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Witness appearing 7 May 2025



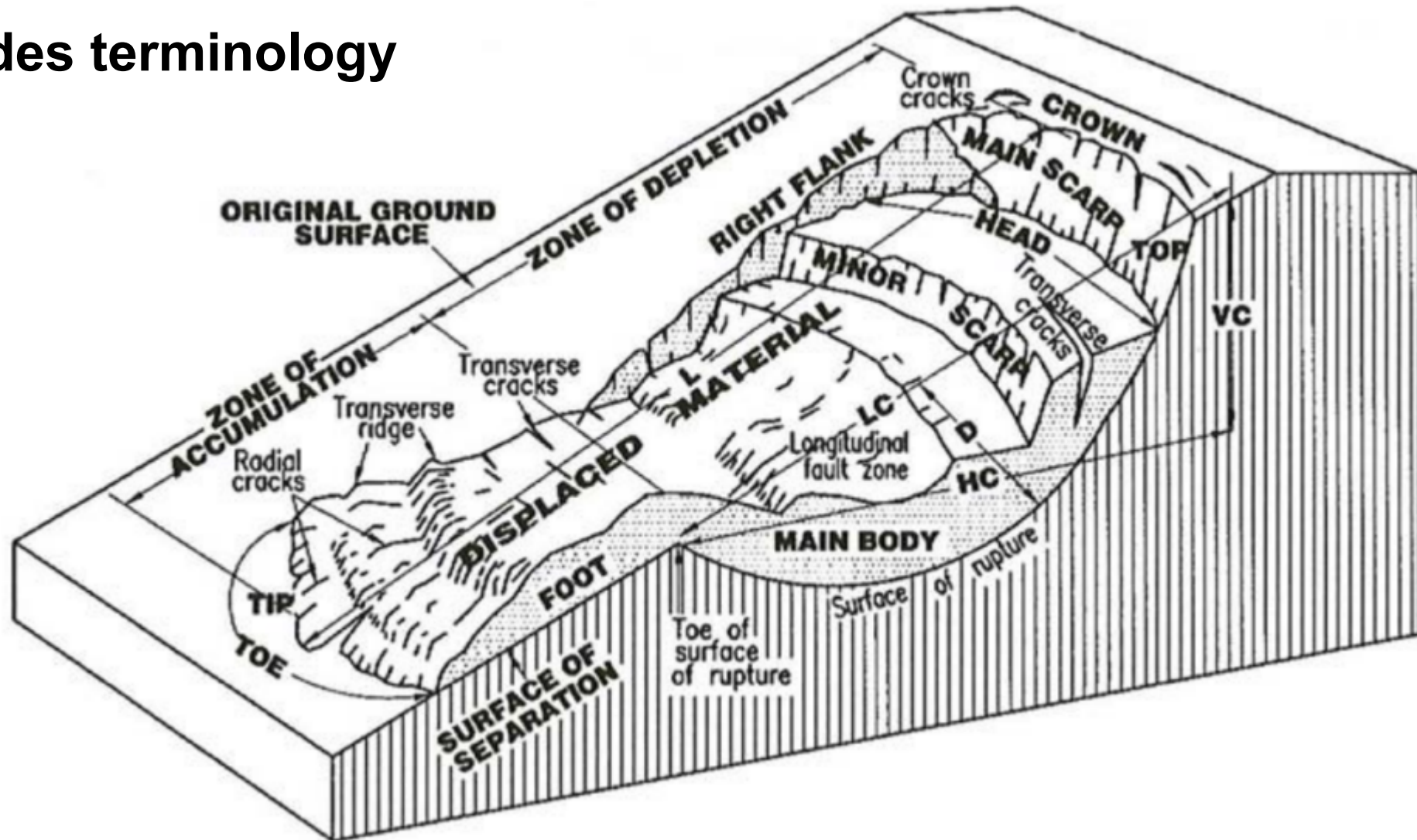
**Board of Inquiry**  
into the McCrae landslide

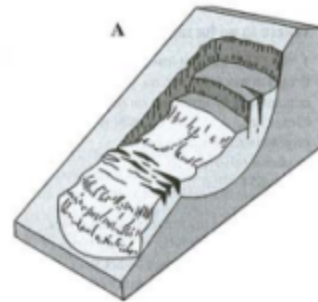
# What influences where landslides occur?

- Movement of rock and soil downslope under the action of gravity.
- Preparatory Factors
  1. Geology – type and thickness of soil
  2. Slope angle
  3. How much water is in the soil
  4. Previous history of landslides
- Development can influence the first 3 factors. Planning controls are in place to protect people, assets and the environment from landslide impacts.

