Landslide planning matrix

Thank you to MRT, council planners, and the TPC for their support in this work

Process thus far

Regional workshops (April – May)	Launceston, Burnie, and Hobart
	36 participants , plus MRT and DPAC
	Representatives from local government (elected, planners, and emergency management coordinators), state government, and industry
	Minutes released for comment from participants
Follow up workshop (June)	MRT, DPAC, Regional planners, state government, and industry
	14 participants
	Minutes released for comment from participants
Request for comment (August)	Councils, Government Departments, industry bodies
	The method we have used
	Are the landslide controls reasonable?
	Other issues you may see with the approach

Our current approaches to landslide.

The regional workshops highlighted the following items:

- A lack of guidance from the State Government landslide.
- A highly varied approach to managing landslide hazard between and within councils.
- That existing landslide mapping while useful is difficult to interpret and apply.

State level approach

- LUPAA (1993) objectives
  - *'...a pleasant, efficient and safe working, living and recreational environment of all Tasmanians and visitors to Tasmania'* and providing
  - *'...a planning framework which fully considers land capability*'.
- Mapping of major population centres is underway or complete
  - Mapping is technical, employing a range of methods since the 1970s to now.
  - The current approach is overcoming many of the previous inconstancies.
  - The mapping can be difficult to interpret.
- Building Code:
  - Structural Provisions (BCA 2009) objectives:
    - Safeguard people from injury caused by structural failure; and
    - Safeguard people from loss of amenity caused by structural behaviour; and
    - Protect other property from physical damage caused by structural failure;

- No policy guidance on landslide

4: State level approach

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  - *'…a planning framework which fully considers land capability'*.
- Mapping
  - Mappi
  - The cu
  - The ma
- Building C
  - Structu
    - S
    - Safeguard people from loss of amenity caused by structural behaviour; and
    - Protect other property from physical damage caused by structural failure;

- No policy guidance on landslide

Key points:

- Intermediate landslide susceptibility mapping does not cover the whole state.
- BCA seeks to protect the occupants or neighbours from structural failure.
- No policy guidance on landslide on how to apply LUPAA objectives.

Regional approach to landslide

Cradle Coast regional land use planning Framework

- **Response to natural hazards:**
  - *"...direct places where people live and work from areas where there is an unacceptable level of risk for the health and safety of people, property, and the environment from natural or man-made hazards."*

- **Risk and Policy:**
  - Level of risk, response and principles:
    - Vulnerable areas – avoidance, adaption and mitigation
    - Unacceptable risk – Avoid
  - Risk, land use and development
    - Unacceptable risk – not to be used for sensitive uses, key infrastructure, or hazardous uses.
    - Low or moderate risk – apply discretion on acceptable risk, management guidelines, assessment, changes to the hazard, cumulative affects.

- **Landslip definition** (section 4.5(c)(v)),
  - "geologically unstable areas *such as steep slope, susceptibility to land slip, springs and seepage(particularly on the coastal escarpment and adjoining ridges and steep valley walls and including designated Class A and Class B Landslip) swelling clays, or subsidence, and including areas of landslip and movement susceptibility as indicated on Tasmanian Landslide Map Series prepared by Mineral Resources Tasmania*."

- **Standard for risk assessment** is to be *"... undertaken for each proposed use or development in accordance with the Australian Geomechanics Society 2007 Landslide Risk Management Guidelines*".

Northern region land use planning framework

- "*Land designated for housing, industry, community and infrastructure services must not be located within or adjacent to areas which are vulnerable to an unacceptable level of risk including coastal inundation, landslip, flooding or contaminated land*." .
- The Northern regional framework identifies the following strategies to be promoted to reduce the risk from natural hazards including:
  - Ensure that new areas zoned for residential, commercial and community purposes are not within areas identified as being high risk areas.
  - Identification of hazard areas is to include the likely impacts of climate change such as sea level rise, storm surge, increased temperatures and intense/extreme rainfall events.
  - Reduce the risk for the loss of life and property by avoiding development on land which has been identified as being subject to a high risk from landslide, bushfire, sea inundation and flooding. and
  - Where avoidance of hazards is not possible or the level of risk is deemed acceptable, ensure best practice construction and design techniques and management practices are implemented. If required, plan for retreat in vulnerable areas.
- Spatial information identified in the framework include:
  - Landslip areas over Launceston (which are currently undergoing review).
  - Landslip A and B zones

Southern regional Land use planning framework

- Regional Policy 8: Managing Risks and Hazards
  - "Protect life and property from possible effects of land instability.
  - Prevent further development in declared landslip zones.
  - Require the design and layout of development to be responsive to the underlying risk of land instability.
  - Allow use and development in areas at risk of land instability only where risk is managed so that it does not cause an undue risk to occupants or users of the site, their property or to the public."

Tasmania
Explore the possibilities

4: Regional approach to landslide

Cradle Coast regional land use planning Framework

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  - w use and development in areas at risk of instability only where risk is managed so it does not cause an undue risk to pants or users of the site, their property the public."

Key points:

- To protect life and property
- To avoid areas of unacceptable risk
- That zoning should consider the hazard
- That development should respond to the hazard
- Duplication between the building code and planning?

Tasmania
Explore the possibilities

4: Local government approach to landslide (current)

Burnie (1989)
- Development in landslip areas should cause a landslip on or adjacent to the property.
- Requires an engineers certificate state the above.
- Consider the capability of the land.
- Areas identified as doubtful land stability.

Central Coast (2005)
- Requires a vulnerability report based on the AGS guidelines.
- Development does not increase the risk of landslide.
- Development must have a acceptable risk to life and property.
- Triggered by land considered to of "doubtful land stability" which includes MRT mapping and a steep slope based on the opinion of the planner assessing the application.

