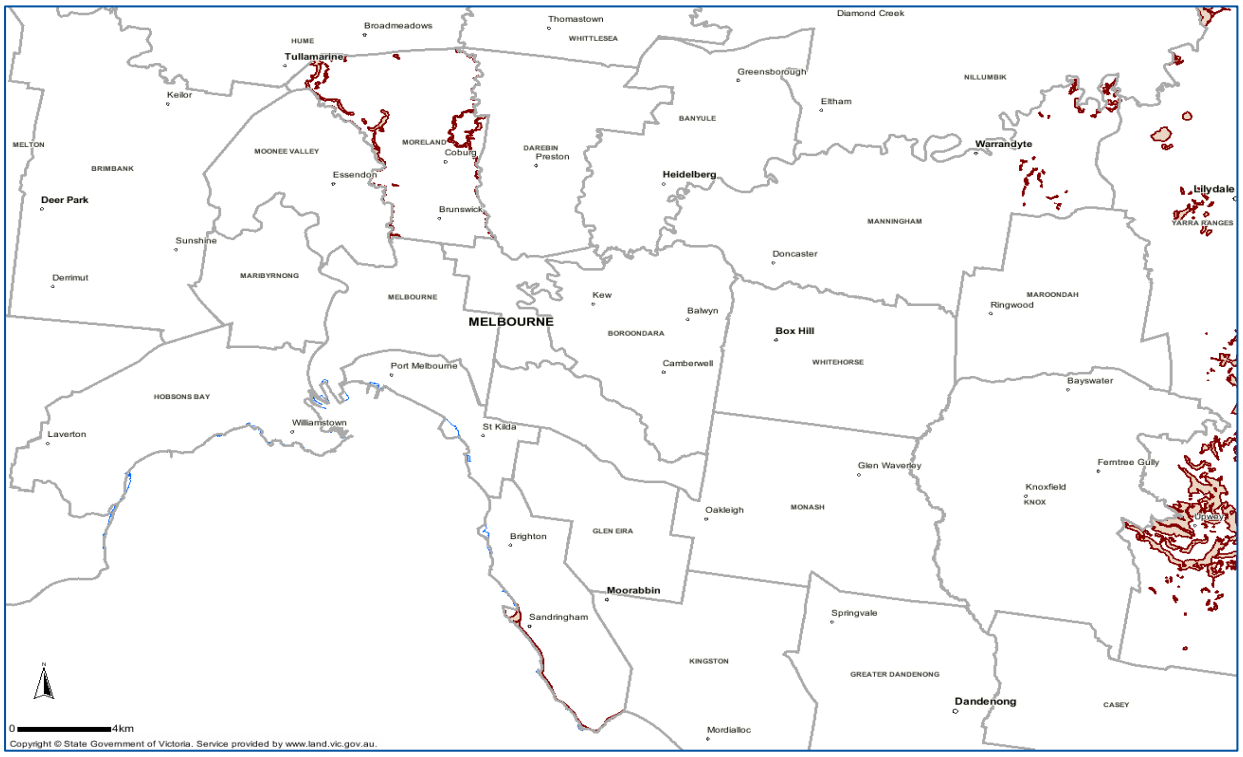
Central EMO locations with areas of concern:



Southern Metro Region – Shire of Mornington Peninsula and City of Frankston Council:



North West Metro Region – City of Moreland and City of Glen Eira:



3. Landslide

3.1. Definition

A landslide is “the movement of mass rock, earth or debris down a slope” (AIDR Manual 24 on ‘Reducing the Community Impact of Landslides’). Landslides may result from a failure of the materials that make up the hill slope and are driven by the force of gravity.

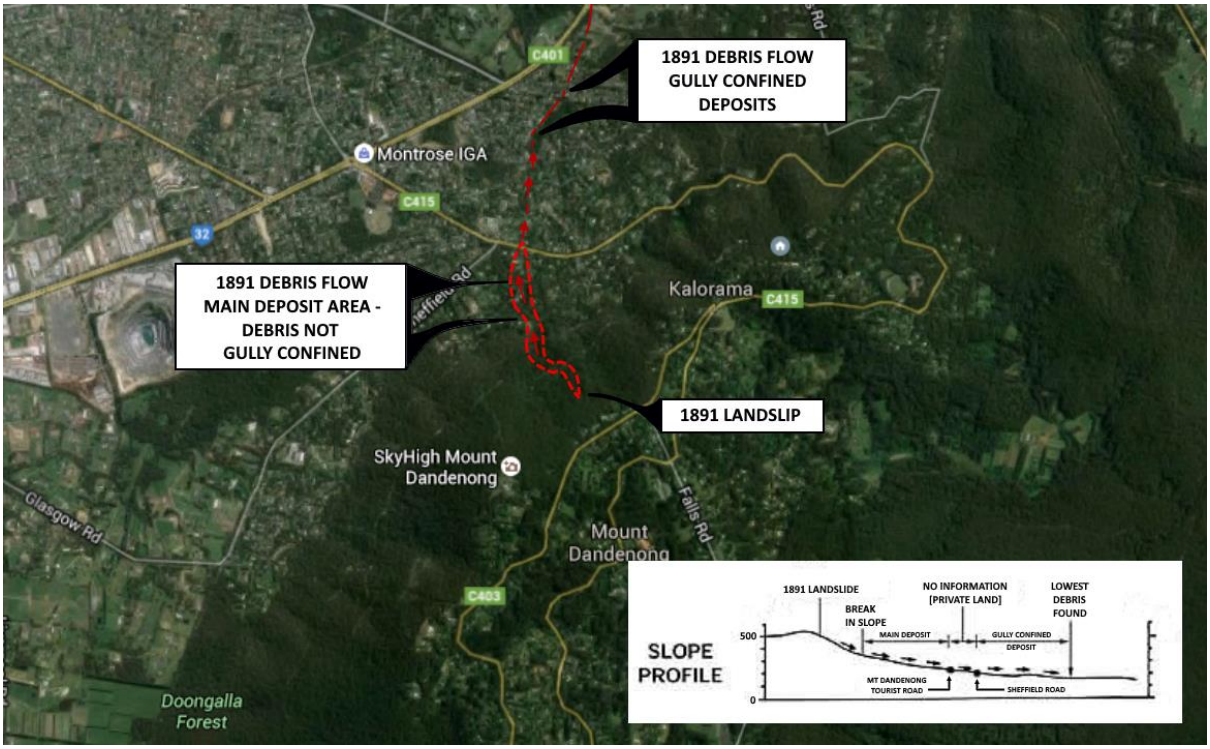
3.2. History

Historically there have been a number of significant landslides in the Central Region, as noted below.

1891 – Mount Dandenong / Montrose

This landslide was caused by the mass clearing of trees for farming and timber, causing 30,000 cubic metres of soil and rocks to be displaced. Two people were caught in the debris flow with one requiring rescuing. A house and several outbuildings were also destroyed.

The area is still subject to numerous minor landslides (in recent years from single rocks of around 20 kg up to around the size of small car in volume) predominantly after fuel reduction burns, mowing and heavy rains.



1992 to present – Blackwood Avenue, Warburton

In the early 1990s a landslide issue was identified in Blackwood Avenue in Warburton for the potential of the Yarra River becoming blocked. In 1992, an area of 6 hectares continued to slide towards the Yarra River, requiring four houses to be removed and other significant works.

The area is still regularly monitored as movement of the land continues. As a result, the Yarra Ranges Shire developed the Blackwood Avenue, Warburton Specific Landslip Contingency Plan, reviewed in 2004.

1854 to present – Olivers Hill /Cliff Road, Frankston

Lanslide issues were identified in Olivers Hill in Frankston in the mid-1800s. In the 1950s three houses were demolished due to the risk of landslide after ground movement. Since then, there have been reported issues every few years, including as recent as 2018. In 2015, City of Frankston commissioned a Landslide Susceptibility Study – Cliff Road Area.

Olivers Hill – Nepean Highway Landslide (1970's)

Olivers Hill Retaining walls (2015)

4. Sinkholes

4.1. Definition

A sinkhole is a cavity in the ground, often caused by water erosion, which provides a route for surface water to disappear underground. The sinkhole term is also commonly used to describe when surface areas collapse and create deep subsurface holes. Sinkholes can also occur from erosion caused by underground water pipes or the collapse of unknown mines).

The final stage of a sinkhole is when the formation of the hole or basin collapses at the surface and suddenly appears.

Signs that indicate that a cavity might be forming underground include:

- Rapid appearance of a hole in the ground.
- Structural changes in houses and buildings.
- Exposed tree roots or rocks.
- Cracks in the ground outdoors.
- Depressions in the ground.
- Trees or fence posts that tilt or fall.
- Doors or windows that become difficult to open or close.

4.2. History

Sinkholes of a larger magnitude (more than 2 meters across) are a rare occurrence in Central Region, with the majority of reported sinkholes caused by leaking pipes under roads, and a small number caused by old wells or mines.

Typically, sinkholes are reported as road collapses and dealt with by the road owner.

Pictured below is a section of backyard that collapsed in Springvale, 2014. The sinkhole was thought to have been caused by a well that had not been properly filled.

The consequences of sinkholes may be minor inconvenience, through to severe damage with properties becoming inhabitable.

In 2018, a sinkhole appeared at the side of a house in Altona North, resulting in a fence collapse and the house being significantly undermined. The property was declared unsafe and the owner relocated until building works were completed. The sinkhole was approximately 10 square meters in size, and was thought to be caused by a leaking pipe.

5. Landslide Consequence Overview

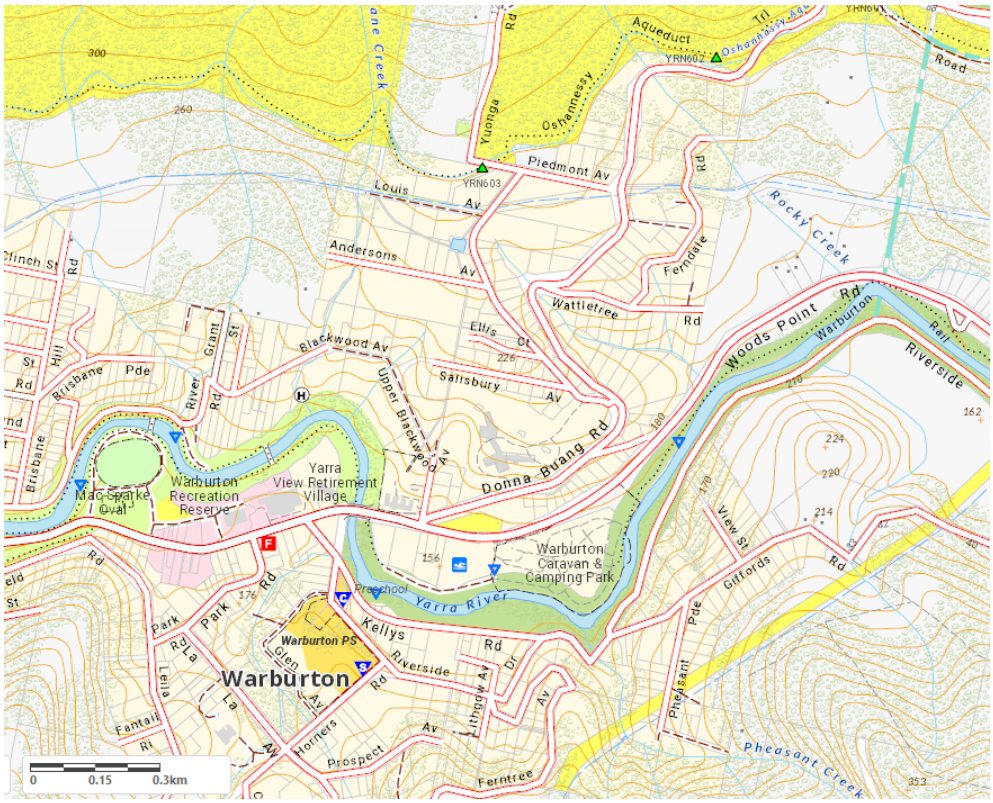
5.1. Scenarios

Landslide Scenario 1

Category S1

Location

- Blackwood Avenue, Warburton



Triggers

- Prolonged very heavy rainfall.
- Failure of monitoring/movement gauges.
- Significant bushfire damage causing the loss of all vegetation cover.
- Failure of major water pipelines.

