

Code of practice for native forest timber production on the QPWS forest estate 2014 / Prepared by: Operational Support, Queensland Parks and Wildlife Service, Department of National Parks, Recreation, Sport and Racing

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Recreation, Sport and Racing

**Code of practice for native forest timber
production on the QPWS forest estate
2014**

Great state. Great opportunity.



Queensland
Government

Prepared by: Operational Support, Queensland Parks and Wildlife Service, Department of National Parks, Recreation, Sport and Racing

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September 2014

Summary

This Code was developed in the context of contemporary State forest management in Queensland.

The Parties

The Queensland Parks and Wildlife Service (QPWS), a division of the Department of National Parks, Recreation, Sports and Racing (DNPRSR), is the custodian of the QPWS forest estate (State forests and timber reserves).

Forest Products, a business unit within the Queensland Department of Agriculture Fisheries and Forestry (DAFF Forest Products), is responsible for commercial harvesting and the sale of the State's native forest timber resources.

Background

The Code of Practice for Native Forest Timber Production on the QPWS Forest Estate 2014 (the Code) prescribes environmental management standards for timber harvesting on the QPWS forest estate. This Code addresses the harvesting of timber products such as sawlogs, poles, piles, girders, sandalwood, landscaping, fencing timbers and other timber products.

The Code is a key element in implementing ecologically sustainable forest management (ESFM) across the QPWS forest estate in accordance with relevant national and State policy for native forests.

The Code has been developed through a process of review and consultation with government, industry and community groups and technical specialists.

The Code is focused on prescribing operational standards to achieve a high level of protection of environmental values (including endangered species, their habitat, water quality, soil properties, and ecological processes).

Code Linkages

The Code also establishes links with the National Forest Policy Statement 1992 (NFPS) and various State government forest policy outcomes, environmental commitments and planning instruments. The Code addresses regional ecosystem (RE) management, threatened species management and cultural heritage management.

The maintenance of a native forest structure and ecosystem function following harvesting, as promoted by the Code, contributes to the maintenance of water, carbon and other nutrient cycles through the ability of native forests to naturally regenerate and through the long term storage of carbon provided by forests and by timber products.

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1. Introduction

Defining the Code's purpose, application and management responsibilities

1.1 Background

The Forestry Act 1959 provides for the reservation, management, silvicultural treatment and protection of State forests and the sale of forest products on State lands, including the QPWS forest estate's State forests and timber reserves.

On State forests, the cardinal principle of management is the permanent reservation of areas for the purpose of providing timber and associated products in perpetuity and protecting a watershed therein, having due regard to:

- conservation of the soil and the environment;
- benefits of permitted grazing; and
- the possibility of applying the area to recreational purposes.

The State's forests are managed for multiple use according to the principles of ecologically sustainable forest management (ESFM) consistent with the NFPS.

Multiple use management is the management of diverse forest uses and values. It covers timber and other forest products, as well as conservation of the forest environment, water catchment and soil protection, wildlife habitat, landscape, wilderness, genetic resources and diversity, recreation, scientific study and education. Such management must be dynamic and does not necessarily imply fixed priorities of use on any particular area nor, that any particular areas must simultaneously provide all products and values at all times. Maintenance of these uses and values requires that forest management is consistent with the principles of ESFM.

ESFM must be applied to all aspects of timber production and all tenures to:

- maintain, or where necessary, enhance ecological and evolutionary processes within forests;
- maintain, or where necessary, enhance the biological diversity of forests, from species to landscapes; and
- optimise the net social, economic and cultural heritage benefits derived from a mixture of forest uses, within ecological constraints, while maintaining options for the future use.