Circular Head (1995)
- Consider if the land is subject to landslip or excessive slope
- No development in areas of know landslip, unless council is satisfied that the development will not cause or further a land slide.
- Regard for the impact of landslip
- Triggers – know landslide or a slope 1 in 4

Devonport (1984)
- Consider the potential for landslip.
- Consider the capability of the land.
- Perform a geotechnical assessment in areas of doubtful land stability identified in scheme.
- Assessment must demonstrate the development is safe.
- Areas of doubtful land stability are based on MRT mapping.

Kentish (2005)
- Development should not cause a landslip to present a risk to life or property.
- Comply with the proclaimed landslide zones A and B.
- Hazard risk assessment that considers landslip in the cradle gateway

King Island (1995)
- Consider the affect of landslip
- Have regard to landslip when considering a development
- Consider the capability of the land

Latrobe (1994)
- Consider if the site is subject to landslip
- Consider the capability of the land

Waratah-Wynyard (2000)
- No increase in landslide potential.
- Identifies A and B zones in scheme

West Coast (?)
- Consider the level of risk from natural hazards (inc landslide).
- Does not cause or accelerate land instability.
- Development should avoid landslip areas.
- Developers must assess if the hazard will occur on their land.
- Does not provide guidance on how to respond to natural hazards.

Break O'Day (1996)
- reasonable avoidance in landslip
- Demonstrate management in landslip
- A and b zones and some areas a 10% slope
- no development in high risk coastal areas

Dorset (1996)
- Consider landslip on slopes >20%
- Consider capability of land

Flinders island (1994)
- Consider landslip on excessive slope
- No development on land with a unacceptable level of risk
- Other risk levels responded to through design
- Landslide is assessed on a slope of 1 in 4, or is known to be susceptible

George Town (1991)
- In mapped landslip areas refer to MRT for advice.
- Building sites must be free of hazard

Launceston (?)
- Class v – prohibit development
- May apply discretion for 3 and 4 - for some type of developments, this would include a geotech report
- Minimise the risk from hazard
- Prevent development in active landslide areas.
- Prevent the increase in risk to life and property
- Building envelope to be free of landslip
- Consider capacity of land

Meander Valley (1995)
- Consider landslip
- No increase in risk or landslide potential in areas of known / suspected landslip or on slopes greater than 25%.

Northern Midlands (1995)
- Consider landslip
- No increase in risk or landslide potential in areas of known / suspected landslip or on slopes greater than 25%.
- Consider land capability

West Tamar (2006)
- Do not cause or contribute to landslip
- Consider the risk of landslide in areas identified by MRT
- To protect human life and property by avoiding where practicable or lessening the adverse impacts of landslip.
- Assess risk in accordance with MRT

Glenmorgan Spring Bay (1994)
- No consideration of landslide

Brighton (2000)
- Development must minimise the need for engineered solutions to protect life and property

Clarence City (2007)
- Identification and mitigation of the risk from landslide

Derwent valley council (1993)
- Consider landslide
- Consider if land is subject to landslide
- Consider the capability of the land

Hobart city (1982)
- Risk from landslip is to be reduced to an acceptable level.
- Consider the capability of the land
- Consider land stability as part of a site development plan.
- Identify potential impacts

Battery Point (1979)
- Consider the capability of the land

Glenorchy (1992)
- Consider landslide as part of a site development on land with a slope greater than 1 in 4 or know to be potentially unstable.
- Council must be satisfied a development will not cause a landslip
- The development must not place an undue risk to the occupants, the public, or property.

Sullivans Cove (1997)
- Consider the capability of the land

Esperance planning scheme (1989)
- Risk from landslide is to be acceptable
- Consider landslide
- Consider the capability of the land
- Account if the development contributes to an increase in exposure to landslide
- Stormwater will not increase the risk from landslide.
- Development will not cause landslide
- Development is not affected by landslide

Huon Planning scheme (1979)
- Consider the capability of the land
- Council must be satisfied that the risk is acceptable
- Avoidance of land instability

Port Cygnet planning scheme (1988)
- Council must be satisfied that the risk is acceptable
- Consider if the land is affected by landslip
- Consider the capability of the land
- Rural B zone is to maintain soil stability on steep slopes.

Kingborough (2000)
- Development can occur on slopes greater than 1 in 5 if development will not be subject to landslip

Sorell Planning scheme (1993)
- Consider landslip as part of a development
- Account for landslide as part of a development where it applies
- Consider the capability of the land

Southern Midlands (1998)
- Clearance of vegetation will not cause a landslip
- Consider if the development is subject to landslide

Tasman Planning scheme (1979)
- In areas of soft rock over a slope of 25% councils should make reference to the MRT mapping
- Refer development to MRT if landslide is a potential

Central Highlands (1998)
- No consideration

4: Local government approach to landslide (current)

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Central Highlands (1998)
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Key points:
- No consistency on when landslide should be considered
  - Landslip A and B areas
  - Slope (between 10 and 25 % slope)
  - Some susceptibility mapping (Tamar Valley)
  - Areas of doubtful stability
  - Opinion of the planner
  - Applicant required to demonstrate that the development is safe and within the capacity of the land
- No consistency on how the development should consider landslide.
  - What standard should it be constructed too – should it be their at all?
- Difficulty in measuring the quality of a landslide report outside of a referral to MRT, peer review, or council consultant
- Zoning may not consider landslide:
  - Lack of mapping
  - Lack of awareness of the problem.