Description of potential physical impacts

- If the Blackwood Avenue landslide moved 20m in a short period of time, for example a few hours, the most likely scenario would be that the toe of the landslide would erode as it entered the river.
- In the very unlikely event of a total blockage of the river, the resulting landslide dam would be likely to be made up of loose debris. This would erode quickly, particularly if over-topped by the river.

- In this situation any landslide dam that did occur may last only a short time, and if over topping occurred quickly the dam may last only a few minutes. If the unexpected occurred and the landslide dam was not rapidly eroded by the river, flooding would occur.
- The flooding would be mitigated by the school sports oval across the river from the landslide, which will act as a “dam spillway”.

Consequences

- Preliminary analysis of river cross-sections would be conducted to consider the consequences of river blockage. The analysis conservatively assumes ‘bank to bank’ blockage occurs at the time of a big flood, and no erosion of the failed landslide mass would occur. The results of the analysis suggest the impacts will differ only locally from a big flood.

The analysis also suggests:

- Water flowing up to about 0.5m deep across the school oval could be expected, with possible local flooding of school buildings.
- Flooding of up to four houses, up to about 1m deep, upstream of the highway bridge.
- Flooding of the swimming pool and related structures and some minor contributory flooding in the Caravan Park.
- The impacts on the local retirement village are considered to be minor, as the floor level of the building is several meters above the maximum anticipated dam flood level.
- If the landslide dam is rapidly breached, downstream flooding will occur. The consequences of downstream flooding are likely to be minor given the likely low height of impounded water and the presence of public open-space adjacent to the river.
- The potential does exist for an individual or a vehicle to get washed away by the dam burst and for services attached to downstream bridges to be damaged.

Wellbeing

- Casualties, injuries or illness for persons in the vicinity of the landslide.
- Displacement and isolation caused by closed roads and blocked housing access.
- Mental health – potential for increased anxiety and long-term mental health impacts for persons directly or indirectly affected.
- Air quality – including potential for hazardous material release, particularly from older buildings impacted. A number of these buildings may contain asbestos.
- Environmental health – disruption of sewage lines and septic tanks could drain into the Yarra river.
- Potential for debris to impact flora and fauna.

Liveability

- Built infrastructure damage – These may include homes, businesses and even essential service facilities.

- Public transport disruption – Damage to bridges or supporting infrastructure on Yarra River.
- Energy electricity impact on power components, such as poles and transformers.
- Localised impacts on community access to power and gas.
- Damage to water supply and waste water reticulation systems.
- Extensive damage may also occur to waste water/septic systems.

Sustainability

- Economic – localised impacts on nearby businesses.
- Regional development and small business.
- Environment – damage to stock, crops, food and natural resources downstream.
- Tourism – impact of tourism trade due to weather conditions, loss of attractions, road closures or reputational loss. Loss of tourism would also include access to Mount Donna Buang.
- Yarra Rivers may be impacted, closed and/or deemed unsafe for swimming.
- Cultural and heritage – impacts to Indigenous or culturally significant sites.

Viability

- Business continuity – considerations for local business needs and support.
- Local and regional investment – considerations for investment into impacted areas to support resilience and recovery. Pressures on local government if preceded by bushfires.

Community Connectedness

- Repeated disruption to access and egress – Multiple landslides or the threat of landslide with repeated or prolonged road closures can disrupt the community system and network to connect.
- The predicted flow areas are all accessible via alternate routes.
- High level of community connectedness in the Warburton area and with the Warburton emergency group.

Transfer of control

- Transfer of control through to local government and water agencies including Melbourne Water and Parks Victoria when the river has adequate flow and roads are opened.
- Department of Health and Human Services (DHHS) and SYR to manage the relocation and recovery stages when access to the sites is deemed safe by Geologists /LGAs.

Landslide Scenario 2

Category S3

Location

- Nepean Highway/Cliff Road, Frankston

Triggers

- Prolonged very heavy rainfall.
- Failure of civil infrastructure works including retaining walls.
- Failure of major water pipelines.
- Design failures for sub ground structures.
- Drainage pipe failure.
- Earthquake.

Description of potential physical impacts

- Damage to houses and services with the potential for the need to demolish houses.
- Risk to personnel who are present in the houses or are walking or driving below the landslide.

- Tilting and cracking of retaining walls requiring extensive and expensive repairs and replacements.
- Road blockages from debris with traffic having to be re-routed for extended periods of time.

Consequences

Wellbeing

- Casualties, injuries or illness for persons in the vicinity of the landslide.
- Displacement and isolation caused by closed roads and blocked housing access.
- Mental health – potential for increased anxiety and long term mental health impacts for person directly or indirectly affected, such as issues in dealing with insurance claims.
- Air quality – including potential for hazardous material release particularly from older buildings impacted. A number of these buildings may contain asbestos.
- Environmental health – disruption of sewage lines and septic tanks- draining into Port Phillip Bay.
- Potential for debris to impact flora and marine environments.

Liveability

- Built infrastructure damage – these may include up to or more than 20 homes and essential service access.
- Public transport disruption – damage to bridges or supporting infrastructure on Yarra River.
- Energy – impact on power components such as poles, transformers and underground wiring.
- Impacts on community access to power and gas.
- Water supply and waste water – damage to reticulation systems.
- Extensive damage may also occur to waste water/sewerage systems.

Sustainability

- Economic – localised impacts on businesses on the Nepean Highway.
- Regional development and small business.
- Environment – damage to natural resources in the bay.
- Tourism – impact on tourism trade due to weather conditions, loss of attractions, road closures or reputational loss.
- Closure of boating facilities.
- Loss of tourism.
- Beaches may be impacted, closed and/or deemed unsafe for swimming.

- Cultural and heritage – impacts to Indigenous or culturally significant sites.

Viability

- Business continuity – considerations for local business needs and support.
- Local and regional investment – considerations for investment into impacted areas to support resilience and recovery with pressures on local government.

Community connectedness

- Repeated disruption to access and egress – multiple landslides or the threat of landslide with repeated or prolonged road closures can disrupt the community system and networks to connect. The predicted flow areas are accessible via alternate routes.
- There is a level of community connectedness but it is unknown at this stage.

Transfer of control

- Transfer of control through to local government and VicRoads roads.
- DHHS and City of Frankston to manage the relocation and recovery stages when access to the sites is deemed safe by Geologists /LGA.

Sinkhole Scenario 3

Category S4

Location

- High Street Road, Malvern

Triggers

- Prolonged very heavy rainfall.
- Failure of storm drain/sewer mains.
- Sandy soil.

Description of potential physical impacts

- Sinkhole forms in road on inbound side.
- Underground infrastructure damaged, including:
  - Water mains.
  - Sewer mains.
  - Fibre optic cables (state significance).
  - Telephone cables .
  - Undermining of tram footings.
  - Road surface damaged – one lane closed.

Consequences

- Closure of major inbound thoroughfare for extended period.
- Loss of access to school facility.
- Closure of tram line requiring buses/schedule changes.
- Disruption to library use.
- Flooding of roadway downhill of site.
- Sewage flowing into storm water and then into major creek lines.
- The impacts on the school are considered to be minor.
- The potential does exist for an individual or a vehicle to drive into the sinkhole.

Wellbeing

- Casualties, injuries or illness.
- Road access closed and house access blocked.
- Environmental health – disruption of sewage draining into the Yarra River.

Liveability

- Built infrastructure damage – minor.
- Public transport disruption.
- Energy electricity impact on power components such as poles and transformers.
- Impacts on community access to power and gas - localised and short term.
- Water supply and waste water – temporary damage to reticulation systems.

Sustainability

- Economic – localised impacts on nearby businesses.
- Yarra River may be impacted, closed and/ or deemed unsafe for swimming.

Viability

- Business continuity – considerations for local business needs and support.
- Local investment – considerations for investment into impacted areas to support resilience and recovery. Pressures on local government if preceded by bushfires.

Community connectedness

- Repeated disruption to access and egress.

Transfer of control

- Transfer of control through to VicRoads, local government and water agencies including Melbourne Water.
- DHHS and SYR to manage the relocation and recovery stages when access to the site is

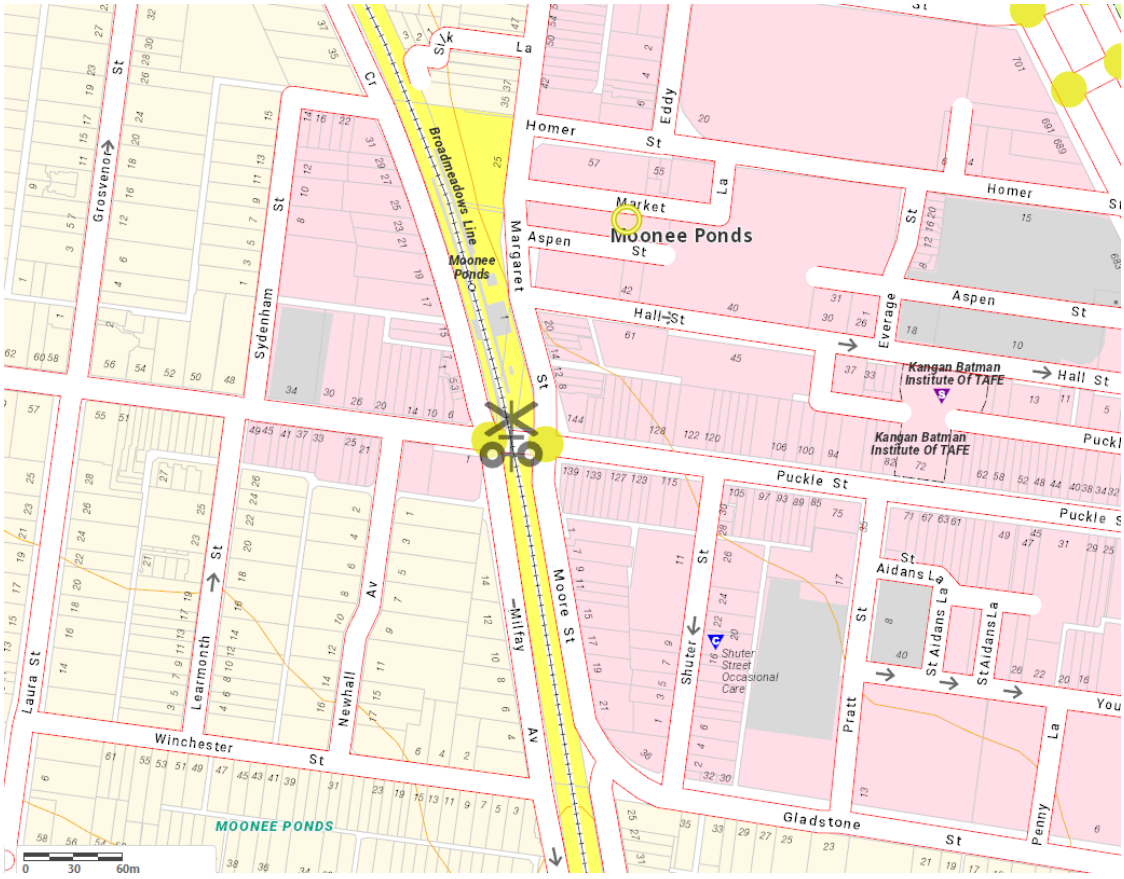
deemed safe by VicRoads and LGAs.

