

SPECIAL CASE - DISPERSIVE SOIL

WHAT IS THIS?

Dispersive soil forms a dissolved slurry when it comes into contact with fresh water due to an imbalance in soil chemistry. This type of soil is also known as sodic soil because of a high sodium content: >6% exchangeable sodium. If this soil is disturbed during development and exposed to rain and runoff, soil dispersion and collapsing can result (Figure 9), which can lead to tunnel and gully erosion which is difficult and costly to repair. Building activities such as excavation, topsoil removal, and ponding of rainwater all increase the risk of initiating tunnel erosion. Dispersive soil has a patchy distribution but is particularly prevalent in southern Tasmania. Because this type of erosion is difficult to combat, it is important to know if your site contains dispersive soil, and to protect this soil from disturbance or exposure to water.

WHY IS MANAGING DISPERSIVE SOIL IMPORTANT?

Preventing exposure of dispersive soil is important to protect infrastructure and the surrounding environment. Exposing dispersive soil to runoff may result in the formation of rills which can quickly enlarge to form deep surface gullies or invisible underground tunnels. When underground tunnels collapse, they can result in surface slumping, which can undermine foundations, resulting in damage to buildings, roads and service infrastructure, septic systems, and increase environmental and public health risks.

The runoff from areas of disturbed dispersive soil will contain large amounts of clay and will appear cloudy and turbid. Because it is extremely fine, it is very difficult to remove this clay without the addition of chemical coagulants or flocculants (see page 77). If this runoff enters local waterways, it will reduce light levels and decrease water quality causing environmental harm.

WHAT DO I NEED TO DO?

Before starting site works:

The presence of dispersive (or sodic) soil must be identified at the planning permit stage via the Tasmanian government LISTmap layer 'Soil Vulnerability - Sodicity Hazard', and/ or by a qualified soil specialist. The approved plans must accurately show areas of dispersive soil on the site. Development should avoid areas of dispersive soil and minimise disturbance to topsoil and vegetation in these areas, including excavation and subsoil exposure.



Managing your site for dispersive soil:

- ▶ Avoid concentrating water flow over the areas of dispersive soil shown on the plans. Divert runoff into specifically designed sediment control systems where the soil is not dispersive, or where the ground has not been disturbed and sufficient vegetation is present. Remember dispersive soil can be very patchy in distribution.
- ▶ When diverting runoff where dispersive soil is present, **DO NOT** disturb the ground – **DO NOT** dig drains or create soakage pits. Create 'above-ground' diversion berms/banks on top of the ground with suitable material or topsoil to create banks upslope of areas of dispersive soil. This maintains grass in the diversion area and reduces infiltration directly to the subsoil.
- ▶ Immediately infill any trenches or holes required for construction to prevent collection and ponding of water on subsoil surfaces.
- ▶ Always compact dispersive subsoil that has been disturbed or excavated. Dispersive soil requires above-average compaction. Consider using a 'whacker packer' for small areas or a 'sheep's foot roller' for large areas.
- ▶ If the soil pH is > 6.5 , top dress the surface of potentially dispersive soil with gypsum, or if the soil pH is < 5 , dress with lime. If soil pH is within the range of 5 to 6.5, use a mix of both gypsum and lime. If unsure, contact a soil specialist for advice.
- ▶ Cover dispersive soil with a minimum 100mm layer of nondispersive soil and bury subsoils prior to revegetation.
- ▶ If the approved plans showing the location of dispersive soil on-site are not consistent with site conditions, have them reviewed and revised by a suitably qualified person before proceeding with work.

Note: Covering dispersive soil directly with rock or another permeable material, which will allow water to continue to contact the problematic soil will NOT fix the problem. Dispersion and tunnel erosion is likely to continue. You can seek further information and advice on the issue of dispersive soil and tunnel erosion from the council, a geotechnical expert, soil scientist, or engineer.

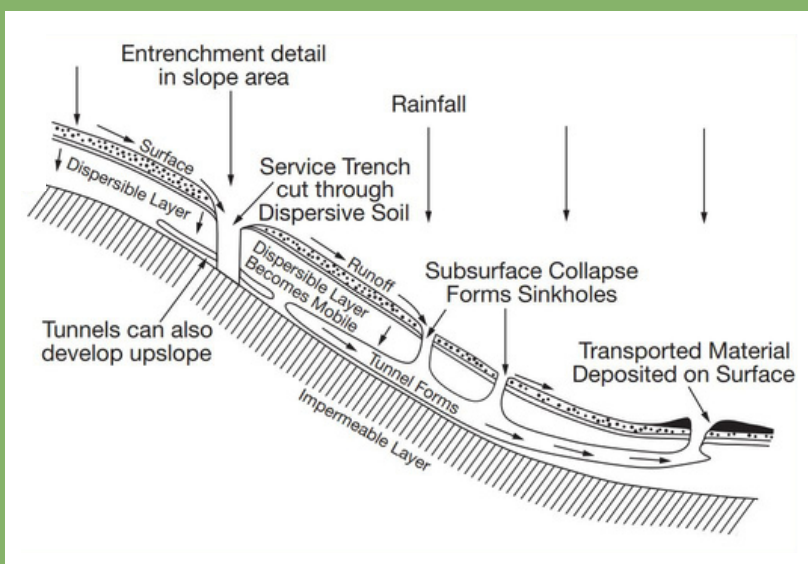


Figure 9: Cross-section illustration of how tunnel erosion can occur in dispersive soil when exposed to rain and runoff. *Figure modified from 'Field Erosion its Characteristics and Amelioration', Boucher (1990).*