Guiding principles for ESFM are:

- 1 the maintenance, protection or, where appropriate, the enhancement of biodiversity, productive capacity, sustainability and health of forest ecosystems, soil and water resources, forest contribution to global carbon cycles, long term, social and economic benefits, and natural and cultural heritage values. The enhancement of biodiversity may be achieved through appropriate planning strategies.
- 2 where appropriate, apply the precautionary principle for the prevention of environmental degradation.
- 3 prevention or mitigation of impacts, on-site and off-site, of forest management practices, which are, or may be deleterious.
- 4 protect Indigenous cultural heritage and ensure participation of Indigenous peoples in all aspects of forested land management and planning.

The NFPS to which Queensland is a signatory, provides a framework for ecologically sustainable management of native forests for the broad range of commercial and non-commercial benefits and values that forests can provide to present and future generations. It requires that management planning and management of forests should maintain, to the maximum extent practicable, options for the full suite of forest values for present and future generations. Timber production is one such value providing the community with products, regional employment and economic development.

Under this policy the production of timber and timber products is considered an appropriate and desirable forest use that can be integrated with other uses and provide benefits to the community. In providing for the harvesting of timber products, forest management should provide for nature conservation and the protection of important forest values.

ESFM is given effect through a code of practice consistent with the NFPS.

1.2 Purpose

In accord with the NFPS, and as part of any applicable forest environmental management system, the Code defines the principles, policies, and practices for sustainable timber production from the QPWS forest estate and seeks to ensure that:

- the forest estate is assessed and protected from loss or degradation;
- harvesting is planned to ensure that social, nature conservation, forest values and environmental needs are identified and provided;
- harvesting practices are safe, sustainable and protect the forest from damage and/or material or serious environmental harm. Corrective action will be taken if damage and/or material or serious environmental harm occurs;
- the forest is able to regenerate to at least maintain its productivity and biodiversity values; and
- research and development is applied to improve forest management and management practices.

The Code supports broader forest management systems including forest: certification, planning, allocation, valuation and utilisation systems.

1.3 Code application

The Code applies to the harvesting of timber products (Schedule 1) from native forests on the QPWS forest estate, where operations are conducted under the *Forestry Act 1959*.

The application of the Code is based on the following principles:

- The Code is not a substitution or lessening of any other standard, Code or law.
- The provisions of the Code are binding on all parties involved in timber production and must be incorporated into supply agreements and other contracts relating to native forest harvesting.
- Where strict application of the Code will be or may be unsafe, or result in damage or environmental harm, alternative practices must be used.

1.4 Standards

The Code defines the minimum standards to be applied to timber harvesting operations with consideration of efficiency, acceptable environmental impact and optimal community benefit.

Code standards consider and seek to balance and be appropriate to:

- the nature, scale, sensitivity and impact of use and its implications to sustainability; the protection of forest, environmental and social values, and the natural or operational capability for restoration and recovery of disturbed areas;
- operational needs for efficient production including:
 - recognised industry best practice;
 - avoidance of unnecessary penalty to good operators; and
 - an onus to stabilise and rehabilitate adverse impacts caused.
- environmental, resource management and conservation legislation and other obligations including the requirements of the *Forestry Act 1959*, *Nature Conservation Act 1992*, *Environmental Protection Act 1994*, *Aboriginal Cultural Heritage Act 2003*, *Torres Strait Islander Cultural Heritage Act 2003*, *Queensland Heritage Act 1992*, *Wild Rivers Act 2005*, the *Environment Protection and Biodiversity Conservation Act 1999*, (EPBC Act), and the Strategy for the Conservation and Management of Queensland's Wetlands.
- forest management policies such as *National Strategy for Ecologically Sustainable Development 1992*, *Intergovernmental Agreement on the Environment 1992* and the *National Forest Policy Statement 1992/1995*.
- forest management systems that have been developed for Australia (e.g. that comply with *The Australian Forestry Standard*).
- community interest including accountability to the public, involvement in decision making processes, public education and the encouragement of community ownership of environmental issues.