Sinkhole Scenario 4

Category S6

Location

- Holmes Road, Moonee Ponds. Located on the west side of the railway station.



Triggers

- Rainfall over an extended time.
- Failure of water pipes.
- Failure of storm drain.
- Nearby building or road works.

Description of potential physical impacts

- Sinkhole forms in road.
- Road surface.
- Underground infrastructure damaged.
  - Stormwater drains.
  - Road surface damaged – one lane closed.

Consequences

- Closure of minor thoroughfare for 24 hours.
- Loss of direct access to railway platform and bus stop.
- The impacts on the rail are considered to be minor.
- The potential does exist for an individual or a vehicle to drive into the sinkhole.

Wellbeing

- Injuries.
- Road access closed.

Liveability

- Built infrastructure damage – minor.
- Public transport disruption – minor.
- Impacts on community access to railway.
- Minor waste water – temporary damage to systems.

Sustainability

- Economic – minimal localised impacts on nearby businesses.

Viability

- Business continuity – considerations for local business needs and support over period of 24 hours.

Community Connectedness

- Once off disruption to access and egress.

Transfer of control

- Transfer of control through to local government.

6. Regional Landslide Arrangements

This section of the plan outlines the specific arrangements for managing landslide emergencies in the Central Region. Arrangements differ depending on the scale of the landslide emergency. Landslide emergencies are generally S1 – S4 landslides, as outlined in the State Landslide Hazard Plan.

6.1. Arrangements for S1 – S4 Landslide Emergencies

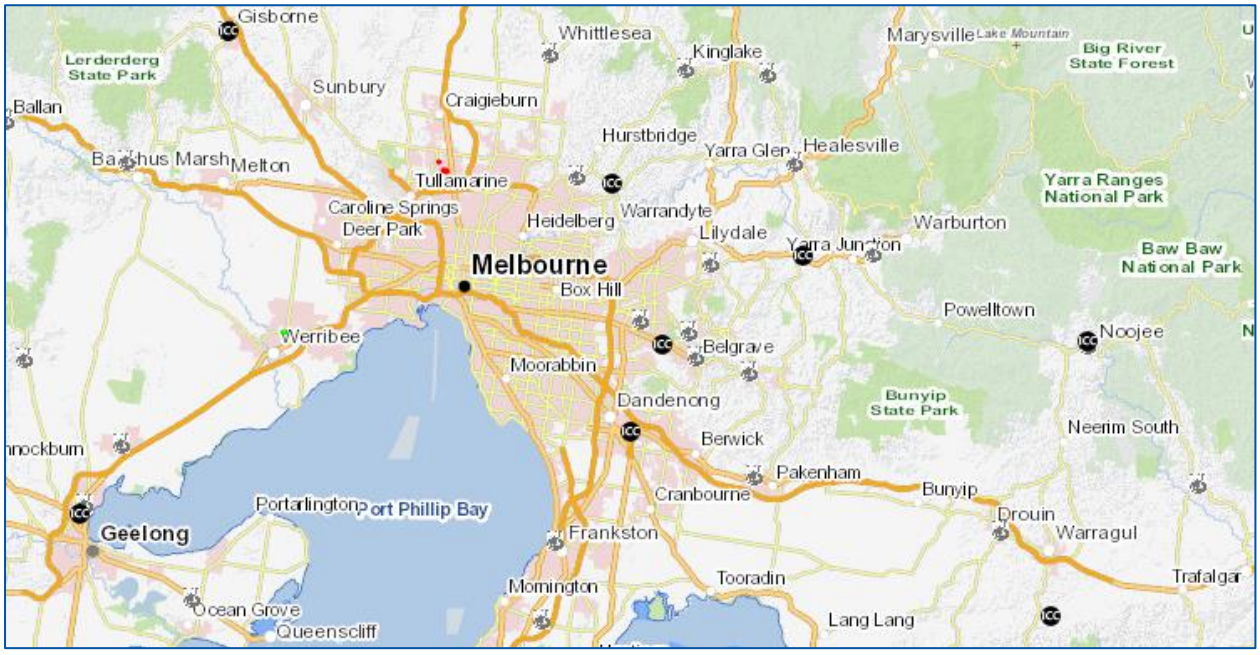
This section describes the arrangements for managing small to very large landslide emergencies, with the following attributes:

Category	Relative Size	Volume of Failure (m3)	Typical Dimension (LxWxD) metres	Individual block size	Overall debris scale
S1	Very Large	>20,000	50 x 100 x 10	Individual block size >1.0m	Approximately the size of the MCG stadium or greater
S2	Large	2,000 to 20,000	25 x 60 x 7	0.5m-1.0m Minimum Dimension	Approximately the size of a local football oval
S3	Medium	200 to 2000	10 x 25 x 4	0.2 to 0.5m Minimum Dimension	Approximately the size of a house
S4	Small	20 to 200	5 x 10 x 2	0.2m Minimum Dimension	Approximately the size of a semi-trailer truck
S5	Very Small	2 to 20	2 x 4 x 1.2	0.1m Minimum Dimension	Approximately the size of a small car
S6	Extremely Small	< 2	1 x 3 x 0.3		Could fit in a wheelbarrow

6.2. IMT Footprints, Structures and Resourcing

Pre-determined Incident Control Centres (ICCs) and Divisional Control Points (DCPs):

ICC Location	Local Government Areas
Dandenong ICC CFA District 8 – L3, Building G, Eastgate One Business Park, 45 Assembly Drive, Dandenong Sth	To be determined by Regional Controller (RC) and State Response Controller (SRC)
Burnley ICC MFB Burnley, 450 Burnley St, Richmond	To be determined by RC and SRC
Sunshine ICC SES Central Region, 239 Proximity Drive, Sunshine West 3020	To be determined by RC and SRC
Ferntree Gully ICC Unit 27/69 Acacia Road, Ferntree Gully 3156	To be determined by RC and SRC
Kangaroo Ground ICC** 35 Kangaroo Ground-St Andrews Road, Kangaroo Ground 3097	To be determined by RC and SRC
Woori Yallock ICC** 7-9 Symes Road, Woori Yallock, Victoria 3139	To be determined by RC and SRC
**to be considered as redundant should other ICCs become unavailable or unserviceable to due to earthquake damage. A map of ICC footprints is available online via EM-COP to registered users.	



6.3. DCP Locations

DCP Location	VICSES Units Within Footprint	Local Government Areas
Wyndham West Unit Brimbank Unit	Sunbury Melton Brimbank Footscray Hobsons Bay Wyndham Wyndham West	Hume (only part) Brimbank Maribyrnong, Hobsons Bay Wyndham
Broadmeadows Unit Essendon Unit	Craigieburn Whittlesea Nillumbik Northcote Broadmeadows Essendon	Hume (only part) Whittlesea Nillumbik Moonee Valley Moreland
Knox Unit	Knox Maroondah Lilydale Healesville Upper Yarra	Yarra Ranges Maroondah Knox
Glen Eira Unit VICSES Victorian Head Office (VHO)	Manningham Whitehorse Malvern Monash Glen Eira	Manningham Whitehorse Boroondara Stonnington Monash Glen Eira
Pakenham Unit	Emerald Greater Dandenong Narre Warren Pakenham	Greater Dandenong Casey Cardinia
Frankston Unit	Port Phillip Chelsea Moorabbin Frankston Hastings Sorrento	City of Melbourne Frankston Kingston Mornington Peninsula Bayside
A map of DCPs is available in Attachment 6.		

6.4. Pre-determined control structures

Control structures for landslide emergencies are determined according to the Landslide Readiness and Activation Trigger Considerations (see Attachment 1).

6.5. Inter-agency agreements

Currently there are no inter-agency agreements.

6.6. Local intelligence sources

Intelligence Type and Description	Location
VicRoads Traffic Camera Dashboard Provides live intelligence (video) about impacts to traffic on major arterials/freeways.	EM-COP > Desktop > Information Displays > Traffic Melbourne

6.7. Regional resources

Councils in Central Region are signatories to the Municipal Association of Victoria (MAV) resource sharing protocol.

Resources are available through existing Regional and Municipal Emergency Management Plans.

6.8. Supporting doctrine

See Attachment 12 Transfer to Recovery draft document.

6.9. Traffic management arrangements

There are no pre-determined traffic management arrangements in place at present.

Response arrangements as per council.

6.10 Public information and warnings roles and responsibilities

Business as Usual

- Responsibility for delivery and coordination of public information and warnings during business as usual operations, or when an ICC has not yet been established remains with the Regional Duty Officer (RDO) and Regional Agency Commander (RAC).

Line of Control

- Responsibility for delivery and coordination of public information and warnings when formal line of control is active, or when an ICC is in place rests with the Public Information section of the relevant ICC, with authorisation through the Incident Controller (IC).

6.11 Public information and warnings triggers

VICSES will only issue community notifications if a landslide is determined to be an emergency and VICSES takes active control of the incident as explained in Section 2.6 of the State Landslide Hazard Plan.

VICSES will consider issuing a community notification based on scale, category and actual or potential community consequences. Further guidance is available in the VICSES Landslide EM-COP Public Publishing Business Rules available in the IMT Toolbox (Public Information) via EM-COP.

When issuing landslide community notifications, personnel should contact the VicRoads emergency services priority phone line on 1300 107 778 to ensure the incident is listed on the VicTraffic website.

Glossary

Glossary and commonly used terms.

