5. Forest infrastructure

It is likely that there are existing roads within your forestry operations area. This section outlines what the Code requires to ensure that existing roads are fit to be used for forestry activities.

It is better that construction of new roads is minimised but sometimes it is necessary. This is particularly so where construction of a new road will have less environmental impact than use of an existing road. If new roads are needed, this section will also provide guidance about where they should go and how to ensure that they are built to a suitable standard for forestry operations.

Steps to success

Step 1: Identify suitable existing infrastructure. Map on FOP.

Step 2: Identify any new infrastructure required. Specify location and design in FOP.

Step 3: Undertake road maintenance and construction.

Step 4: Ensure ongoing maintenance throughout the operation and keep a record in your FOP.

Step 5: When the operation is finished, make sure roads, tracks and landings are closed or maintained as required for ongoing property management.

5.1 Constructing and maintaining roads

The Code reference: 5.1

5.1.1 Road maintenance

The Code reference: 5.1(10)

Properly maintained roads reduce soil erosion and water pollution because the road surface is stable and drainage structures divert water to stable areas. Maintenance is also cheaper than either rehabilitation of degraded roads or new construction. Well maintained and drained roads can also be used sooner after wet weather.
Key principles

1. **Plan your road needs** to minimise disturbance and cost, and to maximise usefulness and longevity
2. **Use existing roads** rather than building new ones, where possible
3. **Maintain** as much **vegetation and topsoil cover** as possible
4. Keep roads as far **away from drainage features** as practicable
5. **Choose** the most appropriate **drainage structures** to ensure that water leaves the road with minimal erosion
6. **Avoid** steep slopes
7. **Maintain** road surfaces and drainage structures to avoid the risk of soil erosion and water pollution
8. **Seek expert advice** if you are unsure

---

**Note**

Time and effort spent on initial good design and construction will provide major benefits for many years to come.

---

5.1.2 Road design and location

Important considerations when planning the road network are:

- The location of timber resources
- The location and condition of existing roads
- Where new roads should be constructed
- The amount of traffic that will use the roads
- The slope of the land
- Environmental factors such as highly erodible soils, drainage features and environmental exclusions
Road Design

The characteristics of your property will affect road design.

» Flat or gentle conditions are easier to road than steep slopes
» Steep roads increase erosion and make it more difficult in effectively draining the road
» Stable soils are better to work with than erodible or dispersible soils

Road design will also be influenced by the amount of traffic which is expected.

» Truck traffic has a heavy impact on road condition
» The number of trucks using the road will guide the choice of road surface and road width
» Trucks, especially when fully loaded, have difficulty travelling on steep roads

Ask an expert

Road design can be challenging. If you are unsure about your obligations or how to design your road network, then you should seek the services of an experienced professional forester or engineer.

Road location

☞ The Code reference: 5.1(3)

Roads are best located close to the crest of a ridge and constructed with outfall drainage (Figure 5.1). This means that less construction effort is required and drainage will be easier to achieve. It also means that you will avoid steep topography.

If you can’t locate the road on or close to a ridge, then the best road location is the one which minimises the amount of earthworks and enables the most effective road drainage (Figure 5.2).
5.1.3 Road construction

The Code reference: 5.1

Road construction requires earthworks and vegetation clearing, both of which have the potential to result in environmental harm.

Construction of new roads must be minimised as far as practicable.
Construction methods

There are three main construction techniques for roads. Most road networks will use all three techniques:

**Minimal earthworks** – when roads are located on ridgetops or in flat or undulating conditions, minimal earthworks may be all that is required.

**Cut and fill (or side-cut)** – the most common technique (Figure 5.3). In sloping terrain, material is cut from hillsides and used to level out other areas. The cut batter should be made to a stable grade which depends on the soil type. The fill batter should be well compacted to avoid erosion and slumpage of the batter and loss of the road surface. Drains should be installed as the road is constructed and drains should be located where the fill batter is at the lowest height.

**Note**

Tree stumps or other woody debris must not be used to provide fill for road construction.

*Figure 5.3: Cut and fill road*
Clearing of vegetation

**The Code reference: 5.1(1,4&5)**

The Code requires that clearing of shrubs and trees for road construction and maintenance is minimised. Clearing should not be greater than 3 metres either side of the edge of the road prism (Figure 5.4). Cleared trees and debris must not be stacked in any landscape feature (defined in the Code 4.1(1), Table C) or any riparian buffer or exclusion zone.