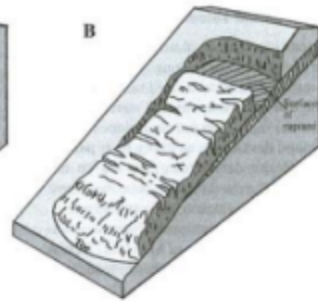


# Landslides terminology

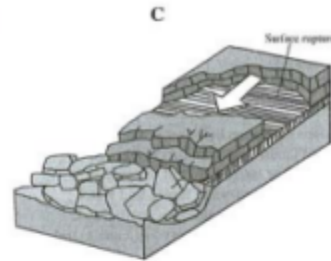




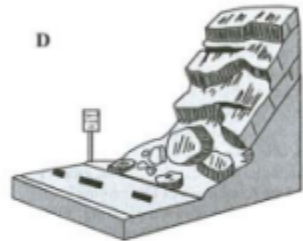
**Rotational landslide**



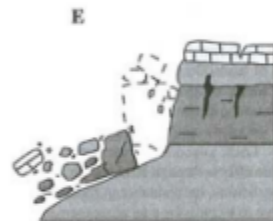
**Translational landslide**



**Block slide**



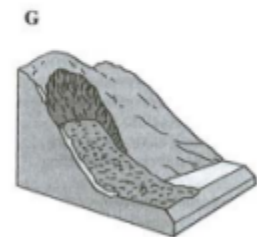