1.5 Code format

The Code of practice is presented in two parts:

- Part A – Core:** Incorporating policies and principles.
- Part B – Schedules:** Incorporating operational prescriptions

1.6 Code management responsibilities

1.6.1 General

Code management is based on a continuous improvement approach involving a cycle of preparation, implementation, operation, audit, review and revision.

1.6.2 Preparation

QPWS is responsible for Code preparation and must liaise with:

- DAFF and other government agencies to define Code standards and establish roles, responsibilities, protocols and procedures for implementation; and
- the timber industry and relevant community groups to identify issues and expectations and to establish procedures for addressing conflicts or concerns.

1.6.3 Documentation

QPWS is responsible for maintaining and supporting the Code and ensuring that the Code is publicly accessible.

1.6.4 Implementation

The Code must be progressively and effectively implemented. Responsibility for implementation should reflect the respective responsibilities of the parties concerned.

Persons involved in administering the Code and/or supervising operations must be aware of their obligations and be competent to implement the Code.

1.6.5 Training and competency

QPWS and DAFF Forest Products must identify their respective competency needs, define competency standards and apply training to ensure that employees are competent to implement the Code (refer also 7.3.3 for operator training).

QPWS is responsible for:

- training of QPWS, DAFF Forest Products and relevant government agencies in the Code;

- providing support to DAFF Forest Products for agreed industry training;
- providing advice in regard to interpretation of the Code and supporting documents; and
- providing advice or direction arising from Code audits.

DAFF Forest Products is responsible for addressing the requirements of permittees authorised for timber harvesting, in relation to the Code and ensuring Code requirements are met.

Permittees are responsible for ensuring that they, their employees and contractors comply with the Code.

1.6.6 Communication

QPWS is responsible for establishing procedures for effective communication with interested groups to receive and disseminate information, and to identify issues, concerns and deficiencies.

1.6.7 Compliance

QPWS is responsible for operational assessment, auditing and reporting on the level of compliance with the Code by QPWS and DAFF Forest Products.

1.6.8 Code review

The Code must be periodically reviewed to ensure continuing suitability, adequacy and effectiveness in the light of submissions, research, best practice development, operational experience and the results of monitoring and audits. QPWS is responsible for reviewing the Code in consultation with interested groups every five years or as required. Reviews must be documented and publicly accessible.

1.7 Definitions and acronyms

Acronyms and abbreviations are contained in Appendix 1.

Definitions are contained in Appendix 2.

2. Principles of environmental care and cultural heritage protection

Ensuring timber production operations conform to the principles of environmental care and cultural heritage protection

2.1 Objective

Timber production operations must be carried out in such a way that natural and cultural values are protected.

2.2 Principles

Timber production must be planned and managed in accordance with the principles of environmental care and other legislative requirements.

2.3 Policy

2.3.1 Risk management

A risk management approach shall be applied to all aspects of the environmental management of timber production on State lands by adoption of a harvest planning framework in order to assess environmental risk and develop strategies within the framework of the Code.

2.3.2 Protection of biodiversity

2.3.2.1 Protected Flora and Fauna – All species must be protected from any adverse effects of harvesting.

The diversity of flora and fauna, including their successional stages, in native forests must be maintained.

The legislative basis for biodiversity protection in Queensland is the *Nature Conservation Act 1992*. Key elements of the legislation require that protection measures must:

- protect EVNT species;
- protect habitat and active breeding sites;
- contribute to the conservation of indigenous species generally;
- complement the conservation goals of the regional nature reserve system;
- maintain ecosystem function and essential processes; and
- monitor biodiversity values and the impacts of standards.

The protection measures detailed in the Species Management Profiles (SMP) are designed to meet these requirements.

2.3.2.2 Regional ecosystem management –

There is no legislative requirement for protection of particular regional ecosystems on State forest, timber reserves and forest entitlement areas.