AAR	After Action Review
AIDR	Australian Institute of Disaster Resilience
AIIMS	Australasian Inter-Service Incident Management System
AHC	Animal Health Committee
AOI	Area of Interest
ALARA	As low as reasonably achievable
ADF	Australian Defence Force
AUSDISPLAN	Australian Disaster Plan
BOM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CFA	Country Fire Authority
CDMO	Chief Disease Management Officer
CSIRO	Commonwealth Scientific and Industrial Research Organisation
COAG	Council of Australian Governments
DGC	Dangerous Goods Code
DCP	Divisional Command Points
DELWP	Department of Environment, Land, Water and Planning
DHHS	Department of Health and Human Services
DJCS	Department of Justice and Community Safety
DSAT	Disaster Area Survey Team
DJPR	Department of Jobs, Precincts and Regions
DRSC	Disaster Recovery Sub-Committee
DSEP	Dam safety emergency plan
DRR	Disaster risk reduction
DVI	Disaster victim identification
DVR	Disaster victim registration

EMA	Emergency Management Australia
EMLO	Emergency Management Liaison Officer
EMO	Erosion Management Overlay
EMMV	Emergency Management Manual Victoria
EMV	Emergency Management Victoria
EMT	Emergency Management Team
EPA	Environment Protection Authority
EPIRB	Emergency position indicating radio beacon
ESTA	Emergency Services Telecommunications Authority
FDI	Fire danger index
FDR	Fire danger rating
FLIR	Forward Looking Infrared
GMT	Greenwich mean time
HA	Hectare
IAC	Inter-agency Commander
IC	Incident Controller
ICC	Incident Control Centre
IEMT	Incident Emergency Management Team
IMT	Incident Management Team
JSOP	Joint Standard Operating Procedure
LGA	Local Government Authority
LHQ	Local Headquarters
MFB	Metropolitan Fire Brigade
MEMP	Municipal Emergency Management Plan
RAC	Regional Agency Commander
RC	Regional Controller
RCC	Regional Control Centre
RDO	Regional Duty Officer
REMPC	Regional Emergency Management Planning Committee

REMT	Regional Emergency Management Team
SAC	State Agency Commander
SCC	State Control Centre
SCOT	State Coordination Team
SCT	State Control Team
SDO	State Duty Officer
SEMT	State Emergency Management Team
SERP	State Emergency Response Plan
SHERP	State Health Emergency Response Plan
SOP	Standard Operating Procedure
SRC	State Response Controller
SWRT	Swift Water Rescue Team
USAR	Urban Search and Rescue
VICSES	Victoria State Emergency Service
VICPOL	Victoria Police

Full listing of Acronyms available at https://knowledge.aidr.org.au/glossary/

Attachments

Attachment 1 – VICSES Landslide Readiness and Activation Trigger Considerations V3.3 March 2018

Readiness Level	RL 1 LOW TO MODERATE	RL 2 HIGH	RL 3 (A) Very High	RL 3 (B) Very High	RL 4 SEVERE	RL 5 EXTREME
Category Scale	S6	S5	S4	S3	S2	S1
FDI	0 - 11	12 - 24	25 - 34*	35 - 49*	50 - 74	75 - 99
Landscape Observation	Trees leaning on an angle Hand size rocks falling on road, small cracks in roadways Less than 1m wide sinkhole *S6 may have little or no impacts on the community and not require specific warnings to be provided except through relevant agency channels (e.g. VicRoads)*		Potential or observed land movement (slump or minor landslide) Head size rocks falling, cracks in roadways that are increasing Sink hole that is over 1m wide but not increasing, small debris flow	Potential or observed land movement that will impact community Isolated or impact to dwellings Rock and/or debris on road closing the road for up to 6 hours, cracks in roadways that require traffic management Sink hole that is over 3m wide and increasing, debris flow in creeks	Potential or observed land movement with direct community impact including people trapped Significant rock and/or debris on road closing the road for greater than 24 hours, road damage that requires road closure Sink hole that is over 7m wide and increasing, multiple debris flows impacting communities	Potential or observed land movement with direct community impact in multiple locations and possible multiple trapped people Rock and/or debris on road closing the road for greater than 72 hours, road damage that requires road rebuilding Sink hole that is consuming infrastructure and increasing, multiple debris flows impacting communities
Approximate Size And/Or	Wheelbarrow < 2 Tonnes 1m (L) x 3m (W) x 0.3m (L)	Small Car 2 to 20 Tonnes 2m (L) x 4m (W) x 1.2m (L)	Semi Trailer Truck 20 to 200 Tonnes 5m (L) x 10m (W) x 2m (D)	House 200 to 2000 Tonnes 10m (L) x 25m (W) x 4m (D)	Country Football Oval 2,000 to 20,000 Tonnes 25m (L) x 60m (W) x 7m (D)	Large Stadium (eg: MCG) >20,000 tonnes 50m (L) x 100m (W) x 10m (D)

Susceptibility with Weather **Areas identified as known risks are:** Grampians Halls Gap Otway National Park Great Ocean Road Wye River Great Alpine Road Great Alpine National Park Snowy River National Park		**SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Likely'.** **Significant chance of Thunderstorms and hail likely.** **Chance of Flash flooding likely. Predicted rainfall over 50mm of rain in an hour.** **Catchment areas identified saturated with little initial losses.**		**SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely"** **Significant chance of Thunderstorms and hail likely.** **Chance of Flash flooding likely. Predicted rainfall of up to 80mm of rain in an hour.** **Catchment areas already identified as saturated with little initial losses.** **Particular interest should be taken in recent fire damaged areas.**	**SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely'** **Significant chance of Thunderstorms and hail likely.** **Predicted rainfall of up to 150mm of rain in 6 hours.** **Catchment areas already identified at capacity, unable to retain further moisture.** **Particular interest should be taken in recent fire damaged and known mapped landslide risk areas.**	**SWW - Heavy Rainfall leading to flash and/or riverine flooding across Districts considered 'Very Likely'** **Potential Dangerous thunderstorm warnings issued. Thunderstorms and hail certain.** **Predicted rainfall above 200mm of rain in 6 hours.** **Catchment areas already identified at capacity, unable to retain further moisture.** **Particular interest should be taken in recent fire damaged and known mapped landslide risk areas.**
	VICSES - Business As Usual Operations			**JSOP 2.03 LINE OF CONTROL**		
Readiness (State)	**SCC Level White**	**SCC Level White**	**SCC Level White/Blue**	**SCC Level BLUE or When ICC activated**	**SCC Level ORANGE Multiple ICCs activated or multi region**	**SCC Level RED Multiple ICCs activated or multi region**
	SAC and SDO (monitor)	SAC and SDO (monitor)	SAC and SDO (actively monitoring)	SDO and SAC In Place	SDO and SAC In Place Consider Day/Night	SDO and SAC In Place Day and Night
Readiness & Activation (Regional)	RDO (monitor)	RAC (monitor)	**Regional Command IN PLACE**	**RCC OPEN: with BASE RCT in place**	**RCC OPEN: RCT in place, some agencies available on immediate recall**	**RCC OPEN: Full RCT/most REMT In Place**
	RAC (aware)	RAC (aware)	RAC/RDO attends Regional Office	RC, RAC, RDO at RCC	RC, RAC and RDO In Place at RCC	RCT, RAC and RDO In Place at RCC
Readiness and Activation (Incident)	RDO (monitor)	RDO (monitor)	RDO - RAC IN PLACE Resource Officer (Stby) Management Support (Stby)	BASE IMT (In Place)	CORE IMT (In Place)	FULL IMT (In Place)

Attachment 2 – Risk and consequence

Impact	Potential Consequences		
People	Some minor inconvenience around local roads.	Increased number of roads being impacted, with a traffic management plan likely to be in place. May require formal landslide warnings to be issued. Potential individual properties relocation and evacuations. Inconvenience to normal transport routes - delays on road network could be expected, school bus routes may require change. Local Regional / State and National Parks may be closed for short periods.	Traffic management plan required for significant number of roads impacted.Some major roads closed for extended periods. Formal landslide warnings issued. Evacuations likely to be undertaken, with the potential for prolonged relocations. Local, regional, state and national parks closed for a number of days. Disruption to communities daily routines including increased traffic and schools closed. Community requiring support to remain functioning. Injuries and potential for deaths due to landslides.
Remote communities	May have minor local inconvenience only.	Some isolation and loss of utilities of individual properties or remote communities are likely. May require additional support to maintain community routine, including consideration for groceries, medication etc.	Potential for community isolation and loss of food/ medical supplies, with resupply requirements dependant on time of power or access outages. Ongoing requirement to assist isolated communities for extended periods of time. May require additional support services to be deployed to areas.
Health	Little impact expected. Some local issues might be encountered, but managed locally within own facility plan.	Consideration for review and familiarisation with facility plan. Victoria Police and DHHS to review vulnerable persons list Potential to engage community networks to ensure additional vulnerable people support.	Vulnerable people likely to be impacted and require relocation. Communities without utilities for extended periods of time needing support. Hospitals and nursing homes may require additional management for increased patient care.
Power	Possible power disruptions.	Likely short term power disruptions.	Power disruptions almost guaranteed, with potential long term outages in affected areas. Will require management for short term solutions.

Water utilities	Little impact expected. Some local issues might be encountered but managed locally.	Increased potential for infrastructure damage and disruption, but still managed locally. Sewerage and potable water may be affected. May take days to restore connections. Silt and drinking water quality concerns.	Likely that some infrastructure will be impacted. Water authorities should develop or initiate their plans to address issues. Significant potential for pollutants including sewerage in water and loss of power will exasperate the impacts.
Telecommunications	Unlikely to impact network, but may have some local damage.	Potential impact for communities - isolation from communications networks. May take days to restore connections.	Significant impact with loss of landlines and mobile towers, which will affect people's capacity to receive warnings and information. Commercial/business impacts with loss of phone services. NBN impacts with loss of power and data. Potential for infrastructure damage for cable/ fibre.
Gas	Little impact expected. Some local issues might be encountered but managed locally.	Increased potential for infrastructure damage and disruption, but still managed locally. Sewerage and potable water may be affected. May take days to restore supplies.	Some infrastructure likely to be impacted. Supply authorities should develop or initiate their plans to address issues. Significant potential longer term supply restrictions.
Road Network	Unlikely to impact network, but may have some local road damage/ impacts.	Some minor roads may be impacted, with possible disruption to critical needs supplies such as milk and transport routes. Roads could be closed up to two hours with mitigation works required.	Roads likely to be cut and egress and access impacted. Major roads potentially cut in some locations, with traffic diversions in place for extended periods. Infrastructure such as bridges destroyed. Potential rescue of trapped persons in vehicles highly likely. Expected impact on rail routes. Economic impact likely with loss of power and utilities supply for lengthy period.
Public Transport	Limited impact on public transport routes.	Impact to public transport routes may occur, with diversions possible and some delays experienced.	Public transport impacts will occur with roads and rail lines cut and no alternative route available, Significant disruption to people movement likely in affected areas.