**Rockfall**



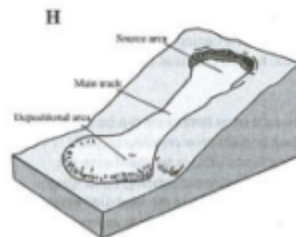
**Topple**



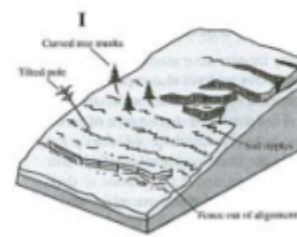
**Debris flow**



**Debris avalanche**



**Earthflow**



**Creep**

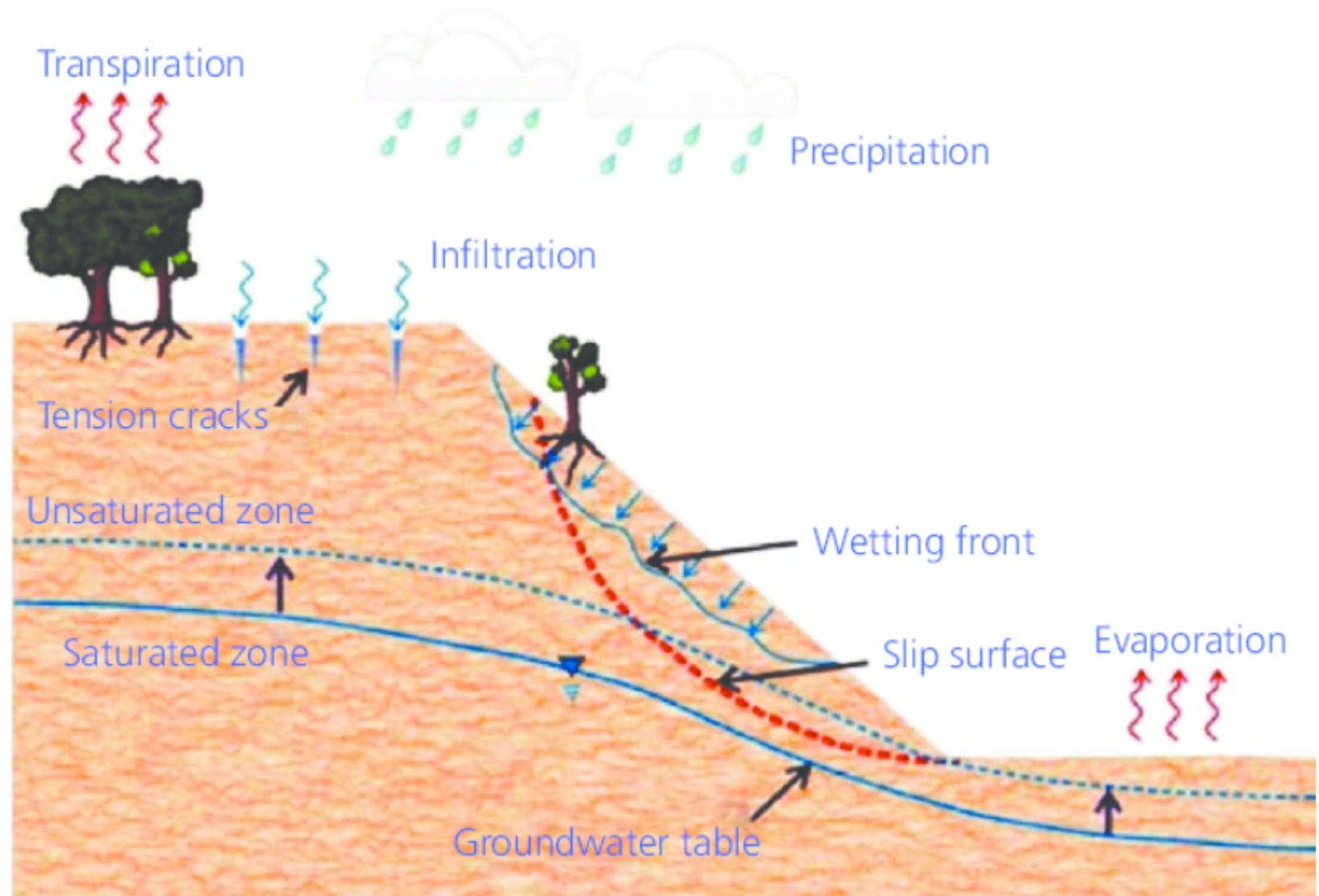


**Lateral spread**

## Landslides terminology

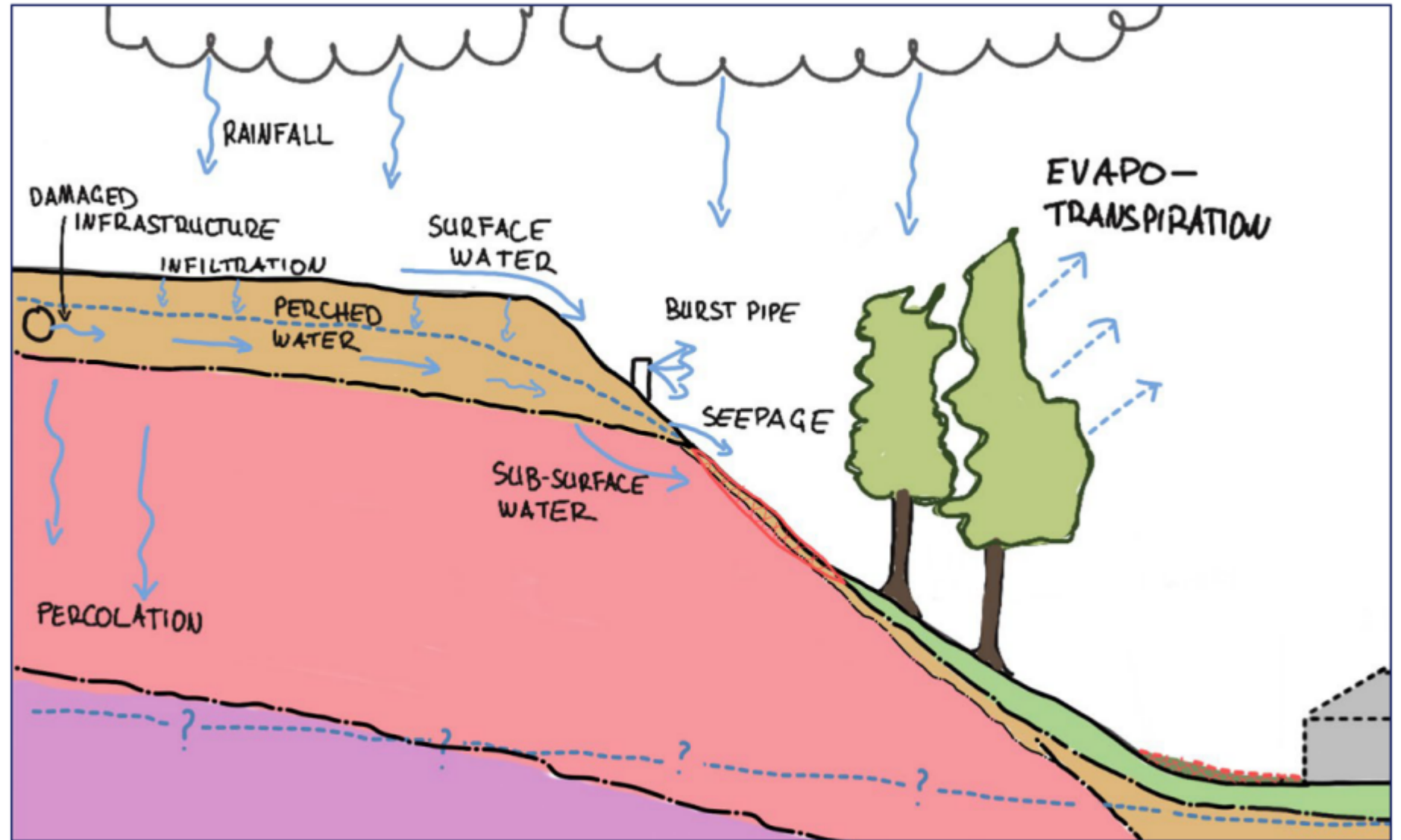