4: Proposed Codes

Cradle Coast

Burnie
Central Coast
Circular Head
Devonport
Kentish
King Island
Latrobe
Waratah-Wynyard
West Coast

Proposed common hazard code in the regional planning project as an interim until the state wide code:

The Common Natural and Environmental Hazard Management Code (E8)

- Minimise unacceptable public an d private risk
- Identify a tolerable level of risk
- Private risk is to be owned by the individual (not sure how this will be interpreted given the Clarence precedent)
- Application:
    - *shown on the planning scheme map; or*
    - *land identified in any Mineral Resources Tasmania Advisory Landslide Susceptibility or Hazard Map; or*
    - *if the characteristics or investigations of the site and surrounding area suggest that there is a potential for landslide movement; and*
    - *land within a Landslip A or B area proclaimed under Part 9A of the Mineral Resources Development Act 1995*
- *The level of likely risk from exposure to a natural or environmental hazard is tolerable for the type, scale, and density of use or development*

Northern

Break O'Day
Common landslide code (E3)
Dorset
Flinders island
- Common landslide code (E3)
- Considers landslip as part of controls on coastal hazards, utilities,

Key points:
- Zoning considers landslide where known
- North and Cradle Coast are proposing interim landslide/ hazard codes until Sate releases one.
- Risk based approach

of risk from a natural hazard (S29.0).
- Coastal hazards consider landslide (E18.3)

Meander Valley
- Common landslide code (E3)
- Consider the impact and minimise the consequences (E3.4.3)
- Considers landslip as part of controls on coastal hazards, utilities, flood prone areas, vegetation management, rural resources and agricultural zones, land stability, and environmental protection.

Northern Midlands
- Common landslide code (E3)

West Tamar (2011)
- Common landslide code (E3)
- Considers landslip as part of controls on coastal hazards, utilities, flood prone areas, vegetation management, rural resources and agricultural zones, land stability, and environmental protection.

Common landslide code (E3)
- Development will not cause or have a cumulative effect to increase the risk of landslide (E3.0)
- Applies to all areas identified in the code overlay, or potentially affected by landslide. (E3.2)
- Avoid development in areas of landslide risk, A or B Zones, or take suitable measures to protect life and property by demonstrating (in a landslip management report) that the residual risk is low or very low as defined in the scheme (E3.5.1).
- Risk based approach (E3.5.2).
- Trigged by the MRT landslide susceptibility mapping.
- Development trigger risk ?

Southern

Brighton
Clarence City
Derwent valley council
Hobart City (2009)
- Includes Sullivans Cove, and Battery Point

Minimise the risk from landslide (S2.0)
Avoid or minimise the risk to the people, property, environment when developing(s17.0)
triggered by a either a rock type and slope, or landslide A and B zones (S17.0)
Protect life and property by making the residual risk acceptable (S17.4)
Development can not affect the land stability of neighbouring parcels (S13.4)

Glenorchy (2011)
Plan to avoid, manage, or mitigate the impact of landslide on a development.
Triggered by MRT landslide mapping and Landslide A and B zones

Huon Valley Planning scheme
- Includes the Esperance and Port Cygnet Schemes

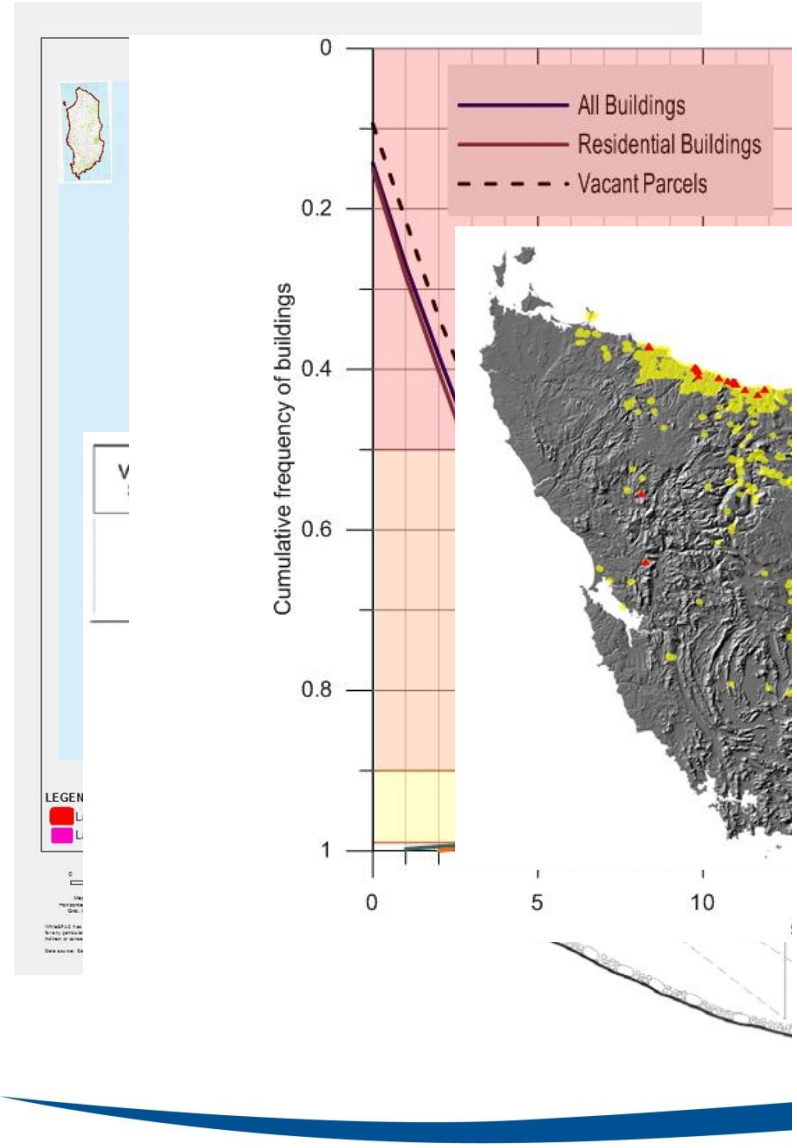
Kingborough
Sorell Planning scheme
Southern Midlands
Tasman Planning scheme
Central Highlands