*Figure 5.4: The road prism*

Maintaining groundcover

**The Code reference: 5.1(4)**

Groundcover can stabilise soils and prevent erosion and water pollution. Groundcover can be vegetation such as grass and herbs, but can include litter, rock and other material that protects the ground surface. The reintroduction of topsoil is critical for establishing ground cover.

Where clearing for road construction is wider than 3 metres from batters or drains, at least 70% groundcover must be established within 1 month of clearing.
How do I…

Assess groundcover?

At the assessment point, estimate the proportion of bare earth that is visible within a 5-metre-radius of where you are standing (Figure 5.5). This is best done by dividing the circle into four, estimating the proportion of bare earth in each quarter, then getting the average for the whole circle. Over a number of assessment points, calculate the average proportion of bare earth in the area. This average needs to be less than 30%.

Figure 5.5: Groundcover assessment

Opening existing roads

The Code reference: 5.1(15)

Existing roads may have overgrown. Established vegetative groundcover and stable road surfaces are good for preventing soil erosion and water pollution. When re-opening roads, clearing width and disturbance to drainage structures must be minimised to retain the benefits of the established vegetation.
5.1.4 Steep areas

Road grade

**The Code reference: 5.1(8)**

Roads must be constructed, upgraded and maintained with a maximum grade of 10 degrees. If a steeper grade will result in an improved environmental outcome (e.g. avoiding the need for a drainage feature crossing) or will mean avoiding difficult ground conditions (such as rock), then the road grade can be increased up to 15 degrees.

**FOP note**

If the road grade is over 10 degrees, then you must note it in the FOP.

**How do I…**

**Measure road grade or ground slope?**

Slope is measured using a clinometer or angle-measuring device (Figure 5.6). A clinometer has a sighting hole with a suspended circular scale within a metal case. Bring the device close to one eye and look into the sighting hole. With both eyes open, tilt the clinometer so that the line in the sighting hole is aligned with a point in the distance that is at the same height as your eye (this can be another person or a mark on a tree). Read off the slope on the degrees scale. 

*Figure 5.6: Measuring ground slope*
Ground slope over 25 degrees

**The Code reference: 5.1(18)**

There are significant environmental and structural issues with constructing roads on ground slopes greater than 25 degrees, therefore road construction should be avoided. If there is no other practical road location, sections of road over 25 degrees must be designed by a suitably qualified person.

5.2 Draining roads

**The Code reference: 5.1.1**

Forest roads, if not adequately drained, can erode and lead to land degradation and water pollution. Appropriate drainage structures and outlets built into new roads in the right locations, ensure that water can leave the road surface without causing damage or pollution.

5.2.1 Types of road drains

The type of drainage structures will depend on the type of road you have.

**Crossfall drainage**

**The Code reference: 5.1.1(1)(c&d)**

Crossfall drainage uses the slope across the road surface to direct water off the road surface. There are two types of crossfall drainage.

- **Infall drainage** directs water to a table drain and is generally appropriate for roads in hilly and steep land, or where safe road design requires it (Figure 5.7a).
- **Outfall drainage** directs water from the road surface to a stable road verge or shoulder (Figure 5.7b).

For effective crossfall, the slope of the road surface (from one side to the other) will be between 3 to 4 degrees (4% – 6%). This equals a 20 to 30 centimetre fall across a road 5 metres wide.
Figure 5.7: Examples of crossfall drainage

(a) Infall drainage

(b) Outfall drainage
Crowned roads

Wider roads and roads on level surfaces are often crowned. A crowned road is higher in the centre than on the sides. The road surface can then shed water in both directions, either to a stable road verge, or to a table drain (Figure 5.8). Generally crowning of roads requires a grader for construction, and requires regular maintenance in very dry or wet conditions unless the road has been sealed with a good quality gravel material.

*Figure 5.8: Crowned road*

Table drains

A table drain runs parallel with the road and captures crossfall water flow from the road surface. The water is then diverted out of the table drain and across the road at regular intervals using either a relief pipe, a rollover crossbank or a spoon drain. The maximum allowable distance of water flow in between table drains is specified in the Code 5.1, Table G.
**Mitre drains**

A mitre drain is constructed as a water exit point for crowned roads (Figure 5.9). Mitre drains must divert water onto a stable surface and should be spaced according to the Code 5.1, Table G.

