

# Guide to Watercourse Crossings

## Background

Watercourse crossings (pg 97) are used to provide access over or through a watercourse or waterbody.

There can be either permanent or temporary watercourse crossings that occur on haulage roads, tracks and extraction tracks.

Watercourse crossings can include bed level crossings such as fords, culvert crossings, bridges and temporary culvert crossings.

This guide provides assistance on the types, design, construction and decommissioning of watercourse crossings in Queensland Native Forest Operations.

## The QPWS Code

The Code of practice for native forest timber production on Queensland's State forest estate 2020 (QPWS Code) is the core management document for watercourse crossings in native forest operations in Queensland.



The QPWS Code refers to various operational schedules which are relevant to watercourse crossings.

## Objectives of the Guide

- Protect the watercourse including vegetation, beds and banks
- Protect soil stability and risk of erosion
- Protect water quality
- Minimise the number of crossings
- Use existing crossings (where possible)
- Ensure crossings have the least environmental impact
- Prevent unnecessary crossing and disturbance
- Provide assistance in managing watercourse crossing (including construction and decommissioning)

*All page references used throughout this document (e.g. pg 75) are for the QPWS Code*



## Location of Crossings

Watercourse crossings can exist on the following:

- Roads or haulage roads
- Access and haulage access tracks
- Machine extraction and snig tracks (major and minor)

The location of the watercourse crossing, coupled with the following factors may impact where the crossing can be located, or trigger additional management actions:

- Land tenure
- Cultural Heritage sites

- Water Protection Zones
- Protected Plants High Risk Area
- Road classification and ownership
- Other Operational Harvesting Plan management actions and
- Additional Legislation

This guide should be read, in conjunction with other contractual documents (OHP) and [Timber Queensland content guides](#) on road construction and maintenance, haulage, working with road managers, etc.

## Types of Crossings

### Permanent Crossings

#### Bridges and Culverts (pg 54)

Bridges and culverts are the preferred method of crossing watercourses and should be designed and engineered to have structural integrity.

Bridges and culverts must:

- Provide water and soil protection and stability
- Prevent water from ponding upstream
- Be adequate size to withstand a 1 in 5 rainfall event
- Allow passage of aquatic animals

When installing and constructing bridges and culverts, load limits and approaches should be considered for a range of haulage and float configurations.

#### Causeways and Fords (pg 54)

Causeways and fords can be used as crossings points when used occasionally. These normally occur during periods of low or no flow.

They can be used where:

- The site is naturally stable
- Land and watercourse structure allow for crossing
- Installation can occur at bed level height
- Located at the same upstream-downstream gradient as the watercourse

Approaches must be gravelled, stabilised or have cordouroy installed to minimise turbidity.



## Temporary Crossings

Temporary crossings (pg 54) are the likely scenario for native forestry in Queensland, due to lack of resources and existing infrastructure. Although, where possible should be minimised and permanent crossings should be used.

Temporary culverts and log/corduoy crossings are to be removed after use and the site must be stabilised (pg 54).



## Culverts (pg 54)

A temporary culvert is a drainage structure that allows water to be channelled under or across the road and is temporary in nature and is removed and stabilised (pg 63, 54).

Use a temporary culvert if the crossing will be used when water is flowing, to avoid threat to water quality, beds and banks and soil stability (pg 54).

A temporary culvert can be constructed using different sizes of culverts or conduits.

## Log/Corduoy Crossings (pg 54)

Log crossings (also referred to as corduroy) crossings can be used, although should be minimized.

The crossing should be gravelled, rocked or corduroyed using logs to bed level height (pg 54) including the approaches, but can not involve earth fill.



## Management of Watercourse Crossings

### Reopening (pg 57)

Existing watercourse crossings can be reopened - providing the design, location and drainage are to The Code standards, including stabilising requirements.

If existing crossings are washed out, or show potential instability, then these must be stabilised and protected, or otherwise avoided.

**Remember to minimise the number of watercourse crossings.**



## Consider During Design

- What is the type of watercourse requiring crossing? The type of watercourse will determine the most appropriate crossing structure. *For example, a permanent stream might require a bridge.*
- Is native vegetation clearing required to complete watercourse crossing construction?
- Can disturbance to the environment, including the watercourse beds and banks be minimised in the proposed location?
- Is the proposed design of watercourse crossing capable for accommodating the target traffic? (pg 54)

## Key Design Elements

- Locate in straight sections of the watercourse with low and stable bank formations (pg 54)
- Cross at right angle to flow direction (pg 54)
- Crossings must be further than 10m from head scarp protection (pg 35) and signs of erosion
- Water Protection Zones (WPZ) must be considered

**Seek input and permission from DAF prior to construction or reopening of watercourse crossings (pg 55)**



## Construction [pg 55, 56, 57]

- Excavators are preferred plant type for crossing construction
- Clearing must be avoided. If required permission must be sought.
- Clearing is confined to the crossing alignment and trees are felled away from the watercourse
- Minimise disturbance to bed and banks and stabilise after construction
- Avoid pushing spoil and debris into watercourses
- Machinery is not used in the watercourse unless essential, then confined within the alignment, whilst considering WPZs

- Approaches to crossings must provide drainage diversion to vegetation and sediment traps, so unfiltered water doesn't flow into watercourses
- There must be drainage and diversions on the approaches of watercourse crossings (pg 34)
- Bed and banks are stabilised after construction

- Avoid deep box cuts and poorly designed drainage
- All watercourse crossings will be accessed through adjoining buffer and filter strip vegetation
- Other schedules within the code are adhered to, including Schedule 13 and 15 (pg 55)



### During Forest Operations

- Excessive turbidity from traversing in poor conditions and lack of gravel or stabilization at the approach of the crossing (pg 54)
- Crossings across streams and gullies, major snig track or minor snig track crossings on u-shaped gullies must be marked (pg 34)
- Tracked snigging machines are not to operate within the Filter Zone, except for at designated crossings (pg 35)
- Machinery is not used in the watercourse, and ensure that buffer and filter water protection zones are adhered to (as per Schedule 3)

#### Acknowledgments

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#### Disclaimer

Information provided in this document is for general guidance only, it does not replace Commonwealth and State Government legislation. This field guide has been developed for Queensland state forests, however some of the information and controls may assist private native forestry operations to meet legal obligations.

### Temporary Closure & Decommissioning (pg 58)

When watercourse crossings are not required on a temporary basis (e.g., wet season) materials used for temporary access will be removed.

When Watercourse crossings are no longer required they must be stabilised, rehabilitated, and allowed to regenerate as follows:

- Removed unless their presence does not pose a threat and/or removal will create greater damage than retention
- Recovery of materials is permitted, provided materials recovery does not result in environmental harm (pg 58)
- Bed and bank contours must be reinstated and stabilized (pg 58)
- Watercourse approaches must be drained and stabilized (pg 58)