Critical infrastructure	Nil impact.	Requires preparatory work and discussion with owner of infrastructure. Potential for damage to infrastructure	Significant work likely to be required to protect critical infrastructure.Contingency plans put in place if loss of the infrastructure occurs.
Public Infrastructure /Essential Community Infrastructure	Limited impact.	Some disruption to community areas and infrastructure. Potential damage of essential community infrastructure.	Significant damage to community infrastructure and community facilities. Long term closure of essential community facilities likely.
Education	Unlikely impact.	Some impact expected. Traffic management plan for school buses should be considered.	Some school and preschools may be impacted by utilities loss and damage to infrastructure. School bus routes closed for period of time in affected areas.
Public Events	Unlikely impact.	Some public events may need to be cancelled or rescheduled due to safety of patrons, either whilst at event or travelling to or from.	Public events likely to be impacted.Cancellation of major events due to damage and risk, and potential direct impact on venue or ability to attend or leave event.
Tourism	Unlikelyimpact, but consideration must be given to any event occurring to ensure it is safe to continue.	Potential impact on tourist locations if area not safe to visit or isolated due to road closures and landslide impact areas. Economic impacts due to isolated areas from road closures/ transport etc.	May impact on high value tourist locations and facilities, with long term impacts in the social and economic environment of communities.
Agriculture/Animal welfare	No impact likely with landowners managing any localised issues.	Potential impact with losses to live stock, fencing and crops including high intensive farming of produce and tree farms.	Substantial impact to crops, including high intensive produce farming (vegetables and fruit) and tree farms, with short and long term impacts due to loss of crops. Economic impact to area. Social impact to area.
Environmental	Minimal impact.	Potential for stream erosion and loss of vegetation around watercourses. Minor tree damage, vegetation displacement and local parks infrastructure damage. Silt and water quality concerns. Potential for new river or creek flow paths to develop, resulting in a change in flood risk.	Stream erosion and loss of vegetation around watercourses expected. Tree damage, vegetation displacement and local parks infrastructure damage. Silt and water quality concerns. Potential for new river or creek flow paths to develop, resulting in a change in flood risk.

Cultural Heritage	Minimal impact.	Some disturbance or damage along watercourses and sacred areas may occur. Potential for destruction of cultural heritage sites.	Potential for impact on historical structures and features. Damage along watercourses and sacred areas may occur. Likely destruction of cultural heritage sites.
Relief and Recovery	Relief and recovery activity unlikely, although there may be some localised issues.	Increased potential for relief and recovery activity, but likely to be managed locally by LGAs with the support of DHHS.	Formal arrangements put in place for relief and recovery activity. Regional Recovery Commander and Health Commander appointed. Demands on relief and recovery to be substantial and potentially long term. Requirement for transition to recovery to be implemented.

Attachment 3 – References

Warburton –
Blackwood Avenue Landslip Management Plan – Yarra Ranges

https://www.yarraranges.vic.gov.au/files/assets/public/emergency-management-portal/storms/blackwood-ave-landslip.pdf

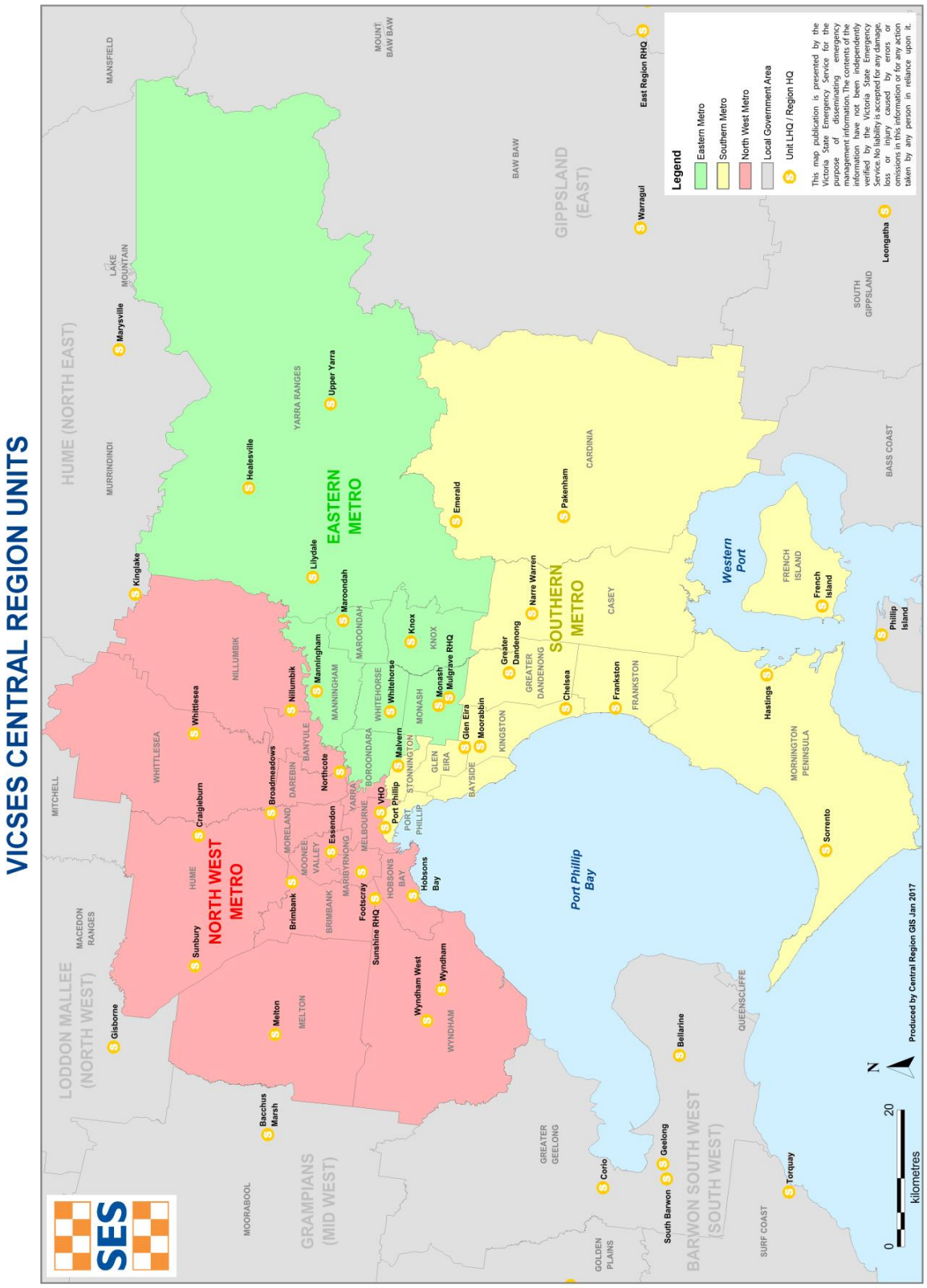
Mt Dandenong –
"A Moving Story- a municipality's perspective"

http://classic.austlii.edu.au/au/journals/AUJlEmMgmt/2000/49.pdf

Olivers Hill/ Cliff Road –
Landslide Susceptibility Study – Cliff Road

https://www.frankston.vic.gov.au/files/assets/public/planning_and_building/planning/strategic_planning/strategic_planning_projects/pdfs/landslide_susceptibility_study_%E2%80%93_cliff_road_area_june_2015.pdf