*Figure 5.9: Mitre drain*

**Relief culverts**

*The Code reference: 5.1.1(8)*

Relief culverts divert water from table drains under the road surface to a safe exit point on the other side of the road (Figure 5.10). Relief culverts should not discharge onto fill batters unless the batter is protected from scouring. Pipes can be made from a variety of materials, including concrete, plastic and steel.

*Figure 5.10: Relief culverts*
Rollover banks

The Code reference: 5.1.1(6)

Rollover banks are a type of cross drain. They are a low mound constructed across the road surface, which diverts runoff from the road (Figure 5.11). They are a good way of draining roads with a low grade (less than 5 degrees) during timber haulage but can be difficult for trucks to negotiate on steeper grade roads. They are useful structures to build on completion of operations where use of the road in the future is planned. Rollover banks can be used with either infall or outfall drainage and must have an effective height of 15 centimetres.

Figure 5.11: Rollover bank

Spoon drains

The Code reference: 5.1.1(6)

Spoon drains are another type of cross drain. They are a shallow ditch in the surface of the road which works in a similar way to rollover banks (Figure 5.12). They are generally not as effective as rollover banks, and so are better used on flatter ground. Spoon drains can be used together with either infall or outfall drainage and must have an effective depth of 15 centimetres.
Figure 5.12: Spoon drain

How do I…

Measure effective bank height or depth for a rollover bank or spoon drain?

Put the end of a tape measure into the lowest part of the drain outlet (Figure 5.13). Hold the tape vertically and, using a string line held level with the top of the bank, measure from the string line to the lowest part of the drain. Where this line hits the tape is the effective height.

Figure 5.13: Measuring effective bank height
5.2.2 Where should drains be located?

**The Code reference: 5.1.1(3&7)**

The Code specifies the maximum allowable distance of water flow along roads according to the grade of the road (Table 4). The steeper the grade of the road, the more often runoff needs to be diverted from the road surface. Runoff must be diverted onto a stable surface, which will not erode. Runoff should not be diverted onto other roads, snig tracks, log landings and portable mill sites or other disturbed areas.

*Table 4: Maximum distance that water may travel along road surfaces and table drains*

**The Code reference: 5.1(Table G)**

<table>
<thead>
<tr>
<th>Road grade (degrees)</th>
<th>Maximum distance (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to ≤3</td>
<td>150</td>
</tr>
<tr>
<td>&gt;3 to ≤5</td>
<td>100</td>
</tr>
<tr>
<td>&gt;5 to ≤10</td>
<td>60</td>
</tr>
<tr>
<td>&gt;10 to ≤15</td>
<td>40</td>
</tr>
</tbody>
</table>

**Earth windrows**

Earth windrows along the road shoulder often result from road construction, maintenance activities and high traffic flow in very dry or wet conditions (Figure 5.14). In some instances windrows are effective in channelling water flow along the road shoulder above high fill batters, to prevent erosion from concentrated water flow. The water flow can be diverted from the road surface at a point where the fill batter is not as high. However, earth windrows must be cut through at regular intervals related to the grade of the road (Table 4) or removed from the road shoulder.
5.2.3 Sediment and erosion control

The Code reference: 5.1.1(7)

Drainage structures concentrate water. Therefore the exit point of the drainage structure must:

» Slow the water down – slowing water flow helps to prevent erosion

» Disperse water via silt traps or ground cover – this allows sediment and nutrients to be filtered out of the water and reduces pollution (Figures 5.15a&b)

What is a stable surface?

A stable surface is able to withstand erosion and damage from concentrated workflow. Stable surfaces at a drainage structure outlet include:

» Good ground cover (established grass and vegetation)

» Natural rock or artificially rocked surfaces

» Concrete

» Fill batter drop down structures
Figure 5.15: Examples of good outlet protection

(a) Establishing groundcover

(b) Artificially rocked surface

Figure 5.16: Example of poor outlet protection
Protection of fill batters and unstable surfaces

The Code reference: 5.1(6&7) & 5.1.1(8)

Fill batters are a high risk area for potential soil erosion.