## Preparatory factors



**Board of Inquiry**  
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## Preparatory factors



Board of Inquiry  
into the McCrae landslide



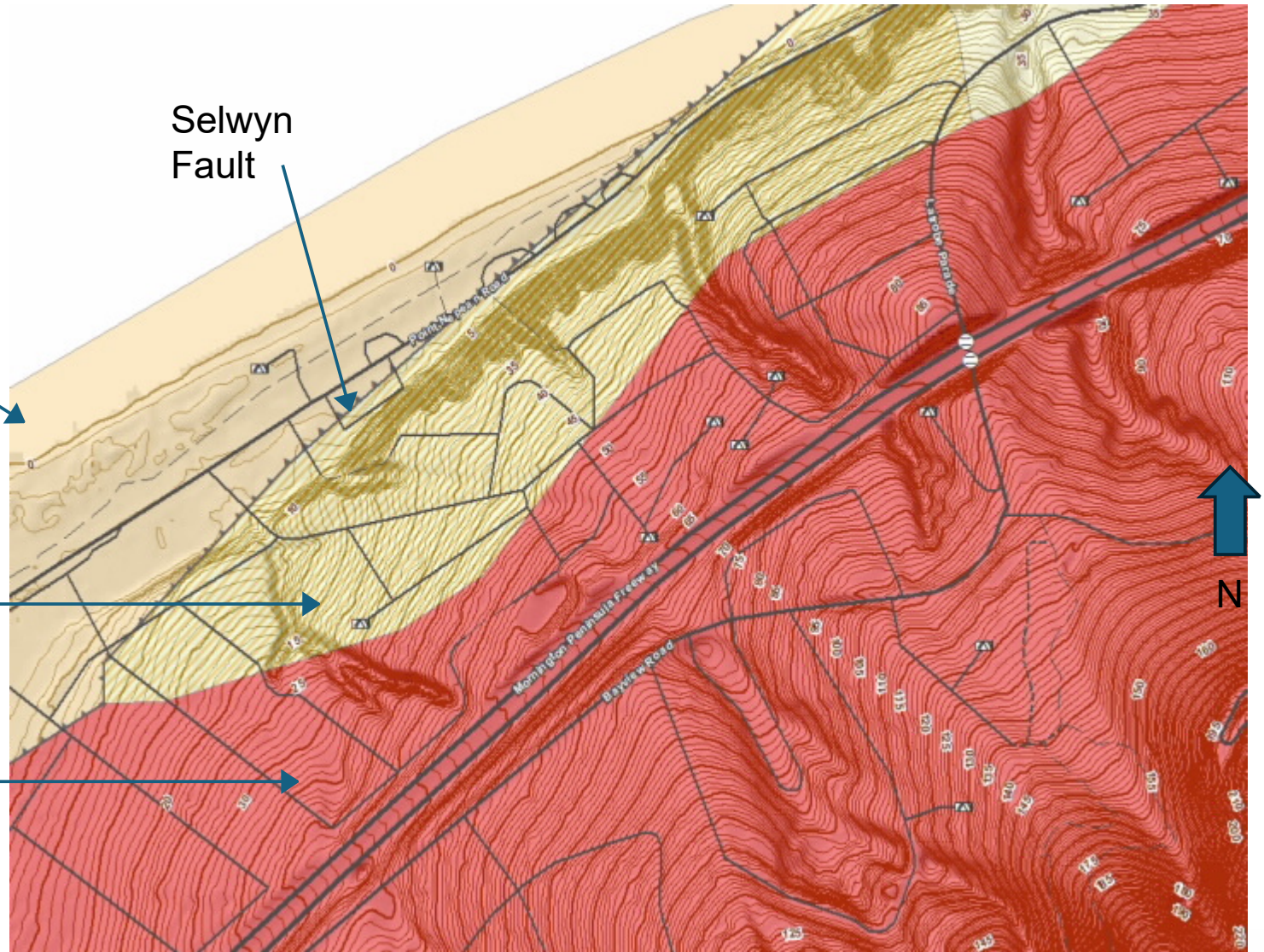
## Preparatory factors – Geology and Slope angle