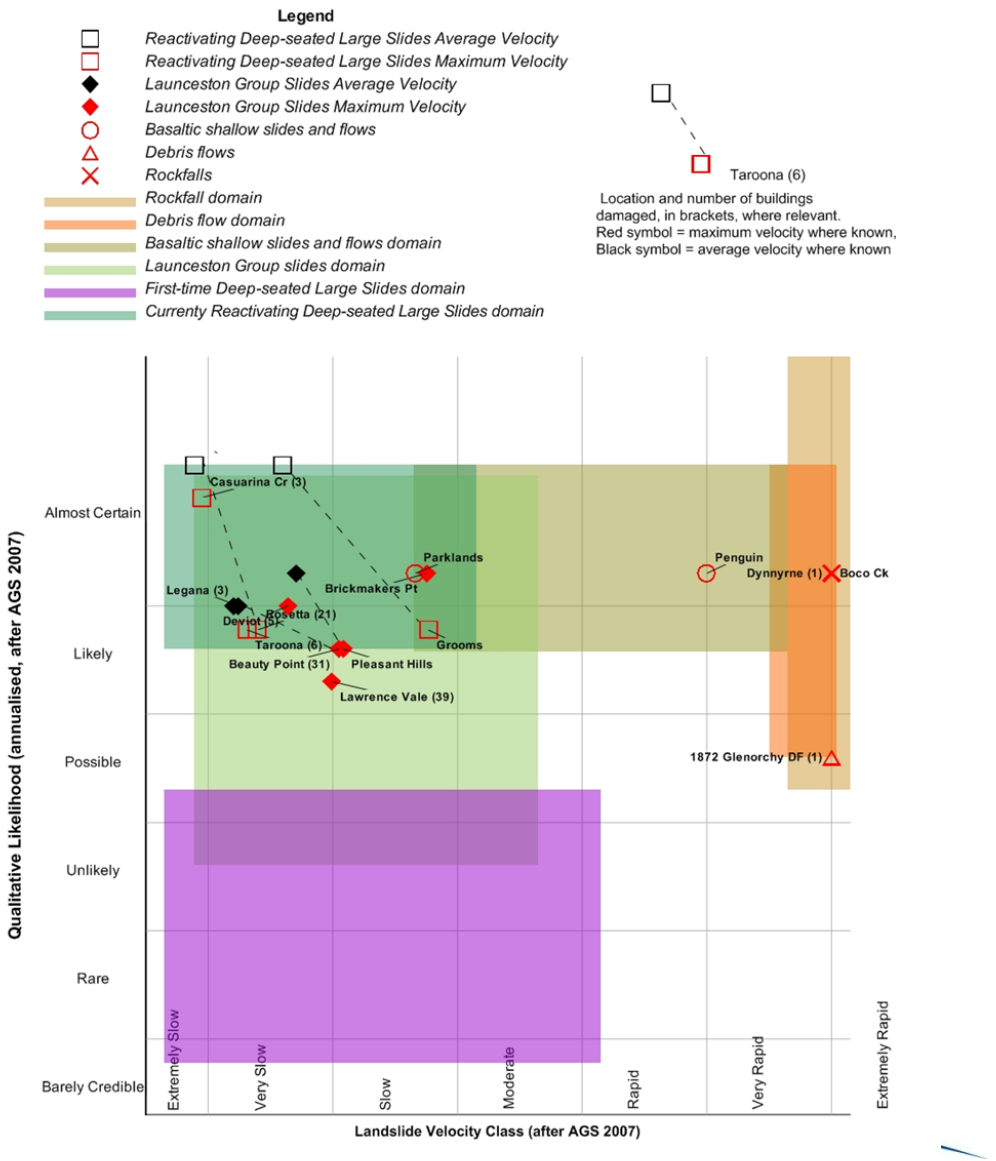
Tasmania
Explore the possibilities

Define the areas of concern

3 : Preferred approach to mapping landslide

Approach to landslide mapping	Weakness	Strength
Option 1 – Basic (slope) susceptibility	Needs a catch all clauses to developments in non-susceptible areas to be called in for assessment. To broad in its application. Difficult to set a slope threshold that will capture all know landslip areas and not be too onerous.	Simple and straight forward. The default position. Precautionary, Conservative. Transparent.
Option 2 – Intermediate (slope and geology) susceptibility	Geology mapping is too crude outside of 1:25k geology mapping areas.	Well established in Hobart. Relatively simple and transparent. Allows the likely failure angle for each type of geology to be applied.
Option 3 - Intermediate (slope and geology) susceptibility, Basic (slope) susceptibility, and know landslides	**Intermediate susceptibility mapping is only located over a small area of the state.** **Current system is not well set up to allow updates to the mapping.** **Intermediate susceptibility mapping is only located the majority of areas in the North West.** **Boundary of bands will be an issue.** **It will take up to a year to deliver the final overlay.** **Perception of inaccurate mapping at the boundaries for basic and intermediate susceptibility mapping.**	**Based on the advice of MRT.** **Intermediate susceptibility mapping covers 80% of the populated areas.** **Users our current knowledge, and AGS standards.** **Intermediate susceptibility mapping identifies areas with little to no potential exposure to landslide.** **Increased confidence in the mapping.**





Understanding the mapping - Pairwise

Chart of qualitative likelihood vs velocity for major landslide types in Tasmania, with indication of damage to buildings. The x-axis provides a proxy to the probable destructive significance figure of AGS 2007, but suprisingly most of the damage to buildings in Tasmania are in the second lowest category (Very Slow) contrary to the consequence description. The symbols provide our known control on the expected behaviour of each landslide type. Note that much of the damage recorded in the state is associated with reactivations of existing landslides.

Pairwise comparison method

- Potentially All Pairwise RanKings of all possible Alternatives (PAPRKiA)
- Qualitative assessment - based on the decision makers preference
- Gives an overall rank to each feature
- Two types of pairs – dominated (implicitly ranked) and un-dominated pairs
- Criteria:
  - Is one more likely to occur than the other?
  - Which has a greater area subject to an event?
  - How broad is the category, does it encompass more than one landslide hazard type
  - Which presents the greater hazard to areas of existing or likely future development?“
  - Are land use controls required by legislation?

What does it tell us?