To protect fill batters:
» Do not leave tree stumps and vegetation in fill
» Compact the fill with multiple passes of a dozer or roller
» Sow sterile or native grass to stabilise the face of the batter
» If the fill batter is higher than 1 metre, install a drop-down structure and dissipater at drainage outlets (Figure 5.17)

Protection of cut batters

Cut batters are also a risk area for soil erosion. To protect cut batters:
» Ensure the grade of the cut batter is appropriate for the soil type to avoid erosion or slumping
» Minimise disturbance above the cut batter (this will reduce water flow down the batter)

Figure 5.17: Drop-down structure and dissipater
5.2.4 When you’ve finished

The Code reference: 5.1(10&12)

At the end of the operation roads must be assessed for their ongoing use.

If not needed for ongoing property management, roads must be stabilised, have effective drainage structures put in place and be allowed to revegetate.

If needed for ongoing property management, roads must be maintained to remain stable with functional drainage structures and sediment controls.

5.3 Constructing and maintaining drainage feature crossings

The Code reference: 5.1.2

Crossings are where roads and snig tracks cross drainage features. Crossings increase the potential for erosion and water pollution. It is important that extra care is taken when dealing with drainage feature crossings.

Key principles
1. Minimise construction of new drainage feature crossings
2. Choose the right crossing type and design it to suit the circumstances
3. Avoid disturbing the banks and bed of watercourses to avoid changing the natural flow of the watercourse
4. Use construction materials that will not cause water pollution and will stay in place during storms
5. Stabilise any disturbed areas after construction and maintenance

Ask an expert

Seek expert advice if you are unsure about drainage feature crossings.
5.3.1 Crossing design and location

Design requirements

Crossing design

The Code reference: 5.1.2(3)

Crossings must be constructed at right-angles to the flow of water in the drainage feature wherever possible (Figure 5.18). In some circumstances using an angled approach may improve environmental outcomes, but this should be avoided.

Figure 5.18: Crossing approach at right angles

Crossing design must:

» Take account of the requirements of fish and other aquatic animals
» Limit disturbance to the stream banks and stream bed
» Limit changes to the natural flow of the stream

Design capacity

The Code reference: 5.1.2(6)

The design capacity of the crossing is a measure of its ability to convey and withstand the water flow from storm events of a particular size.

If the crossing is permanent it must be designed so that it can carry the water that results from a one-in-five-year storm event (i.e. the heaviest storm that can normally be expected in any five-year period). It must also be able to stay in place in the event of a one-in-ten-year storm event.
Crossing location

The Code reference: 5.1.2(2)

Crossings should be located where construction will cause minimal disturbance to stream banks, stream beds and natural flows. Drainage feature crossings should be minimised.

FOP note

Drainage feature crossings should be recorded in the FOP.

5.3.2 What types of crossings can be used?

The Code reference: 5.1.2(1)

Crossings must be stable causeways, culverts or bridges. Gully stuffers may be used if stable but must not be constructed.

Causeways

The Code reference: 5.1.2(8)

Causeways are a natural or constructed crossing that enables vehicles to cross a drainage feature with minimal disruption to the stream bed (Figure 5.19). The water flows over a causeway. Causeways must be constructed of non-soil material to minimise soil turbidity. For example crushed gravel, rock, bitumen, concrete or logs.

Figure 5.19: Causeway
**Culverts**

Culverts are constructed crossings that allow water to pass under the road formation (Figure 5.20). They are commonly constructed using round pipes with a layer of fill over the top of the pipe. This fill is compacted and leveled to form the road surface.

*Figure 5.20: Culvert crossing*

**Bridges**

Bridges are constructed over a watercourse, and allow the streamflow to pass under the structure (Figure 5.21). Generally, bridge timber (logs) can be accessed on-site. Bridges can be constructed with limited or no disturbance to the drainage feature banks or bed.

*Figure 5.21: Bridge*
Gully stuffers

New gully stuffers are not to be constructed under any circumstances. A gully stuffer is where logs, debris or soil material have been placed to fill a gully at the crossing point (Figure 5.22). There is limited capacity for water to exit along the natural stream course. Existing gully stuffers can be used if they are stable and require no additional maintenance work.