Coastal  
Beach and  
Dune  
Deposits

Selwyn  
Fault

Pleistocene  
Dune  
Deposits

Granite



# Victorian Planning Provisions

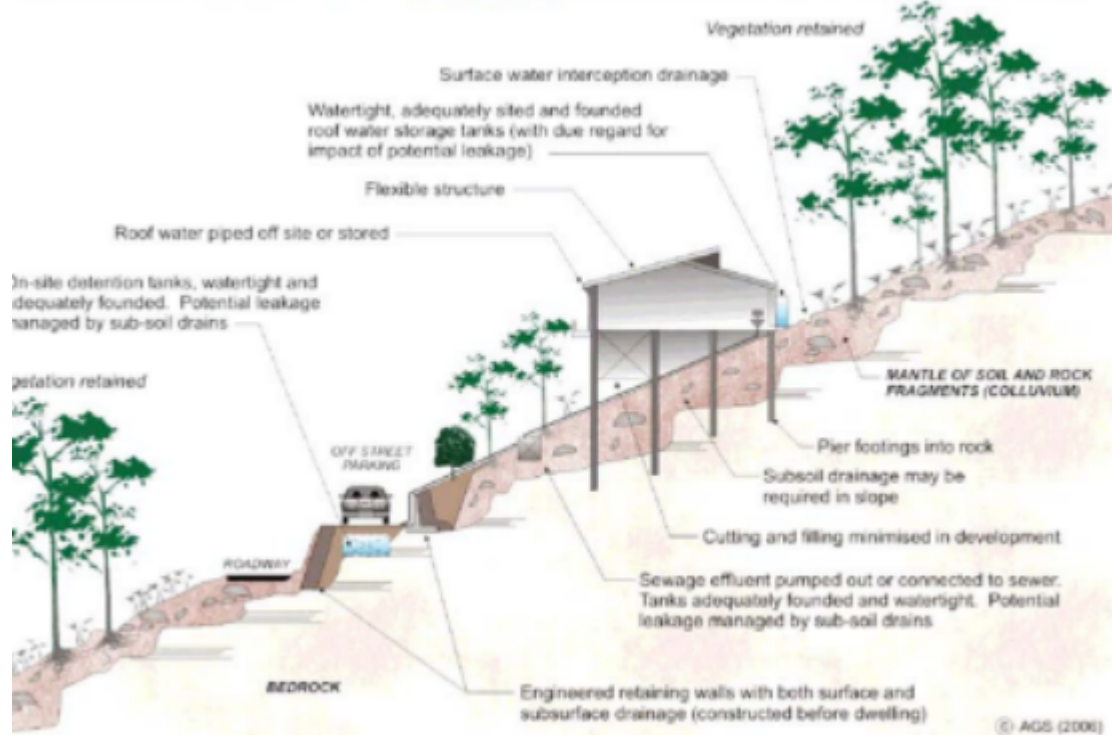
- CLAUSE 13.04-2S EROSION AND LANDSLIP
- **Objective**
  - To protect areas **prone** to erosion, landslip or other land degradation processes.
- **Strategies**
  - Identify areas subject to erosion or instability in planning schemes and when considering the use and development of land.
  - Prevent inappropriate development in unstable areas or areas prone to erosion.
  - Promote vegetation retention, planting and rehabilitation in areas prone to erosion and land instability.
- Landslip is dealt with under the **Erosion Management Overlay (EMO)**.