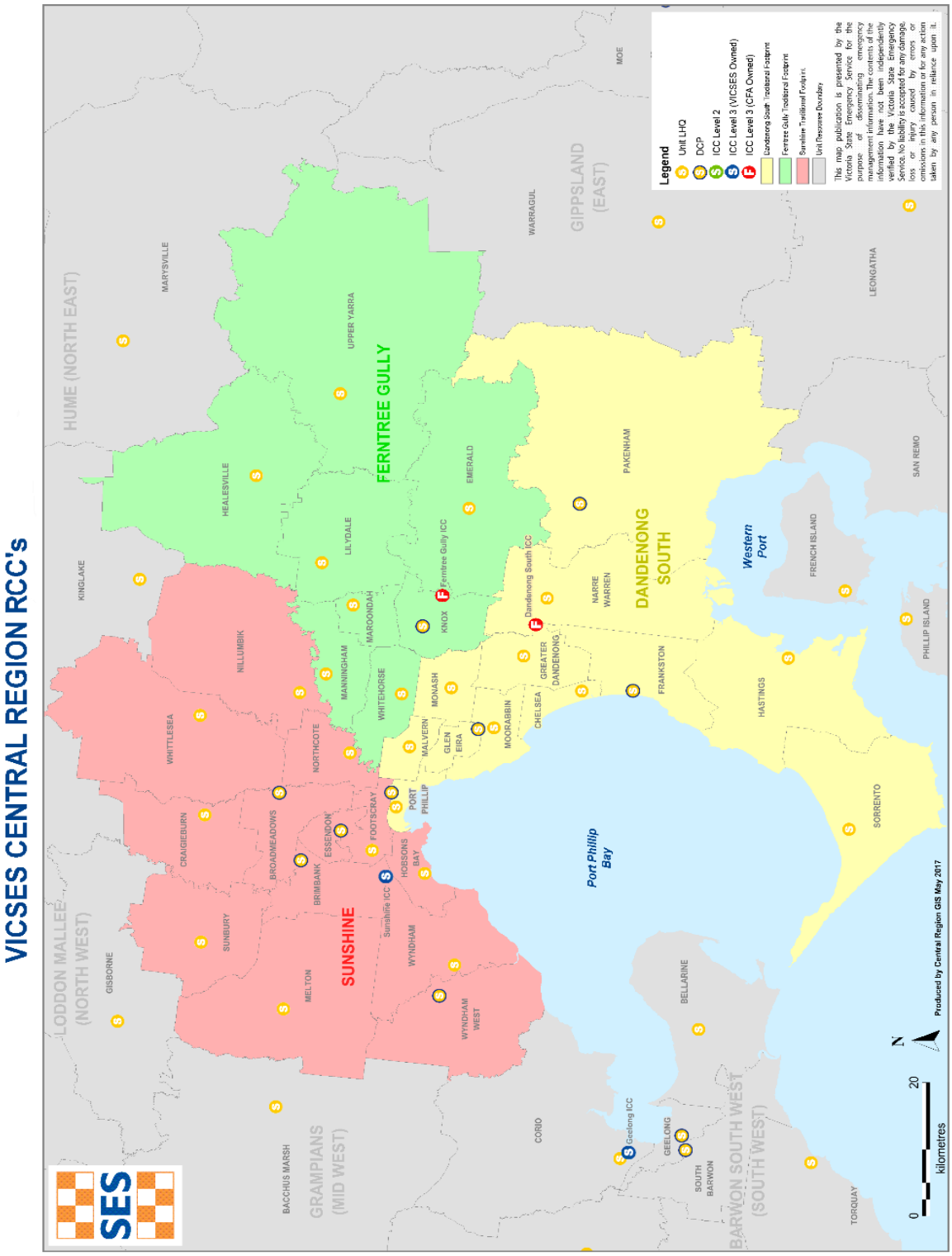
Attachment 4 – Central Region unit map



VICSES Central Region Unit Map

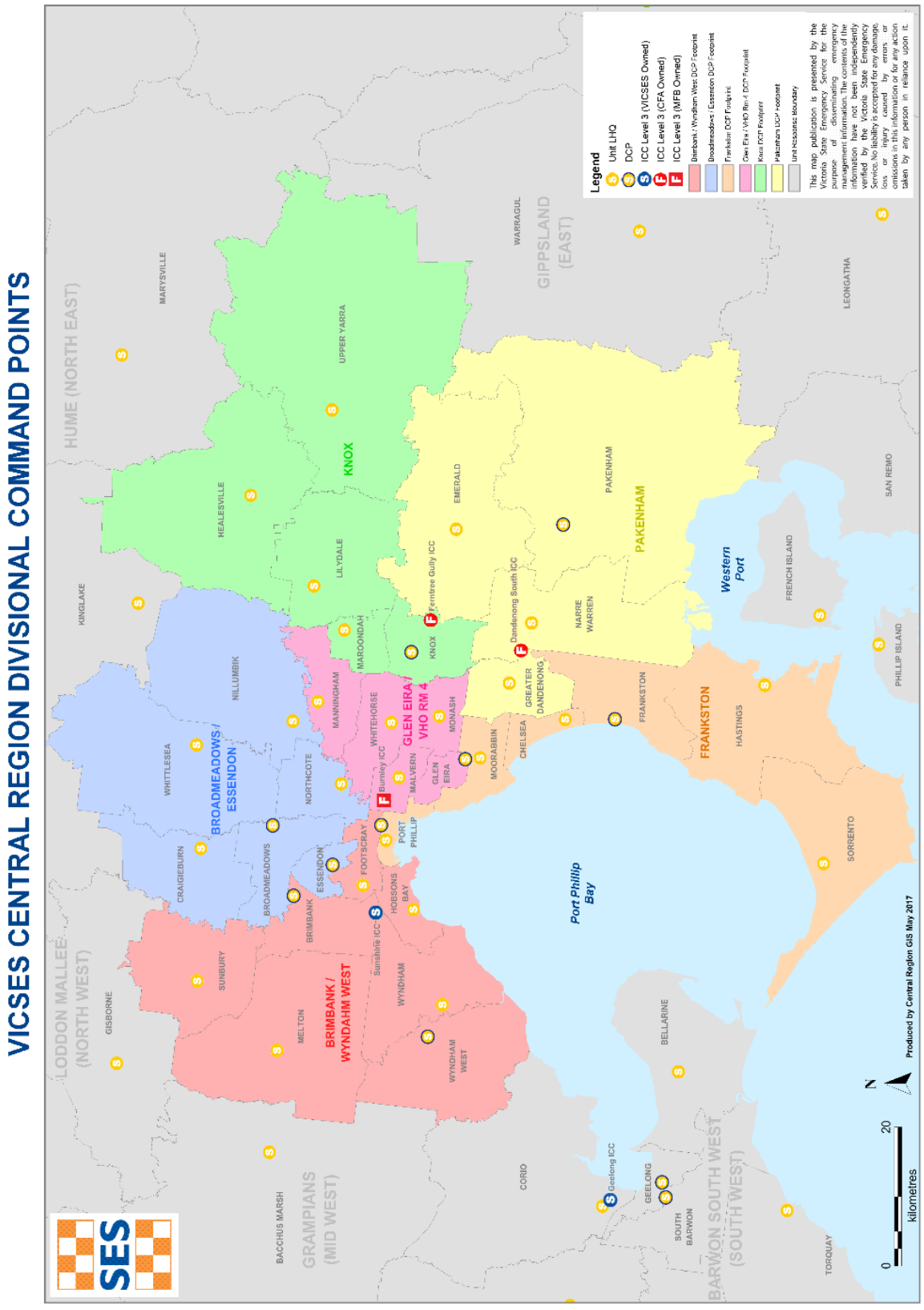
Map source: MapInfo

Attachment 5 – Regional Control Centre map



VICSES Central Region – Regional Control Centre (RCC) Map (source: MapInfo)

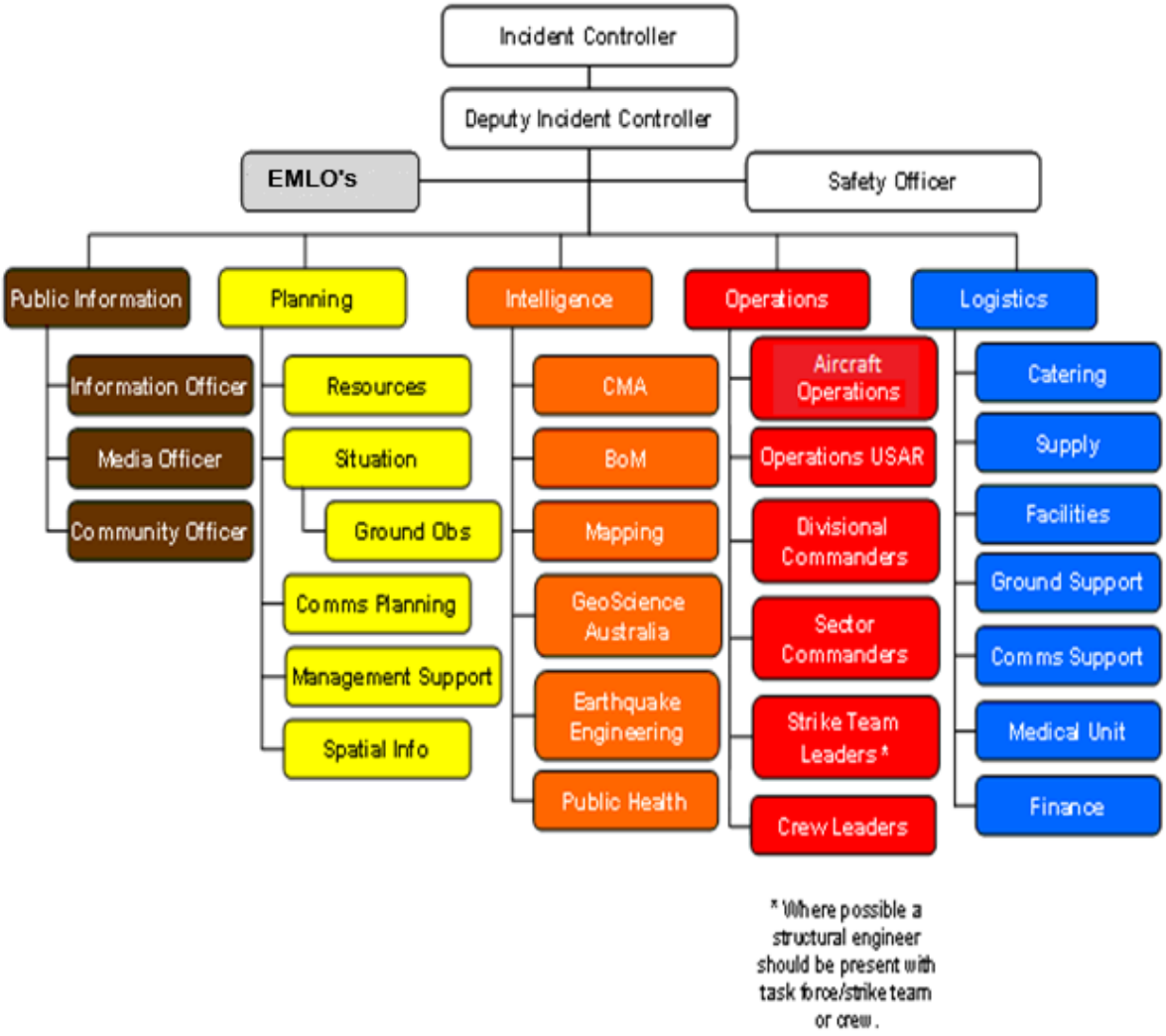
Attachment 6 – Divisional Command Point map



VICSES Central Region – Divisional Command Point Location (source: MapInfo)

Attachment 7 – AIIMS Level 3

Possible Incident Structure for Landslide of major scale (S3 –S1)



Attachment 8- Erosion Management Overlays 44.01

The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies have developed a series of Erosion Management Overlays to protect areas prone to erosion, landslide or other land degradation processes, by minimising land disturbance and inappropriate development.

Vegetation precinct plan specified in the schedule to Clause 52.16.

Reference:- *planningschemes.dpcd.vic.gov.au/schemes/vpps/44_01.pdf*

Attachment 9 – Historical reference

Landslide in the Dandenong Ranges

The Queenslander, published August 8 1891

The Melbourne Age gives the following particulars of the landslide which occurred in the Dandenong Ranges, near Melbourne, during the recent floods, and which seems to have been of much the same character as that which took place at Minden, in the Bosewood district, about March, 1890

From a distance of fully twenty miles. It commenced within 100 ft. of the summit of Mount Karawerabool the highest peak of the Dandenong Ranges and extended down the whole northern slope, afterwards following a creek for over a mile.

The slip at Dandenong occurred about 2 o'clock on Sunday afternoon, the 13th July, during the continuance of the memorable heavy rainfall that has caused such disastrous results along the Yarra Valley.

Mr. Sidney Ellery, a brother of the Government Astronomer, rents Mr. Teuton's cottage, and all the morning had been on the edge owing to the occasional strange rumbling sounds proceeding from the hills.

His residence was sufficiently elevated to give him no cause to fear a flood of water in spite of the excessively heavy rain, but he was quite unprepared for the enormous mass of mud, trees, scrub, Ac, that came down the gully about 2 o'clock with an indescribable booming sound. Looking outside the door, the whole mountain behind seemed on the move, and for a time there appeared to be no escape for him, for the approaching mass began to divide on either side, thus encircling his residence.

As the solid wall neared the outlet of the gully it came in an almost direct line with such resistless force that it rose up the western slope to a height of over 100 ft. This temporary obstruction broke its force, and it levelled itself out over the plain, carrying away bodily, after totally demolishing it, Mr. Herschell's house, stable, fence, and a corner of a shed beside Mr. Abbott's house.

The little boy before referred to, after the first alarm, ran across to Mr. Abbott's, and just escaped the edge of the debris, but Mrs. Herschell was not so fortunate. She was carried down with the torrent over fifty yards, and had to be dug out of the mud amidst a tangled mass of broken trees, house debris, furniture. The escape is a most marvelous one, but it will be a long time before she recovers from the bruises and shock.