Figure 5.22: Gully stuffer

5.3.3 Crossing construction and maintenance

When constructing or maintaining crossings you must:

» Prevent erosion and water pollution
» Ensure fish and other aquatic animals can continue to travel up and down the water course
» Minimise changes to the natural flow of the stream and the shape and condition of the stream banks and stream beds
» Minimise disturbance to soil and streamside vegetation
» Not place fill material into the watercourse
» Store fill material outside the exclusion zone for the watercourse
Crossing and approach material

The material that is used on the crossing surface and on the approaches to the crossing must be stable so that it won’t be displaced during normal use of the crossing, or by the water flow resulting from a one-in-ten-year storm event.

The base of the crossing must be made of erosion-resistant material.

Disturbed areas

If the bed and banks are disturbed during construction and maintenance, they must be reshaped and stabilised as soon as possible. Stabilisation techniques can include the use of rock, gabions, reno mattresses, geotextile and revegetation.

Road drainage approaching crossings

Drainage feature crossings are critical sites for preventing sediment pollution of streams as roads can be a major contributor of sediment. Approaches to the crossing must be drained effectively at a point between 5 and 30 metres of the drainage feature crossing (Figure 5.23). This is to ensure that polluted water is prevented from entering the drainage feature at the crossing.

Figure 5.23: Draining crossing approaches
When you’ve finished

Crossings must be able to continue to withstand storm events and carry water without polluting after the operation is completed. It is important to decide whether the crossing will be removed (if it can be done safely), stabilised and put out of service or maintained for ongoing property management.

5.4 Snig tracks

The Code reference: 5.2.1

Snig tracks are used to transport logs from the harvest site to the log landing or portable sawmill site.

Extra care must be taken because snig tracks are subject to heavy machinery traffic, which results in increased ground and soil disturbance, and therefore a greater risk of soil erosion and water pollution.

Key principles

1. Use existing snig tracks and log landings wherever possible
2. Use walkover techniques
3. Maintain as much ground cover as possible
4. Minimise damage to other trees and vegetation
5. Retain logging slash including bark and tree heads on snig tracks
6. Avoid drainage feature crossings if possible
7. Avoid steep slopes wherever possible
8. Maintain drainage structures
5.4.1 Snig track design, location and layout

The Code reference: 5.2.1(6,7&11)

The location of snig tracks should reflect the location and distribution of log landings or portable sawmill sites in relation to the location of timber resources.

Consider the number of snig tracks needed:

Too few: higher machine costs (have to travel further for logs) and more potential for concentrated soil damage and compaction

Too many: higher construction costs and greater widespread disturbance

Use an uphill snigging pattern wherever possible

Downhill snigging patterns are a greater erosion risk because they concentrate water and are harder to effectively drain

Downhill snigging is unsafe

Where downhill snigging is necessary, ensure snig tracks enter the log landing from the side or from below to prevent runoff discharging onto the log landing site

Locate tracks where the groundslope allows them to drain naturally

Avoid drainage feature crossings wherever possible

5.4.2 Construction and maintenance of snig tracks

Environmental protection

The Code reference: 5.2.1(2)

Avoid groundcover and soil disturbance and soil exposure when constructing, maintaining and using snig tracks.

Snig tracks must not be constructed or used within exclusion zones or riparian buffer zones except where explicitly permitted by the Code 4.4(2).
Walkover extraction

Walkover extraction is where harvesting machinery extract logs without the need for earthworks, and without removal of underlying soil and vegetation (Figure 5.24). This is the preferred technique, as it reduces the need for snig track construction.

Figure 5.24: Slash retention for walkover extraction

Re-opening old snig tracks

✏️ The Code reference: 5.2.1(4&5)

Minimise soil and vegetation disturbance. Old snig tracks must not be re-opened and used if they cannot be drained properly.

Note

During all forestry operations, the use of bulldozer and skidder blades should be restricted to the minimal removal of obstructions (which include logs, tree heads and rocks) and the construction or maintenance of drainage.
Steep areas

The Code reference: 5.2.1(10)
Snig track grade must not be greater than 25 degrees except where the Code allows it for improved environmental outcomes. If the track is greater than 25 degrees:
» It must improve the environmental outcome (compared to alternatives)
» It must not be greater than 28 degrees
» Effective drainage must be achieved
» It must be less than 75 metres long

FOP note
If the track grade is greater than 25 degrees, you must note it in the FOP.