However the following applies:

- All regional ecosystems must be managed to ensure that their ecological integrity is protected. Ecological processes, health and vitality and their ability to regenerate and evolve must be maintained.
- The latest Regional Ecosystem numbering and status, issued by the Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts, and any subsequent revisions, as listed in the schedules of the *Vegetation Management Regulation 2000* applies
- Timber harvesting is not permitted in 'rainforest' regional ecosystems as defined by Queensland Herbarium.
- The harvesting of 'rainforest' tree species is not permitted unless there are no alternatives for access or they present an unacceptable safety risk. This restriction does not apply to natural hoop pine, bunya pine and kauri pine trees occurring outside areas mapped as rainforest.
- Timber harvesting is not excluded in any regional ecosystem on the basis of its conservation status where the Code's prescriptions or an approved alternative is applied.
- Clearing associated with timber harvesting activities must be restricted in accordance with prescribed limits (Refer Schedule 6.2).
Note: Refer to Appendix 2 for definition of clearing under this Code.

The protection measures detailed in Schedule 6 are designed to meet these requirements.

2.3.2.3 Fire management – Wildfire control and management burning is managed under:

- Part 7 of the *Fire and Rescue Service Act 1990* – Control and Prevention of Fires; and
- Part 7 of the *Forestry Act 1959* – Control and Prohibition of Fires on State Forests, Timber Reserves and Forest Entitlement Areas.

The environmental impacts of fire, which includes wildfire and burning in conjunction with harvesting for protection and/or regeneration purposes, shall be managed in accordance with the responsibilities, procedures and standards detailed in the relevant fire management plan, policy and procedures.

This includes planned burning in appropriate conditions to reduce the risk of hotter and more intense fires which can result in uncontrolled loss of carbon sequestered in biomass.

2.3.2.4 Pest and disease management –

Timber production activities shall be regulated to ensure all reasonable steps are taken to prevent or minimise the introduction and/or spread of pests and diseases.

Management and control measures must conform to the requirements of the *Nature Conservation Act 1992*, the *Land Protection (Pest and Stock Route Management) Act 2002*, the *Agricultural Chemicals Distribution Control Act 1966*, and relevant pest, weed and disease strategies.

2.3.3 Protection of other elements of environmental and cultural heritage

2.3.3.1 Landscape and visitor use management

– Operations must conform to the requirements of the *Forestry Act 1959* and the *Environmental Protection Act 1994*.

Timber production activities shall be regulated to prevent or minimise conflicts between harvesting activities and landscape values, and recreational usage.

The protection measures detailed in Schedule 7 are designed to meet these requirements.

2.3.3.2 Geomorphological features – Timber production activities shall be regulated to prevent or minimise damage to, or deterioration of, geomorphological features.

2.3.3.3 Soil protection – Timber production activities shall be regulated to prevent or minimise soil erosion, or deterioration of the soil's physical, biological or chemical properties.

Operations must conform to the requirements of the *Environmental Protection Act 1994* and *Wild Rivers Act 2005*.

The protection measures detailed in Schedules 2, 4, 5 and 18 are designed to meet these requirements.

2.3.3.4 Water and watercourse protection -

Timber production activities shall be regulated to prevent or minimise pollution of watercourses and systems.

Operations must conform to the requirements of the *Environmental Protection Act 1994* and the *Wild Rivers Act 2005* and, in accordance with the *Environmental Protection (Water) Policy 2009*, the management intent is to maintain surface water and groundwater quality.

The protection measures detailed in Schedules 3, 8, 9, 10, 11 (and Schedules 2, 4, 5 and 18 dealing with soil) are designed to meet these requirements.

2.3.3.5 Air and noise protection - Timber production activities shall be regulated to prevent or minimise interference caused by smoke, dust, odour, noise or light with environmental or social values.

Operations conducted must conform to the requirements of the *Environmental Protection Act 1994* and the *Environmental Protection (Air) Policy 2008* and the *Environmental Protection (Noise) Policy 2008* and seek to avoid, ameliorate, isolate or restrict the source of any nuisance.

The protection measures detailed in Schedule 16 are designed to meet these requirements.