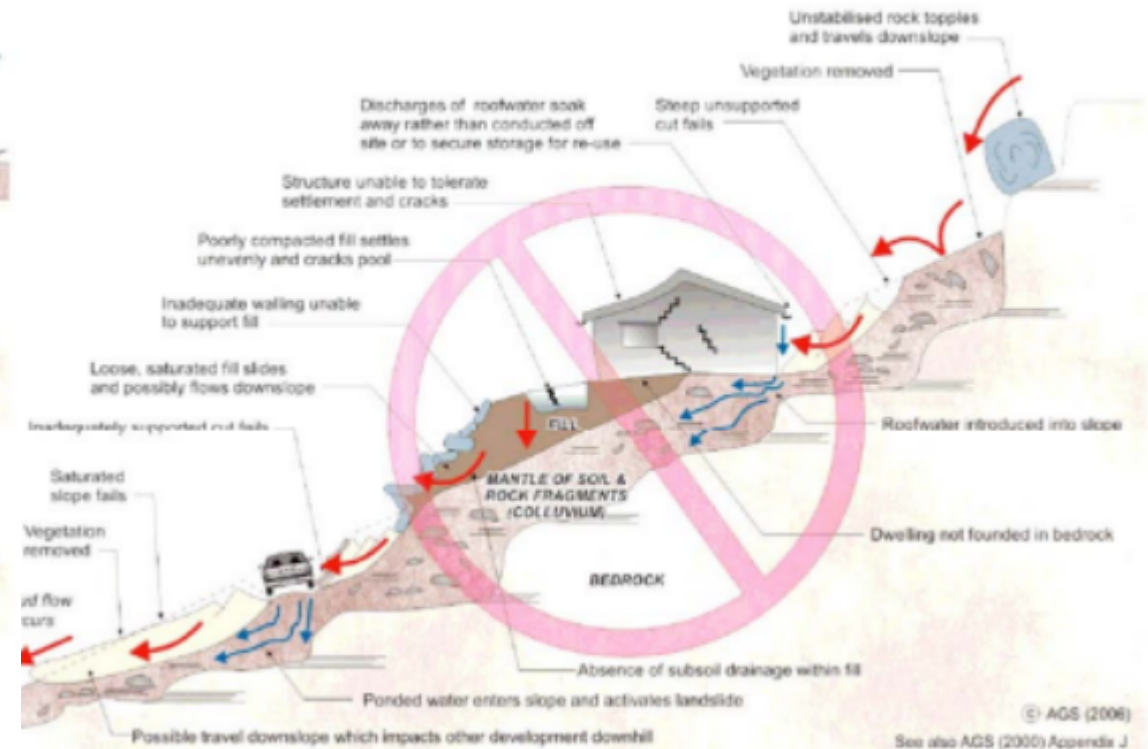
## How are landslide risks managed through the planning scheme?

- Identify and map all areas susceptible to landslides based on geology, slope angle and past landslide. This defines the Erosion Management Overlay.
- There are planning provisions or development controls that apply to proposed development in the overlay. These include:
  - Limiting earthworks that could destabilise landslide prone slopes.
  - Reducing the potential for water to infiltrate into the soil.
  - Ensuring landslide risk is assessed by geotechnical specialists with the objective of making sure development includes appropriate controls to maintain a tolerable risk.
  - Retaining vegetation where possible.
  - In some cases preventing development in areas where landslide risks cannot otherwise be reasonably managed through other controls, for example in channels prone to debris flow.

## EXAMPLES OF **GOOD** HILLSIDE PRACTICE



## EXAMPLES OF **POOR** HILLSIDE PRACTICE



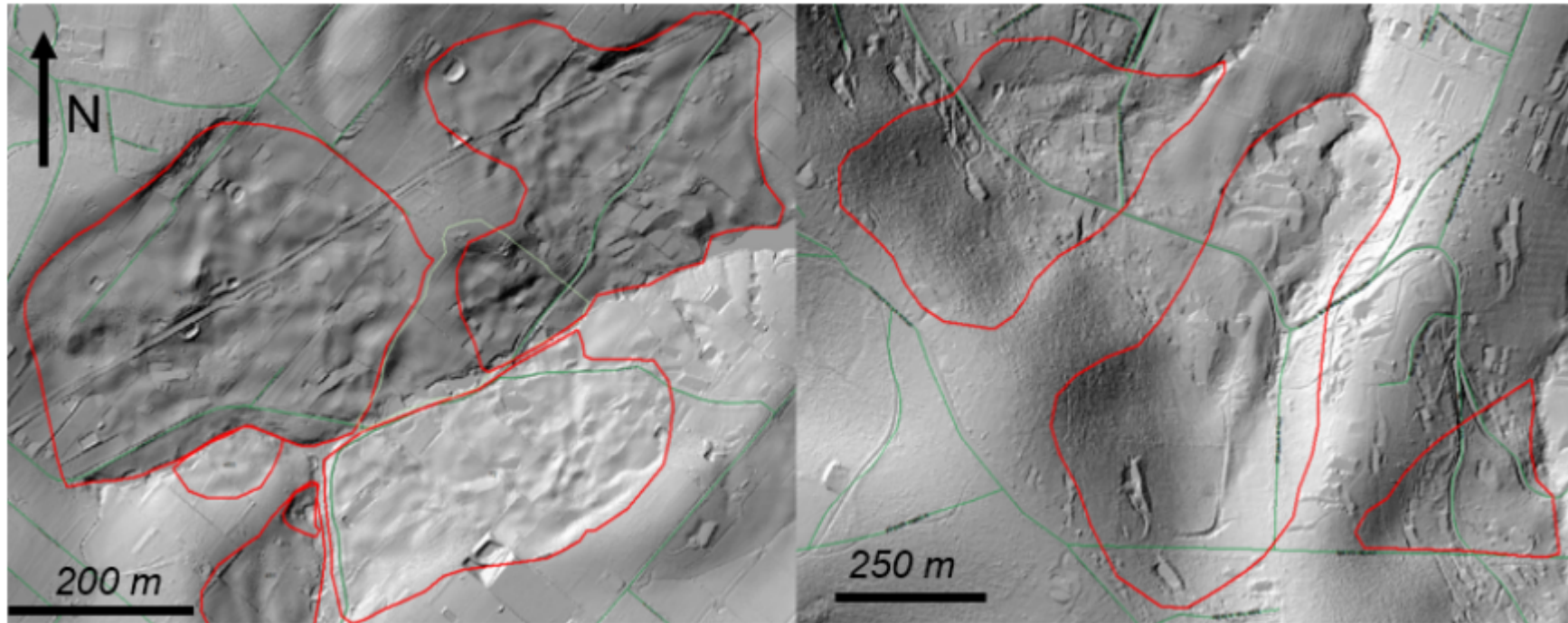
## Landslide susceptibility mapping – previous technology