5.4.3 Draining snig tracks and log landings

Where should drains be located?
The Code reference: 5.2.1(14)
Drainage structures must divert water onto a stable surface such as ground cover that can withstand concentrated workflow without eroding and can trap sediment.

Snig track drainage spacing
Table 5 specifies the maximum allowable distance of water flow along snig tracks, which is dependant on the snig track grade. The steeper the grade, the more often runoff needs to be diverted from the snig track. Runoff must be diverted onto a stable surface, which will not erode. Runoff should not be diverted onto other snig tracks, roads, log landings and portable mill sites or other disturbed areas.
Table 5: Maximum distance that water may run along snig and extraction tracks

**The Code reference: 5.2.1(15), Table H**

<table>
<thead>
<tr>
<th>Track grade (degrees)</th>
<th>Maximum distance (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to ≤5</td>
<td>100</td>
</tr>
<tr>
<td>&gt;5 to ≤10</td>
<td>60</td>
</tr>
<tr>
<td>&gt;10 to ≤15</td>
<td>40</td>
</tr>
<tr>
<td>&gt;15 to ≤20</td>
<td>25</td>
</tr>
<tr>
<td>&gt;20 to ≤25</td>
<td>20</td>
</tr>
<tr>
<td>&gt;25 to ≤28</td>
<td>15</td>
</tr>
</tbody>
</table>

**Size and types of snig track drainage structures**

**Snig track drainage techniques**

**The Code reference: 5.2.1(15)**

Snig tracks can be drained using any of the following techniques:

- Retain the existing groundcover using **walkover** techniques
- Retain or install slash and harvesting debris on snig tracks
- Construct or maintain **outfall drainage** on the snig track
- Construct **crossbanks**

**Crossbanks**

**The Code reference: 5.2.1(17&18), 5.2.2(5)**

Crossbanks must have an effective height of at least 35 centimetres if the soil has not been compacted, or 25 centimetres if the soil has been compacted (Figure 5.25). As a guide, crossbanks should not be higher than 50 centimetres.

A crossbank must be constructed between 5 and 20 meters of a drainage feature crossing.

They must be constructed from earth, rock or gravel, without any bark or organic material, although bark and other forest debris can be retained on snig tracks between drainage structures.
5.4.4 Snig track crossings

The Code reference: 5.2.2

When planning the location of snig tracks, the number of crossings must be minimised.

Machinery must not cross a drainage feature which has running water or when the soil is saturated, except by means of a stable crossing.

The types of snig track crossings that can be used include stable causeways, culverts or bridges. Existing, stable gully stuffers can be used; however, no new gully stuffers can be constructed.

The snig track approach must be as close as possible to right angles to the flow of water.
When you’ve finished

The Code reference: 5.2.1(16), 5.2.2(7)

The most important action is to install effective drainage. This should occur immediately, and must occur within two days unless the soils are saturated. Effective drainage is either crossfall drainage, or crossbanks at the spacings specified in Table 5.

If practical, you must reshape the snig track to remove all earth windrows, wheel ruts and log furrows. Recoverable topsoil must be spread back over the surface of the track to assist revegetation.

Note

It is recommended practice to drain snig tracks progressively as you complete operations in any particular area. Therefore you should install effective drainage on a specific snig track when you have finished using it.

Parts of the snig track approaching crossings must be reshaped to match the original natural ground surface as closely as possible. If vegetation groundcover will not grow back naturally, a suitable sterile seed or native seed with fertiliser must be sown to establish effective groundcover.

5.5 Log landings and portable mill sites

The Code reference: 5.2

Log landings and portable sawmill sites are used to sort, process and load logs or sawn wood onto trucks for transport.

Extra care must be taken in these areas because they are subject to heavy traffic. This results in increased ground disturbance and water runoff, and therefore a greater risk of soil erosion and water pollution.
5.5.1 Design and location

Size

 água The Code reference: 5.2(2) água
Log landings and portable sawmill sites must be no larger than the minimum size necessary for efficient operations.

The size of log landings and portable mill sites should cater for:

» safe operation of harvesting and loading machinery and trucks
» the amount of truck traffic using the site
» the volume of logs and/or timber which is expected to be serviced, processed and loaded on the site
» any relevant environmental requirements

Location

 água The Code reference: 5.2(1&5) água
Wherever practicable, log landings and portable mill sites must be located on ridge-tops. Consider the location of existing roads, snig tracks and timber resources.