- The relative importance for intervention from land use planning
- It is a decision support tool – it does not make the decisions

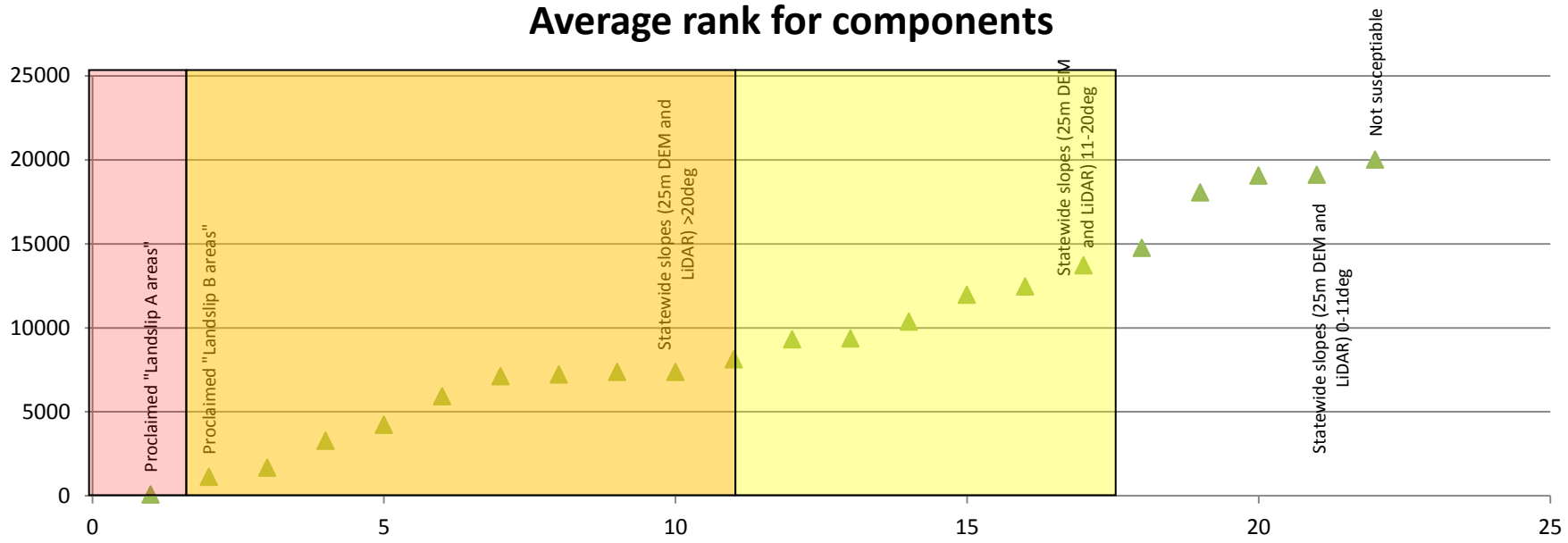
Y is 1000 N is 1 = is 100	Proclaimed "Landslip A areas"	Proclaimed "Landslip B areas"	Statewide slopes (25m DEM and LiDAR) 0-11deg	Statewide slopes (25m DEM and LiDAR) 11-20deg	Statewide slopes (25m DEM and LiDAR) >20deg	Rockfall susceptibility source + runout area 34deg
Proclaimed "Landslip A areas"		X	X	X	X	X
Proclaimed "Landslip B areas"	X		1000	1000	1000	1000
Statewide slopes (25m DEM and LiDAR) 0-11deg	1	X		1000	1000	1000
Statewide slopes (25m DEM and LiDAR) 11-20deg	1	1	X		1	1
Statewide slopes (25m DEM and LiDAR) >20deg	1	1	1000	X		1000
Rockfall susceptibility source + runout area 34deg	1	1	1000	1000	X	
Rockfall susceptibility runout area 30deg	1	1	1000	1	1	X
Shallow slide + flow susceptibility source-high	1	1	1000	1	1	1
Shallow slide + flow susceptibility source-moderate	1	1	1000	1000	100	100
Shallow slide + flow susceptibility source-low	1	1	1000	100	1	100
Debris flow susceptibility Mountain source + runout >30 Q1	1	1	1000	1	1	1
Debris flow susceptibility Mountain runout 30-26 Q2	1	1	1000	1000	1	1000
Debris flow susceptibility Mountain runout 26-22 Q3	1	1	1000	1000	1	1000
Debris flow susceptibility Mountain runout 22 - 12 Q4a	1	1	1000	1000	1	100
Debris flow susceptibility Mountain runout - dam-burst	1	1	1000	1	1	100
Deep-seated slide susceptibility (source-runout-regression)	1	1	1000	1	1	1
Launceston Group slide susceptibility (large and small)	1	1	1000	1000	1	1
Mapped slides - deep-seated/Launc. Gp, recently active	1	1	1000	1000	100	1000
Mapped slides - deep-seated/Launc. Gp, activity unknown	1	1	1000	1000	1000	1000
Mapped slides - other slides/flows, recently active	1	1	1000	1000	1000	1
Mapped slides - other slides/flows, activity unknown	1	1	1000	1000	1	1
Column Totals	19	18	18000	12105	4212	7407

