It is engineering best practice that the construction of earth formations (fills) should be free of organic material. Organic material, such as tree stumps and roots, surface vegetation (grass and scrub), slash and branches, and topsoil is unable to be compacted, decays over time, and can be a point of water entry, resulting in weak and unstable fills that may collapse.

Regulation 30 (1) of the NES-PF requires that fill must contain no more than 5% (by volume) of vegetation and wood.
Earthworks Construction
1.2 Clearing and Stripping

Scope
This guide covers preliminary earthworks processes of vegetation clearance and stripping. It also includes removal of trees from the road corridor and landing sites (road-line salvage) and stumping.

Where to use
Clearing and stripping must be carried out in advance of all bulk earthworks including cut and side-cast, and cut and bench formation (refer to FPG EC #3 Bulk Earthworks) and full bench construction (refer to FPG EC #4 Fill Placement and Compaction). The interrelationship with these other Forest Practice Guides should be considered, where appropriate, when developing earthworks prescriptions.

Borrow pits and overburden dumps should also be cleared and stripped of vegetation and organic material.

Excavator and bull dozer clearing stumps and stripping prior to bulk earthworks.

Excavators clearing vegetation and stripping topsoil ahead of landing construction.
Earthworks construction
1.2 Clearing and Stripping

Earthworks management
All clearing and stripping should be carefully planned and executed with attention to both the short and long term effects on potential soil erosion. Local conditions pertaining to the operation should be detailed on the earthworks prescriptions.

The extent of road-line salvage, site clearance and stripping should be determined as part of the planning and design process (refer to FPG EC #1 Planning and Design) and clearly specified in the road-line salvage and earthworks prescriptions provided to contractors.

Road-line salvage
The establishment of new harvest access roads into a forest typically requires the felling and removal of trees (roadside salvage). This is often carried out by a specialist harvesting contractor, prior to the earthmoving contractor taking possession of site.

Where separate harvesting and engineering contractors are engaged the hand-over of the site, from the harvesting to engineering contractor, on completion of the road-line salvage operation needs to be managed carefully. A site inspection should be carried out to confirm clearance widths are sufficient to construct the road or landing effectively.

Note: allowance needs to be made for cut and fill slopes.
Earthworks should not commence if insufficient trees have been cleared and there is a risk that the cut and fill batters will encroach into standing trees.
Health, safety and environmental considerations

The planning and execution of road-line salvage and clearing operations must consider safety and environmental impacts and not create or leave hazards that will affect future operations.

Hazards arising from road-line salvage and stripping operations are:

1. Poor placement of tree stumps on steep slopes where they may be dislodged by future log tree felling and extraction operations.
2. Leaving trees standing above landing sites or operational areas. These may present wind fall risk to road users and skid workers.

Place stumps and debris in a stable location where they will not interfere or cause safety issues for other forestry operations or have adverse environmental effects.
Summary of key requirements

1. Ensure the extent of road-line salvage and site clearing requirements is confirmed during the planning and design phase and these are clearly communicated in the relevant operational prescriptions. On steep sites ensure allowance is made for cut and fill batter slopes.

2. Ensure a forestry earthworks management plan for the site is in place prior to earthwork commencing – Refer to Schedule 3 of NES-PF.

3. For orange and red zone sites and all others on sloping ground the extent of cut and fill batters (plus buffers) should be marked on the ground prior to road-line salvage and site clearing commencing.

4. Prior to earthworks commencing ensure that required (sufficient) trees have been removed to enable safe construction of the road or landing.

5. Choose the right machinery size and combination for the terrain, stump size and soil type. Excavator/dozer combinations can work best.

6. Strip all organic matter, including top soil and stumps, prior to constructing the road or landing, to minimise the vegetation and wood within the fill.

7. Place stumps on flat stable ground or a secure bench or beyond the toe of fills. Where there is no suitable placement option, cart to a safe disposal site.

8. Keep stripped material away from water bodies or any restricted areas.

Maintenance

Not applicable, as clearing and stripping is the first step in constructing a road or landing.

National Environmental Standards for Plantation Forestry

Relevant regulations for earthworks are 25 – 35.

Contact

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Other Practice Guides in this series

- 1.1 Planning and Design
- 1.2 Clearing and Stripping
- 1.3 Bulk Earthworks
- 1.4 Fill Placement and Compaction

Visit: https://docs.nzfoa.org.nz/forest-practice-guides/ to view all guides