Log landings and portable sawmill sites must be located at least 10 metres away from any exclusion or riparian buffer zone.

Managing water flow

 água The Code reference: 5.2(4&6) água
Log landing and portable mill sites must be located and constructed to ensure that they drain naturally using crossfall. Runoff must be diverted to a safe point where it can discharge onto established vegetation away from any drainage feature.
Debris management

**The Code reference: 5.2(7,8&9)**

Large volumes of tree waste and sawdust are generated at log landings and portable sawmill sites. This waste can:

» Create a fire risk
» Affect soil quality
» Lead to water pollution

This tree waste and sawdust must be removed as harvesting operations progress, and be distributed through the harvest area in small volumes. The waste must not be stacked against any retained trees, as this creates a fire risk that could result in the tree being damaged or destroyed.

Vegetation and debris from these sites must not be deposited in a riparian exclusion zone or riparian buffer zone.

When you’ve finished

**The Code reference: 5.2(10)**

Any topsoil that has been removed from the log landing or portable sawmill site must be respread from the stockpile over the site at the completion of harvesting.

The site must be drained and reshaped so that water runoff can safely disperse from the site into surrounding undisturbed vegetation.

5.6 Using forest infrastructure

Forest infrastructure is subject to heavy use by trucks and harvesting equipment which can result in rapid deterioration, particularly in wet conditions. The Code addresses this by identifying circumstances when forest infrastructure cannot be used.

**Key principles**

1. **Avoid** operating in *wet weather*
2. **Maintain** stable and effective *drainage structures* and surfaces
3. **Choose** the right machinery
4. **Remedy damage** to infrastructure as soon as possible
5.6.1 Wet weather limitations for forestry operations

The Code reference: 5.2.3

Harvesting on wet and saturated soils is likely to cause environmental harm and damage to forest infrastructure (Figure 5.26). The Code includes specific limitations for operations.

General harvesting limitations

The Code reference: 5.2.3(1)

Harvesting operations must not occur when:

» There is runoff from the snig track surface
» Soils are saturated
» Soil is rutted to a depth of more than 200 millimetres below the track surface over a 20-metre section or longer

Figure 5.26: Consequences of using roads in wet weather

rutting more than 200mm
Seasonality limitations within the Northern Rivers Catchment Management Authority Area

The Code Reference 5.2.4

The Code for Northern NSW incorporates specific operating conditions for some areas in the Northern Rivers Catchment Management Area:

» from the beginning of December to the end of March each year
» where the rainfall erosivity is 6,000 or greater
» where groundslopes are 20 degrees or steeper.

In these circumstances, forestry operations involving machinery that causes ground disturbance must not occur unless:

» only one snig track or extraction track, extending from felling operations to a log landing is open and in use at any one time
» drainage structures are immediately installed on those snig tracks or extraction tracks or sections of these tracks and
» drainage structures are installed at the end of each day of operations for each snig track and extraction track that has been used during that day.

The EPA will provide landholders affected by this clause with a property scale map detailing the exact areas on their property where rainfall erosivity is equal to or greater than 6000.

5.6.2 Maintaining Stable Surfaces

Blading off

The Code reference: 5.1(17) & 5.2.1(9)

Blading off must not be undertaken under any circumstances. It is a technique where the wet, soft, top layer of a road, snig track, log landing or portable sawmill site, is removed using a grader or bulldozer, to reveal a firm surface underneath. Blading off results in greater water
concentration, soil compaction, progressive degradation and environmental harm and can mean that the road is impossible to effectively drain.

**Impacts of log trucks on roads**

*The Code reference: 5.1(13)*

Log trucks are heavy and can easily damage poor road surfaces.

Trucks cannot use forest roads where the surface of the road has broken down (Figure 5.27). Road surface breakdown is defined as rutting of more than 150 millimetres deep for a distance of more than 20 metres.

*Figure 5.27: Example of road surface breakdown*

Trucks cannot use natural surface roads where there is water runoff from the road surface, as there is an increased risk of soil erosion. If the truck is already loaded or partially loaded, it can travel to its destination using the road.

**Note**

If there is any water runoff from the log landing, all machines must remain stationary. You can still use forwarders, excavators and truck-mounted loaders to load trucks, but these machines must remain stationary. The only exception to this is if the log landing is constructed of gravel or other stable material.