2.3.4 This section intentionally removed from the Code

2.3.5 Cultural heritage

Cultural heritage values (objects, places, landscapes) shall be managed with the objective of protecting those values where timber harvesting operations are conducted consistent with the *Nature Conservation Act 1992*, the *Environmental Protection Act 1994*, the *Aboriginal Cultural Heritage Act 2003*, the *Torres Strait Islander Cultural Heritage Act 2003*, the *Queensland Heritage Act 1992*, the *National Forest Policy Statement (1992/1995)* and any applicable cultural heritage management requirements.

3. Worker and public safety

Ensuring that the health and safety of workers and the public is protected consistent with the *Work Health and Safety Act 2011* and any subordinate legislation.

4. Personnel training and competency

Ensuring personnel are competent to perform their assigned roles and tasks

4.1 Objective

Competent personnel are a fundamental pre-requisite for the achievement of ecologically sustainable forest management.

To achieve Code requirements, all persons engaged in timber production must be trained and competent to perform their assigned roles and tasks safely, effectively, efficiently and responsibly.

4.2 Principles

4.2.1 Training and Competency

All persons engaged in timber production must be trained and competent for the task(s) they perform.

4.2.2 Competency standards

Certification to National competency standards applies to relevant tasks associated with timber production.

4.3 Policy

4.3.1 Competency based training and certification

The Code promotes the development and implementation of a system for competency-based training and certification with the aim that certification becomes a requirement for employment in relation to the environmentally relevant aspects of timber production.

5. Harvesting planning

Effective planning provides a sound basis for ESFM and the management of environmental risk

5.1 Objective

Timber harvesting must be well planned in order to protect and maintain forest values for present and future generations.

The Code establishes a framework for detailed strategic and operational level harvest planning that ensures timber harvesting activities are:

- appropriate;
- ecologically sustainable;
- economically and socially responsible; and
- cognisant of any relevant overarching strategic land use planning mechanism.

5.2 Principles

5.2.1 Forest planning framework

Consistent with ESFM principles, the planning framework will ensure that:

- forest resources are assessed, secured and sustainably managed in balance with community, regional employment and economic development needs;
- timber harvesting areas are identified taking account of community benefit, land tenure, forest capability, nature conservation, other forest values, competing uses, appropriateness to site, and compatibility with existing uses and use rights;
- harvesting regimes are appropriate, ecologically sound, of acceptable impact and maintain or improve forest productivity;
- harvesting practices are appropriate for the forests long-term productivity, efficient, safe and environmentally responsible;
- harvested forest is able to effectively regenerate and is protected to maintain or enhance forest productivity; and
- planning is documented and publicly accountable.

5.2.2 Forest protection framework

5.2.2.1 Nature conservation – Use of the forest for timber harvesting must ensure that nature conservation values are maintained. This will include the maintenance of ecological processes that sustain the forest and biological diversity while protecting rainforest, wilderness, old growth forests and watercourse environments consistent with legislation and relevant government policies and agreements.

In a regional context the conservation framework is based on:

- a nature conservation reserve system;
- managing the rest of the forest area such that any special areas are protected and links are provided between protected areas;
- managing timber harvesting areas in a complementary manner to ensure species and habitat protection; and
- encouraging sympathetic management of adjacent other State lands or private forests.

5.2.2.2 Forest values – The management of timber harvesting must maintain the full range of forest values including biological, geological, landscape and cultural heritage over time. Significant forest values must be identified and appropriately managed.

5.2.2.3 Social amenity – The management of timber harvesting requires that socially sensitive places within or adjacent to timber production areas are to be identified and excluded from or buffered from any adverse effects of timber harvesting. This may include exclusion zones around significant forest use areas and the protection of existing uses and use rights.