Pairwise assessment – what is the r

Landslide Component	Assessment 1	Assessment 2	Average
Proclaimed "Landslip A areas"	20	119	69.5
Proclaimed "Landslip B areas"	1019	1217	1118
Mapped slides - deep-seated/Launc. Gp, recently active	2018	1316	1667
Mapped slides - other slides/flows, recently active	6113	416	3264.5
Launceston Group slide susceptibility (large and small)	4313	4115	4214
Shallow slide + flow susceptibility source-high	9506	2315	5910.5
Debris flow susceptibility Mountain source + runout >30 Q1	8012	6212	7112
Mapped slides - deep-seated/Launc. Gp, activity unknown	4016	10406	7211
Rockfall susceptibility source + runout area 34deg	8408	6311	7359.5
Remaining areas susceptibility > 20 degrees	4214	10505	7359.5
Debris flow susceptibility Mountain runout 30-26 Q2	9011	7211	8111
Mapped slides - other slides/flows, activity unknown	7112	11504	9308
Shallow slide + flow susceptibility source-moderate	12305	6410	9357.5
Debris flow susceptibility Mountain runout 26-22 Q3	10208	10505	10356.5
Rockfall susceptibility runout area 30deg	13304	10604	11954
Debris flow susceptibility Mountain runout 22 - 12 Q4a	13304	11603	12453.5
Hobart-Glenorchy deep-seated slide susceptibility (Rosetta scenario)	-	13305	13305
Remaining areas susceptibility 11-20deg	13106	14303	13704.5
Shallow slide + flow susceptibility source-low	17003	12503	14753
Debris flow susceptibility Mountain runout - dam-burst	18002	18101	18051.5
North West deep-seated slide susceptibility (source-runout-regression)	19001	19100	19050.5
Remaining areas susceptibility 0-11deg	20000	18200	19100
Very low to no susceptibility	20000	20000	20000

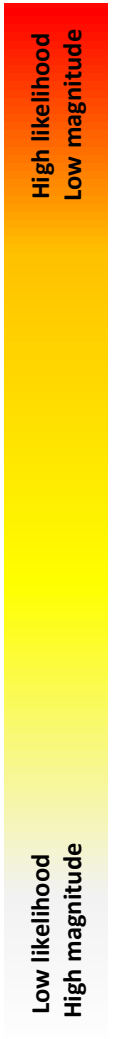
Understanding the mapping - Pairwise

Tasmania
Explore the possibilities


Average rank for components
25000
20000
15000
10000
5000
0
0
5
10
15
20
25
Proclaimed "Landslip A areas"
Proclaimed "Landslip B areas"
Statewide slopes (25m DEM and LiDAR) >20deg
Statewide slopes (25m DEM and LiDAR) 11-20deg
Statewide slopes (25m DEM and LiDAR) 0-11deg
Not susceptiable

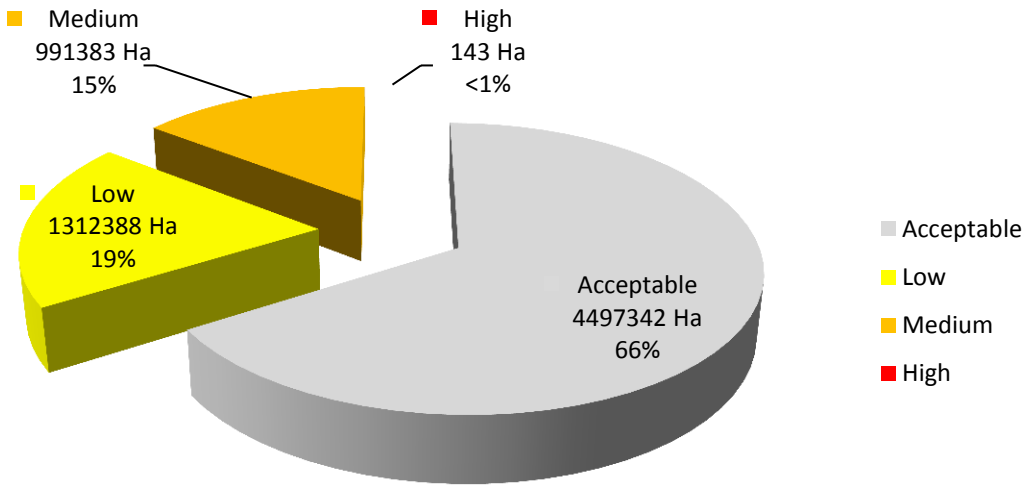
Classifying the features

Landslide Component	Average	Landslide planning band
Proclaimed "Landslip A areas"	69.5	High
Proclaimed "Landslip B areas"	1118	Medium
Mapped slides - deep-seated/Launc. Gp, recently active	1667	Medium
Mapped slides - other slides/flows, recently active	3264.5	Medium
Launceston Group slide susceptibility (large and small)	4214	Medium
Shallow slide + flow susceptibility source-high	5910.5	Medium
Debris flow susceptibility Mountain source + runout >30 Q1	7112	Medium
Mapped slides - deep-seated/Launc. Gp, activity unknown	7211	Medium
Rockfall susceptibility source + runout area 34deg	7359.5	Medium
Remaining areas slopes >20deg	7359.5	Medium
Debris flow susceptibility Mountain runout 30-26 Q2	8111	Medium
Mapped slides - other slides/flows, activity unknown	9308	Low
Shallow slide + flow susceptibility source-moderate	9357.5	Low
Debris flow susceptibility Mountain runout 26-22 Q3	10356.5	Low
Rockfall susceptibility runout area 30deg	11954	Low
Debris flow susceptibility Mountain runout 22 - 12 Q4a	12453.5	Low
Hobart-Glenorchy deep-seated slide susceptibility (Rosetta scenario)	13305	Low
Remaining areas slopes 11-20deg	13704.5	Low
Shallow slide + flow susceptibility source-low	14753	Acceptable
Debris flow susceptibility Mountain runout - dam-burst	18051.5	Acceptable
Deep-seated slide susceptibility (source-runout-regression)	19050.5	Acceptable
Remaining areas slopes 0-11deg	19100	Acceptable
Very low to no susceptibility	20000	Acceptable



What is the consequence?