Used to indicate areas susceptible to landslide



## Previously unmapped landslides identified from LiDAR

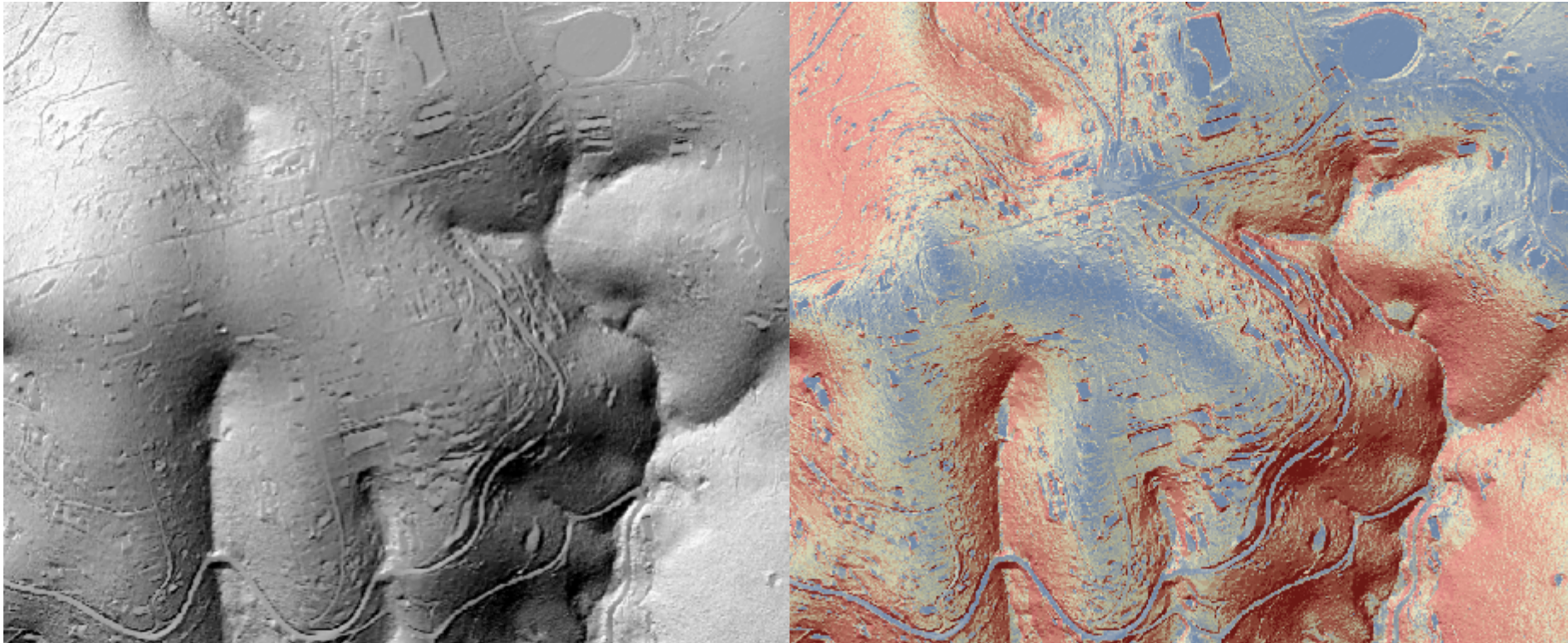


Sharp features – more recent or active

Subdued features – less active

## Current mapping technology – improved measure of slope angle

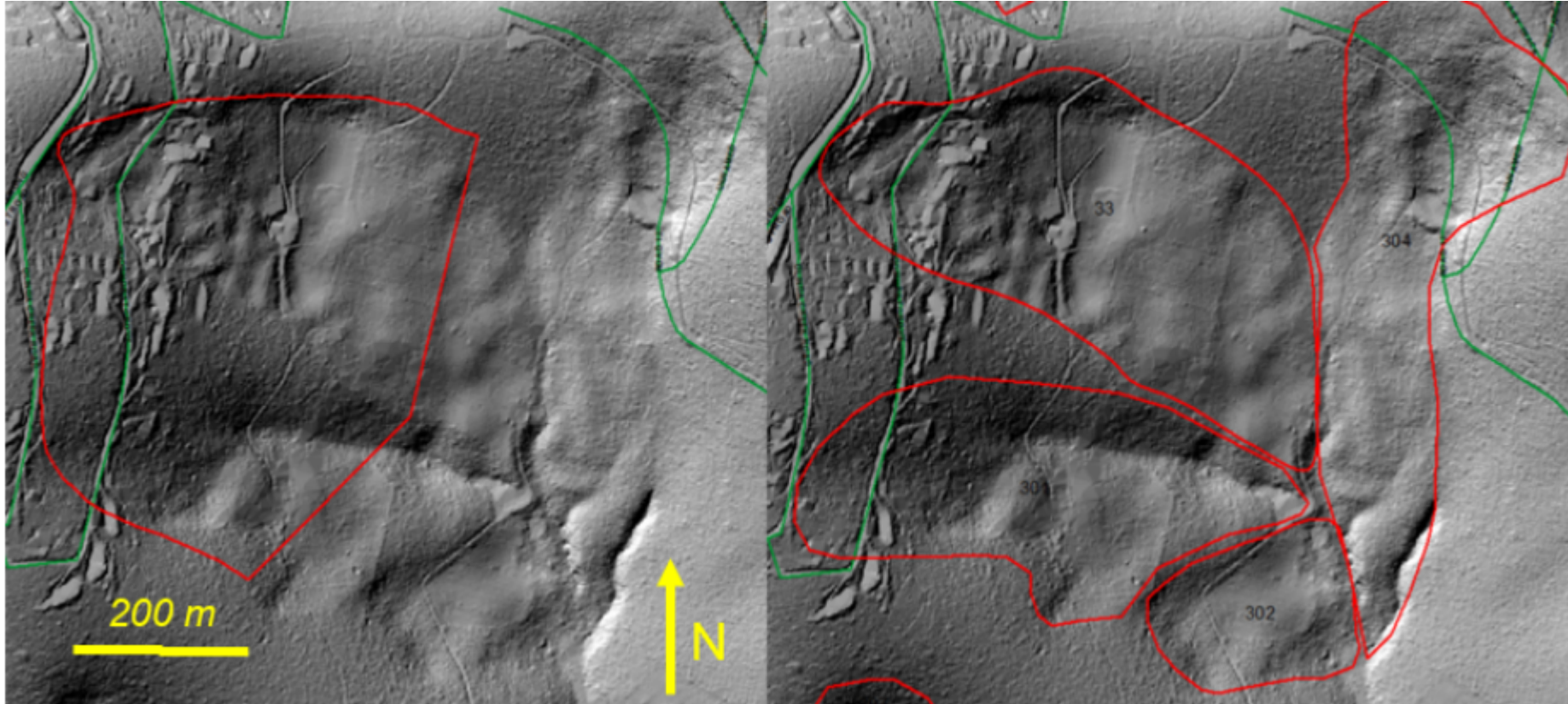
Current (2015/2017) LiDAR technology allows improved application of susceptibility criteria and mapping of EMO extent.



Olinda township. High resolution, 1m elevation grid



## Updated to landslide inventory



Previous mapped

Revised mapped

Woodhurst Grove, Kalorama



## Landslide susceptibility mapping to define EMO extent

- The inventory informs what landscape attributes are susceptible to landslide.
- Landslide susceptibility and the extent of an EMO mainly relates to:
  - Geology
  - Slope angle
  - Known history of instability
- The EMO extent is based on criteria relating to these attributes.
- Landslide triggers or causal factors can include rainfall, leaking services, earthworks, earthquakes .

# Thredbo Landslide