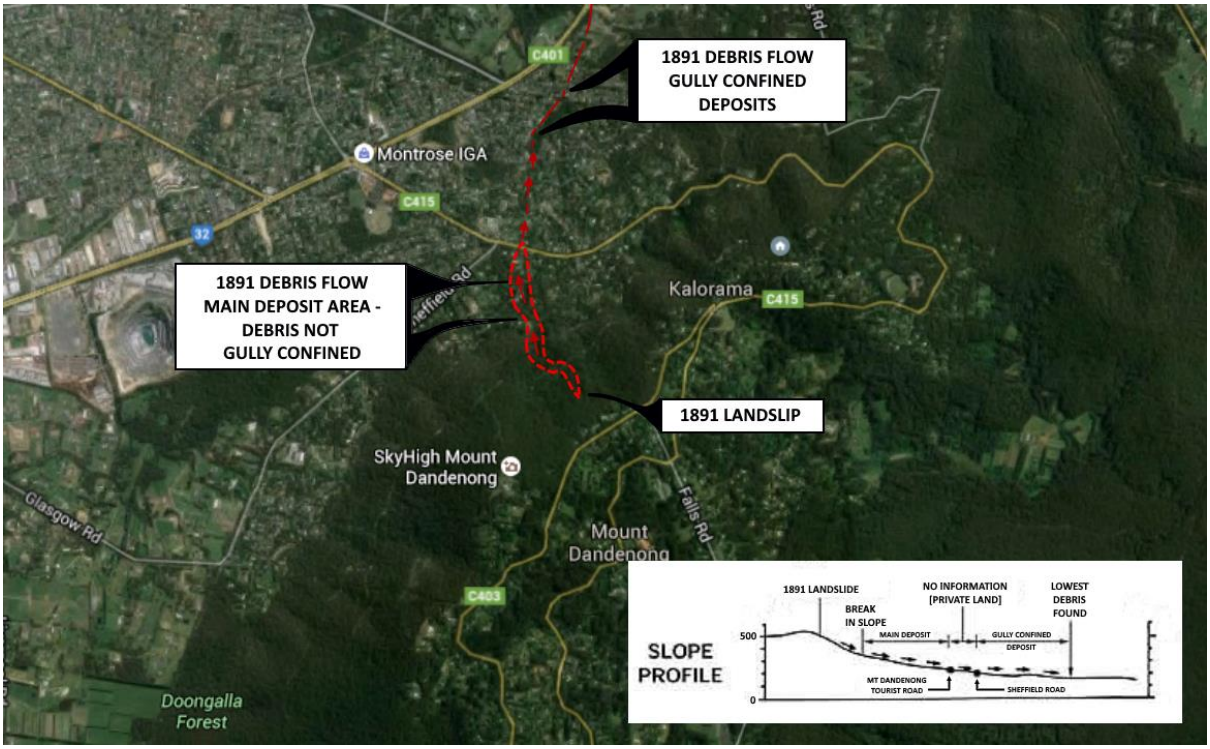
The two horses in the stable were carried downstream for over a quarter of a mile, and now lie in a barrier of trees, Ac, every bone in their bodies seeming to be broken.

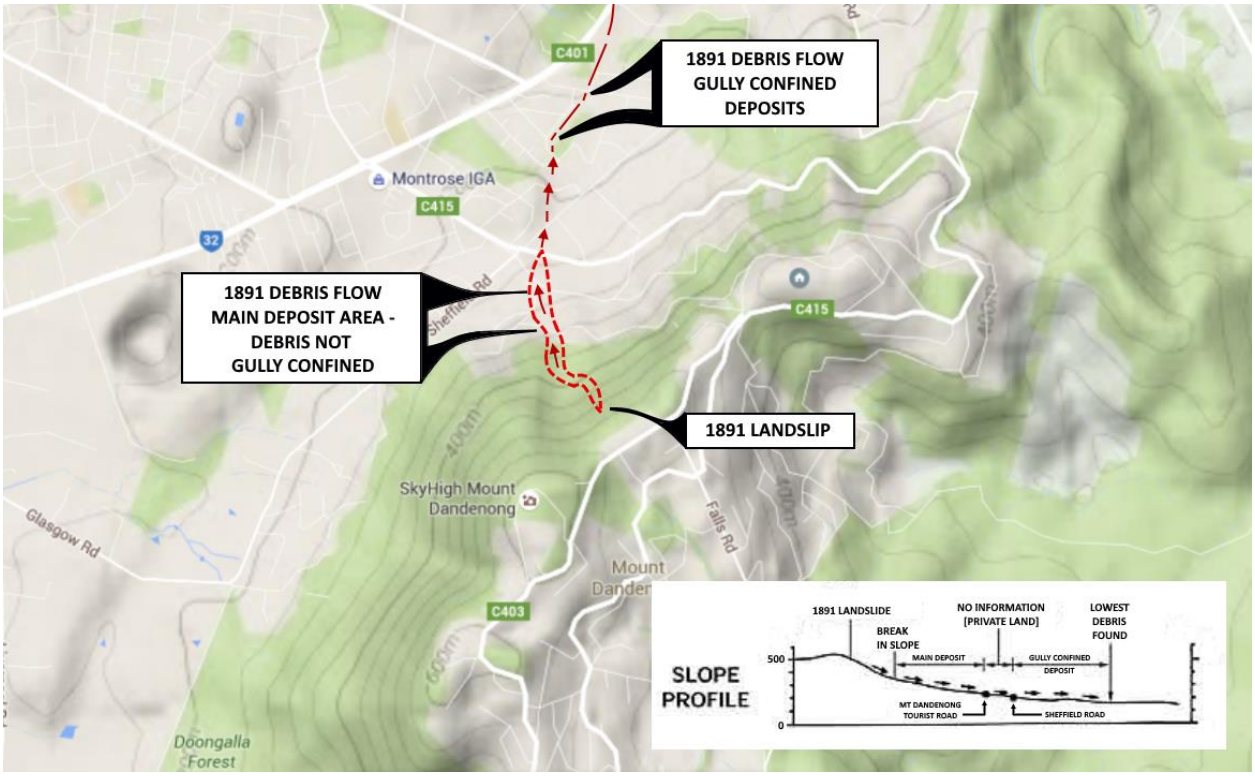
As evidence of the enormous power exerted, there are hundreds of trunks of trees up to 20in. in diameter snapped short off in lengths of 6ft. to 15ft., and a thick axle of a dray is bent. Almost every tree over the disturbed area, estimated at over fifty acres, has been uprooted and broken up, and all along the course of the creek lie baulks, Ac, on each edge, showing that the water must have been over 20ft. deep in the middle.

About a mile down the creek the debris is piled to a height of 30ft. Near the top of the range about fifteen more acres of ground have been disturbed, a great deal of it having sunk 10ft. to 80ft. It can only be a matter of time before other large slips occur, in fact, from the unsettled state of the country it is wonderful that the slip was not more extensive than it is.

A reservoir of water seems to have been formed in a basin on the bed rook, and the excessively heavy rain raised it higher than the natural outlet by the springs, until at last the walls on the western side gave way.

Directly the ground was broken it rushed out like the bursting of a dam, carrying fully 100 yards of earth with it. Great fissures appear on the surface of the ground that has already commenced to move downhill, but the hundreds of trees over it still stand fairly erect.


1891 DEBRIS FLOW GULLY CONFINED DEPOSITS
Montrose IGA
C401
C415
32
1891 DEBRIS FLOW MAIN DEPOSIT AREA - DEBRIS NOT GULLY CONFINED
Kalorama
C415
1891 LANDSLIP
SkyHigh Mount Dandenong
Glasgow Rd
Falls Rd
Mount Dandenong
C403
Doongalla Forest
SLOPE PROFILE
1891 LANDSLIDE
BREAK IN SLOPE
NO INFORMATION [PRIVATE LAND]
LOWEST DEBRIS FOUND
MAIN DEPOSIT
GULLY CONFINED DEPOSIT
500
0
MT DANDENONG TOURIST ROAD
SHEFFIELD ROAD


1891 DEBRIS FLOW GULLY CONFINED DEPOSITS
C401
Montrose IGA
C415
32
1891 DEBRIS FLOW MAIN DEPOSIT AREA - DEBRIS NOT GULLY CONFINED
C415
1891 LANDSLIP
SkyHigh Mount Dandenong
Glasgow Rd
Falls Rd
C403
Doongalla Forest
SLOPE PROFILE
1891 LANDSLIDE
BREAK IN SLOPE
NO INFORMATION [PRIVATE LAND]
LOWEST DEBRIS FOUND
MAIN DEPOSIT
GULLY CONFINED DEPOSIT
500
0
MT DANDENONG TOURIST ROAD
SHEFFIELD ROAD

Attachment 10 – Sinkhole: RDO notification

The questions and prompts below will assist in ensuring a detailed brief on the event is available for the RDO.

Question	Notes
Are there threatened or entrapped persons requiring rescue?	
Provide wordback within 10 minutes.	
Where is the landslide located? If possible, provide GPS coordinates.	
Estimated size of the sinkhole.	
Have roads, bridges or waterways been impacted by the sinkhole?	
Is access/egress into the area affected by the sinkhole?	
Are there impacts to community infrastructure? Note: Infrastructure is items or places necessary for the maintenance of community functions, e.g. schools, essential services (utilities), care facilities, water pumping stations, etc.	
Actual or potential community consequences? E.g. Long term access problems, tourism impacts, etc.	
Is there known damage to services such as phone lines, electricity, gas, water, sewerage, etc.?	
Have photographs or video been taken and sent to the RDO?	
Have other agencies been notified and/or attended?	
Will people need to be relocated? If so, contact MERO.	

Identified risks and hazards

Provide a summary of the identified risks and hazards from the Scene Assessment and Dynamic Risk Assessment.
▪ Do not get close to the sinkhole. ▪ The hole will most likely undermine the surrounding area. ▪ Do not prod the hole – leave this to experts. ▪ Secure the area – keep unauthorised people out of the area.

Categories/Scale of sinkhole

Category	Relative Size	Volume of Failure	Overall debris scale
S1	Very large	Sinkhole that is consuming infrastructure	Size increasing Multiple debris flows impacting communities
S2	Large	Over 7m wide	Multiple debris flows Impacting communities and increasing
S3	Medium	Over 3m wide	Debris flow increasing
S4	Small	Over 1m wide	Not increasing Small debris flow
S5	Very small	Less than 1m wide	Small debris flow
S6	Extremely small	Less than 30cm wide	No visible increase in size

Incident command and control

Role	Name and Contact Number
Incident Controller	
Safety Officer	
Communications Officer	
Other Agencies	
Equipment on scene	

Attachment 11 – SOP072 Operations Involving Landslides

Standard Operating Procedure

SOP072 Operations Involving Landslides

Version 1.0

Purpose

This SOP describes the VICSES policy and procedure in relation to members undertaking operations involving landslides (including sinkholes), and the actions required to ensure effective control and management of the incident.

Audience

	Subject Matter Operator (competency holder)	Crew Members	Crew Leaders	Unit Management (including Unit Duty Officer)	Regional Operations Staff (including RDO / RAC)	State Operations Staff (including (SDO, SAC, SMDO, etc.)	Other Regional and State Staff
Basic Awareness							✓
Working Knowledge		✓		✓		✓	
In Depth Knowledge	✓		✓		✓		

Background

VICSES is the Control Agency for landslide emergencies where the risks and consequences to community have reached an unacceptable threshold.

Victoria has a number of identified landslide risk areas; however landslide can occur outside of these locations dependant on weather, slope, and other environmental factors. Landslide risk often increases following fires as the exposed earth on sloping terrain can become unstable, particularly during heavy rainfall as the top layers of soil become heaver and through gravity may move causing a landslide.

Although landslides may occur at any time, there is an increased likelihood of landslides (and sinkholes) during spring and autumn.

Many landslides occur in isolated or unpopulated areas with little or no impact, or they may be small and result in a small amount of debris in areas that do not affect anything. Where there is no emergency, any response or clean up required is the responsibility of the landholder and / or road owner / authority.

Occasionally a landslide can have significant impacts and consequences at which point VICSES becomes the control agency.

1

Heavy rainfall during storms in 2010 caused large areas of the Grampians to experience debris flow landslides, resulting in extensive damage to the road infrastructure and millions of dollars of repairs. Following the fires of 2015 / 2016 the hills in the area of Wye River were left exposed and the subsequent rain in the area caused a number of landslides along the Great Ocean Road.