Landslide planning bands by area – State



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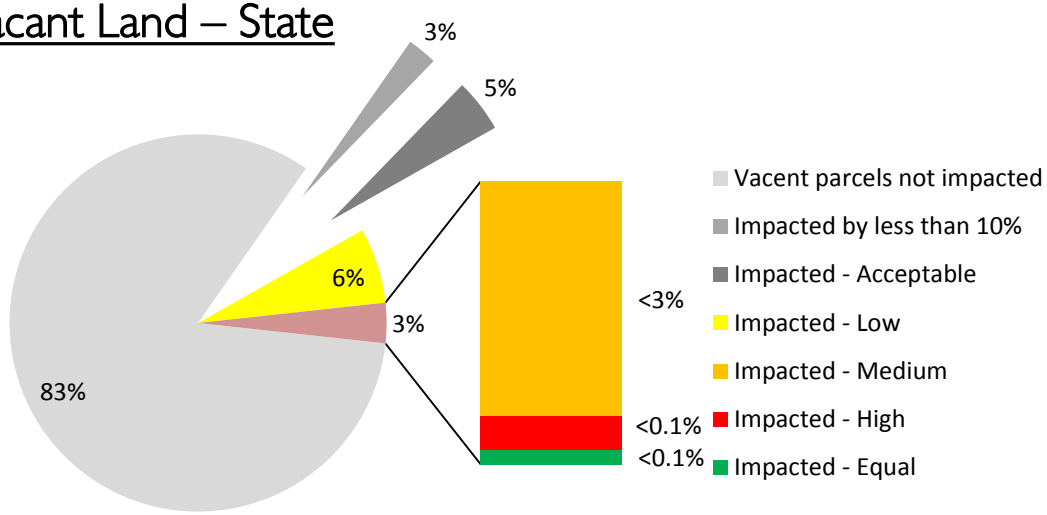
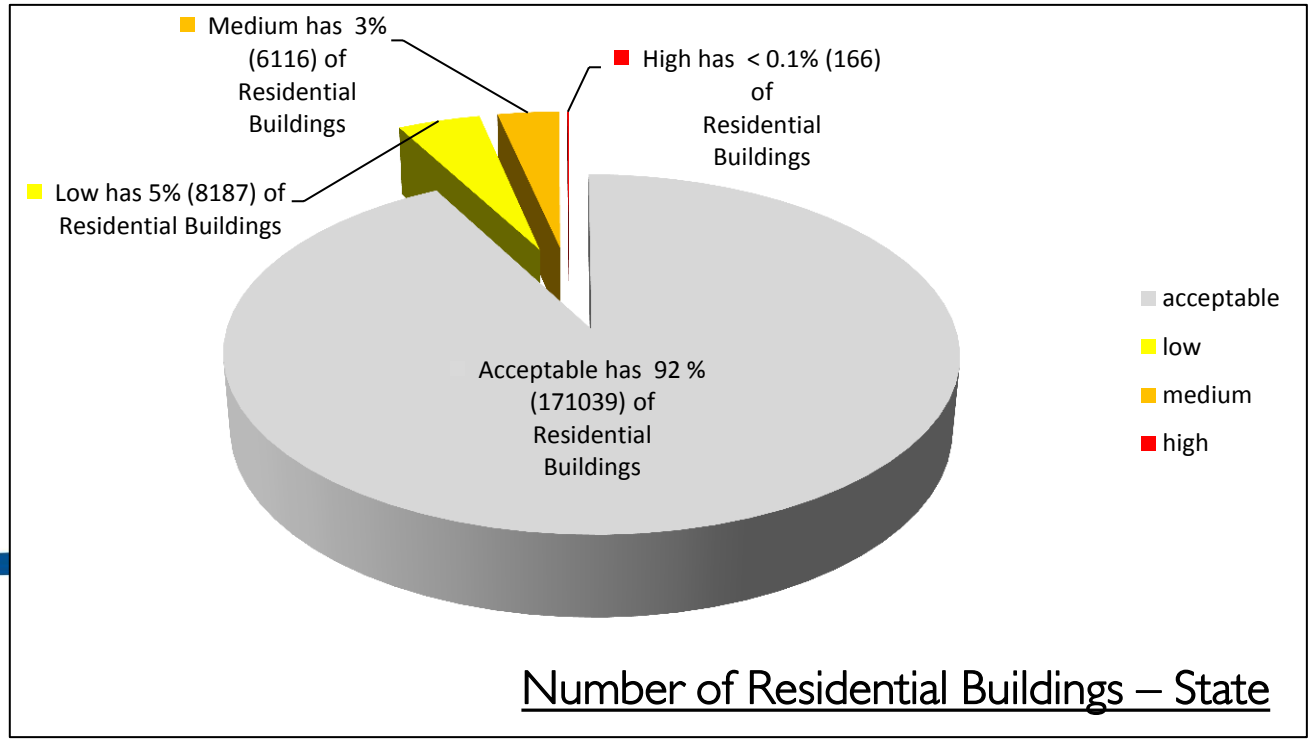
Vacant Land – State





Number of Residential Buildings – State

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	Acceptable	Low	Medium	High
Break O'Day Council	3281	90	26	43
Dorset Council	2524	44		
Flinders Council	619	13	3	
George Town Council	2611	16	33	
Glamorgan-Spring Bay Council	3041	101	4	
Launceston City Council	19940	5	3284	
Meander Valley Council	7654	80	112	
Northern Midlands Council	4293	12		
West Tamar Council	7027	105	1003	67
Grand Total	**50990**	**466**	**4465**	**110**

Landslide planning matrix

Acceptable Band	White or clear on the landslide hazard map.
Consequence	Rare to almost incredible - a landslide is rare to almost incredible to occur in this area based on current understanding of the hazard, but it may occur in some circumstances.
Control Level	Development and use is not subject to landslide controls.
Strategic Planning	No impacts on land use strategies or change to zoning required.
Guidance on Use Standards	No hazard specific controls. No controls are required to bring the use into an acceptable risk level.
Guidance on Development Standards	No hazard specific controls. No controls are required to bring the development into an acceptable risk level.