Policy

1.1 Dynamic Risk Assessment

When approaching a reported landslide incident and before any task is undertaken, a Dynamic Risk Assessment (DRA) is to be conducted in line with JSOP 8.02 Dynamic Risk Assessment to identify the actual or potential risks and hazards. These need to be communicated and understood by all attending members and the Crew Leader or Incident Agency Commander is responsible for ensuring initial controls are implemented.

1.2 In Scope Events

The State Landslide Hazard Plan identifies that VICSES' role as the control agency for the response to emergency landslide includes events associated with:

- Landslides caused by natural and man-made interference, or;
- Sinkholes caused by natural and man-made interference.

Specific events that are out of scope for landside response are outlined below.

1.3 Out of Scope Events

The State Landslide Hazard Plan identifies that the following events are not emergencies for which VICSES will be the Control Agency:

- Landslide events that threaten the integrity of dams, or;
- Landslide events that are contained within a declared mine area, or:
- Avalanches (the movement of only the snow or ice).

These events are out of scope for landside response as they have their own specific response arrangements. VICSES may be asked to support other agencies that have a responsibility with these events.

1.4 Control Structure

A landslide event requires a coordinated response from multiple supporting agencies. The roles and responsibilities of all agencies including VICSES are available in Appendix A of the State Landslide Hazard Plan and are summarised in the table below:

VICSES Role	Responsible Agency / Owners	
Make the scene safe (cordon)	Stabilising the scene	Landholder / Road Authority
Support evacuation of people	Evacuation management	Victoria Police
Ensuring the right agencies are involved and engaged	Restoring Utilities	Water / Gas / Electricity / Telecomms
Forming an IMT and Incident EMT (impact and consequence)	Traffic Management including freight and tourism	Road Authority (LGA/VicRoads)
Short term traffic management	Public Transport routes	Public Transport Victoria / DET
Issuing public information and warnings (via the RDO or ICC)	Clean-up / restoration	Landholder / Road Authority
	Relief - Isolation / Accommodation	LGA (with support of DHHS)
	Relocation (medium-long)	DHHS

Where a landslide is identified as being an emergency, VICSES is to establish an appropriate Control structure to manage the response and recovery from a landslide incident.

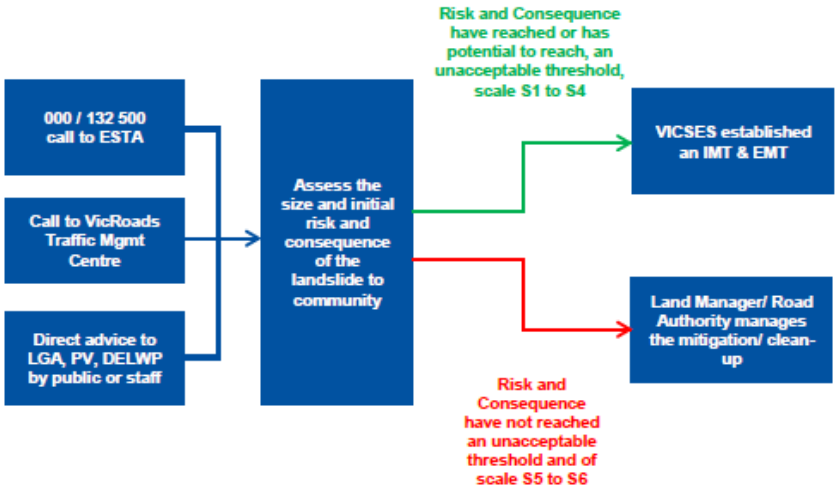
As part of the response VICSES will lead the issuing of public information and warnings in conjunction with other relevant authorities.

1.5 Determining VICSES Response

In determining VICSES' response to a landslide event and to establish effective command and control, consideration should be given to the consequence or potential consequence associated with the event.

VICSES has determined to apply six (6) scale categories of landslide events. It is important to note that whilst size can assist to categorise the nature of the event, it is just one factor that may impact the overall scale or category and the associated response based on actual or potential community consequences is to be in line with the VICSES Landslide Readiness and Activation Trigger Considerations.

Category / Scale	Relative Size	Volume of Failure (m3)	Typical Dimension (LxWxD) metres	Individual Block Size	Overall Debris Scale
S6	Extremely Small	< 2	1 x 3 x 0.3	-	Could fit in a wheelbarrow
S5	Very Small	2 to 20	2 x 4 x 1.2	0.1m minimum dimension	Could fit in a small car
S4	Small	20 to 200	5 x 10 x 2	0.2m minimum dimension	Could fit in a semi-trailer truck
S3	Medium	200 to 2,000	10 x 25 x 4	0.2 to 0.5m minimum dimension	Around the size of a house
S2	Large	2,000 to 20,000	25 x 60 x 7	0.5m-1.0m minimum dimension	Around the size of a country football oval
S1	Very Large	>20,000	50 x 100 x 10	Individual block size >1.0m	Around the size of the MCG or greater



1.6 Community Notifications and Warnings

VICSES will lead the issuing of community notifications and warnings in conjunction with other relevant authorities, including publishing warnings to VicEmergency along with road closures via the VicTraffic website.

Impacts of landslide events will vary between locations due to the size and impacts of each event. VICSES will consider issuing an EM-COP community notifications and warnings based on landslide scale, category and actual or potential community consequences. Where possible, community notifications and warnings should be tailored to the individual community at risk.

The Regional Duty Officer (RDO) is required to publish community notifications and warnings for Landslide events in line with the process outlined in Attachment 2 Landslide Community Information and Warnings until an Incident Control Centre is established (if deemed necessary).

In the event that the RDO is not able to issue community notifications and warnings, the Warnings and Advice Duty Officer (WADO) and State Duty Officer (SDO) are able to assist with this task.

The VICSES landslide warning business rules can be found on the Public Information section of the IMT Toolbox - VICSES Landslide EM-COP Public Publishing Business Rules.

1.7 SCC Activation Trigger

The State Response Controller (SRC) in conjunction with the State Agency Commander (SAC) will activate the State Control Centre (SCC) in line with VICSES Landslide Readiness and Activation Trigger Considerations.

1.8 RCC Activation Trigger

The Regional Controller (RC) in conjunction with the Regional Agency Commander (RAC) will activate the Regional Control Centre in line with VICSES Landslide Readiness and Activation Trigger Considerations.

1.9 ICC Activation Trigger

The Regional Agency Commander will activate an Incident Control Centre (ICC) as outlined in the relevant Regional Landslide Emergency Plan and/or in line with VICSES Landslide Readiness and Activation Trigger Considerations.

Procedure

2.1 Unit Activation

When alerted to a reported landslide:

- Ascertain the location and initial impact of and/or threat of further landslide.
- Triage the event in line with the Triage Principles for Landslide in the VICSES Operations Management Manual.
    - Where required, contact relevant authorities (e.g. VicRoads via the Emergency Services priority line – 1300 107 778 – not for public distribution) to advise of the event.
    - Ensure contact details for the Unit Duty Officer and Crew Leader are provided to any other authorities contacted.
    - Advise the RDO on the event and information gathered from the triage process.
- Determine the what is an appropriate response and what resources may be required:
    - For a small landslide that is impacting a roadway where the road owner (local government or VicRoads) and they confirm they can attend in a timely manner, the Unit may advise that SES Dispatch of this and that they will not be attending
    - If the road owner is not able to respond in a timely manner or where there are consequences (eg: isolation of community) and/or there is an imminent risk to life and/or property by further landslide, the Unit should dispatch a crew to the site.

2.2 First Responder Actions

The following actions are to be completed upon arrival at a landslide event:

Size Up / Arrival on Scene

- Create a safety cordon that limits access to the landslide site by members of the public.
- Undertake an initial scene assessment and identify risks using Dynamic Risk Assessment.

Establish Incident Control

- Ensure the Incident Controller is identified by a tabard so everyone knows who is in Control.
- Communicate hazards from Size Up to all responders on scene.
- Provide initial wordback to SES dispatch.
- Notify the relevant road authority if the landslide has impacted the roadway or is likely to impact the roadway.
- Establish Incident Emergency Management Team with other emergency services, support agencies (e.g.: utility companies if these are affected).
- Assess community consequences of incident in consultation with other agencies and the RDO.
- Develop initial Incident Action Plan Communications Plan.

Site Control

- Establish Hot, Warm, and Cold Zones to ensure responder and public safety.
- Where possible, use physical barriers and markings to identify Zones.
- Ensure responders are wearing correct PPE&C.
- Remove all non-essential responders and members of public from the Hot and Warm Zones.

Notification and Activation

- Notify VICSES RDO:
    - Once on scene assess the initial size and scale of the landslide using the guidelines of the VICSES Landslide Readiness and Activation Trigger Considerations.
    - Provide SitRep in line with Attachment 1 Landslide – RDO Notification.
    - Images or video via mobile phone MMS are highly valuable. If safe to do so, including items in the photo to provide a scale can assist in determining the level of response required.

2.3 Regional Duty Officer Actions

Upon notification of a landslide event, the Regional Duty Officer will:

- Notify the RAC and SDO in line with SOP004 Incident Notification Procedure.
- Determine if Community Warnings and Notifications are required for the event.
- Notify other emergency service organisations in conjunction with the Unit on scene.
- Contact agencies responsible for any services impacted by the incident i.e. road authority / water / power / gas / sewerage.
- Contact the land owner requesting them to attend the scene (if not already on scene).

2.4 Regional Agency Commander Actions

Upon notification of a landslide event, the Regional Agency Commander will:

- If required, activate relevant Regional Landslide Emergency Plans in line with VICSES Landslide Readiness and Activation Trigger Considerations.
- If required, activate relevant Incident Control Centre(s) and Regional Control Centre in conjunction with the Regional Controller.

2.5 Ongoing Actions

VICSES should maintain control:

- Implement control actions to minimise or eliminate hazards identified in the DRA.
- Once the emergency component of the incident is resolved the landholder and/or road authority is responsible for any clean-up and / or restoration of the area.

Safety

Safety Officer

A Safety Officer must be appointed for the duration of the operation beginning with the first crew on scene.

Environmental Notes

A landslide impacting on properties may contain contaminants including asbestos, raw sewerage as well as other hazards.

Responsibilities

This SOP is issued under the authority of the Chief Officer Operations. It is administered at the State level by the Deputy Chief Officer Operations – Readiness, at the Regional level by Assistant Chief Officers, and at the Unit level by Unit Controllers.

References

A number of references were used in the preparation of this SOP:

- Emergency Management Manual Victoria
- State Landslide Hazard Plan
- Operations Management Manual
- Victorian Occupational Health and Safety Regulations 2017
- VICSES Landslide Readiness and Activation Trigger Considerations
- VICSES Landslide EM-COP Public Publishing Business Rules

Related Doctrine

- JSOP 8.02 Dynamic Risk Assessment
- SOP004 Incident Notification Procedure
- SOP010 Steep and High Angle Rescue Operations
- SOP026 Personal Protective Clothing and Equipment for Operations
- SOP035 Entering Land or Premises During Operations
- SOP041 Operations Involving Asbestos

Attachments

Attachments for this SOP are titled:

1. Landslide - RDO Notification
2. Landslide - Community Notifications and Warnings