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Low Band	Yellow on the landsli
Consequence	Possible to unlikely -
Control Le	
Strategic Pl	
Guidance o Standards	
Guidance o Developme Standards	

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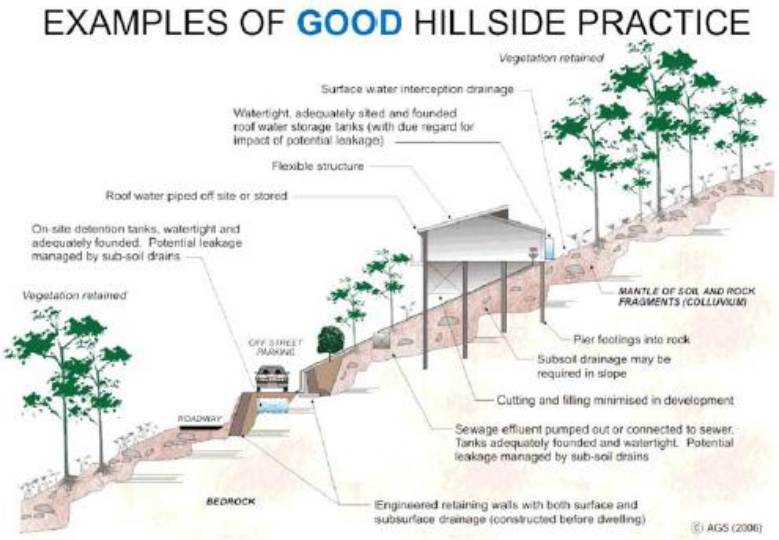
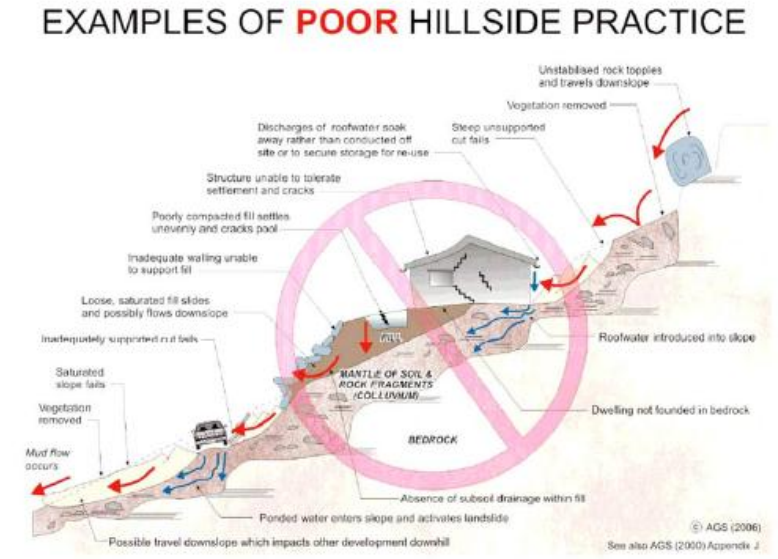
PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007





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Medium Band	Orange on the landslide hazard map.
Consequence	Likely - the area has known landslide features, or is within an identified regional (1:25000 scale) landslide susceptibility zone, or has legislated controls to limit disturbance of adjacent unstable areas.
Control Level	Planning controls are necessary for all use and development to ensure that risks are tolerable (as recommended by AGS). Any vulnerable or hazardous use will only be allowed in exceptional circumstances.
Strategic Planning	Where there is no compelling reason to include land identified in this band for development, it should be zoned for rural, open space or environmental purposes. Compelling reason may include it is an existing residential area, and further development will be infill. Alternatively a Landslide Risk Assessment may be required to demonstrate that a proposed zoning is reasonable.
Guidance on Use Standards	Development in declared Landslip B areas is controlled under Part 10, Division 1 of the *Building Act 2000* and by Part 2, Division 1 of the Building Regulations 2004. **Minor use**s are permitted. **Residential use** in existing residential areas is permitted, however the rezoning of areas for residential use is discretionary subject to a Landslide Risk Report. **Vulnerable and hazardous use**s are discretionary subject to the completion of a Landslide Risk Report. **Post – disaster and catastrophic risk based use** are generally prohibited; however, if there is an overriding community benefit or an exceptional circumstance they may be allowed as an exceptional use subject to the completion of a Landslide Risk Report.
Guidance on Development standards	**Extensions** should be developed to meet the intention of the ABCB 2006 Landslide Hazards – Handbook for good hillside construction. **Infill and Works** with a final floor area of less than 200 m^2 should meet the intention of the ABCB 2006 Landslide Hazards – Handbook for good hillside construction. Infill and works with a final floor area over 200m^2 should complete a Landslide Risk Report that guides the form of the development. **Sub-division** are discretionary subject to the completion of a Landslide Risk Report demonstrating how the subdivision will achieve tolerable risk as defined by the ABCB 2006 Landslide Hazards – Handbook for good hillside construction.

High Band	Red on the landslide hazard map.
Consequence	Almost certain - the site is within a declared Landslip A area.
Control Level	All use and development would require significant investigation and an engineered solution to mitigate the natural hazard and enable the development to achieve and maintain a tolerable level of risk, however, the mitigation measures may never achieve comprehensive levels of security and safety.
Strategic Planning	Strategies should discourage all development except vital community infrastructure that cannot be reasonably located elsewhere. Strategies must indicate appropriate zoning and overlays to provide a clear message to the public and the drafters of local government planning schemes to ensure use and development is generally prohibited except under special circumstances.
Guidance on Use Standards	Most use and development is prohibited in declared Landslip A areas and is controlled under Part 10, Division 1 of the *Building Act 2000* and by Part 2, Division 1 of the Building Regulations 2004. **Minor use** is discretionary subject to a Landslide Risk Report and the minister's approval. **Residential, vulnerable and hazardous, Post – disaster and catastrophic risk based use** are generally prohibited, however; if there is an overriding community benefit in an exceptional circumstance a performance based solution may be appropriate. The performance based solution should demonstrate that a tolerable level of risk (as recommended by AGS) can be achieved and maintained throughout the life of the development
Guidance on Development Standards	**Extensions, works, infill, and sub-division** are generally prohibited.

Questions

- Does the approach to landslide have merit as template for other natural hazards?
- Are the landslide controls appropriate?
- What issues do you see with the approach?

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