5.2.2.4 Environmental values – Management of the forest for timber harvesting requires that soil, water, air, noise and other environmental values be protected from loss or degradation. This may include special management areas or exclusion zones for slope, instability, watercourse protection and species management, as well as specification of practices for avoidance, stabilisation and/or rehabilitation of disturbance.

5.3 Policy

5.3.1 This section intentionally removed from the Code

5.3.2 Timber harvesting areas on the QPWS forest estate

Forest values and uses must take into account community benefit, overarching land use planning decisions, the purpose of the land (as per the *Forestry Act 1959*), forest capability, nature conservation, protection of significant forest values, competing uses, use being appropriate to the site and compatibility with existing uses and use rights.

Planning instruments will:

- define the forest protection framework; and
- identify timber harvesting areas and their use constraints.

Waste from timber harvesting must be minimised.

5.3.3 This section intentionally removed from the Code

5.3.4 This section intentionally removed from the Code

5.3.5 Silvicultural regimes

Silvicultural regimes are determined by State Government Forest Policies.

The Code aims to provide for the protection of environmental values during harvesting activities.

5.3.6 Harvesting practices

Operations must be capable of achieving the environmental outcomes described in the Code.

5.3.7 Forest regeneration

Timber harvesting is conditional upon effective regeneration of the forest in term of species mix, stocking and site productivity (see Core section 8).

5.3.8 Timber harvesting operations planning

5.3.8.1 **Advanced Harvesting Notification** – DAFF Forest Products will provide QPWS with advance notice of planned harvesting operations.

5.3.8.2 **Operational harvesting plan (OHP)** – DAFF Forest Products must prepare OHPs for timber harvesting on all areas of the QPWS forest estate.

Approval of OHPs by QPWS will only be required on an exception basis where an aspect of

harvesting does not conform to the requirements of the Code. Routine OHPs that are compliant with the Code are not required to be submitted to QPWS for approval.

The currency of the OHP must be maintained for the full duration of the timber harvesting.

Timber harvesting activities on the QPWS forest estate will be subject to periodic audit by QPWS' audit program.

5.3.8.3 **Special sales** – QPWS encourages the salvage of storm or fire damaged forest products and will expedite approval for these operations. QPWS acknowledges that for "special sales" some Code requirements may need to be modified.

5.3.8.4 **Harvesting completion advice** – These must be submitted at the completion of harvesting operations.

5.3.9 Documentation and accountability

The planning process must be documented, recorded and made available for audit.

6. Operational access

Providing for safe, effective and environmentally responsible operational access

6.1 Objective

Road and track construction, maintenance and use have the potential to cause localised soil erosion and watercourse sedimentation.

The Code aims to ensure that the maintenance of existing access and the construction and maintenance of new access provides for safe, appropriate and economic timber harvesting while protecting the range of forest environmental values and, in particular, minimising soil erosion and watercourse sedimentation.

6.2 Principles

6.2.1 Management framework

Access provision and management must be planned to ensure:

- access is warranted and appropriate to timber harvesting and other forest management uses;
- forest values and biodiversity are protected;
- design standards will achieve the desired function with safety;
- provision will be cost effective, minimise the loss of productive area and minimise adverse social or environmental impact;
- use is controlled to maintain safety, minimise structural damage and/or material or serious environmental harm;
- drainage standards are maintained during and on completion of harvesting operations;
- maintenance is timely, effective and ongoing; and
- access is stabilised / rehabilitated, decommissioned and, where necessary, permanently closed..

6.2.2 Access standards and density

These must be based upon:

- design, engineering standards consistent with the road's purpose and be capable of carrying the required traffic, vehicle configurations and required legal loads with due regard to economy and safety; and
- an appropriate network of road classes that address operational timber harvesting requirements and that minimises the total impact of harvesting and roading, or otherwise best serves the overall forest management need.

6.2.3 Forest protection framework

Construction, use and maintenance must identify potential environmental threats and:

- protect EVNT species, and the integrity of REs;
- protect significant social, cultural heritage and landscape values;
- protect exclusion zones from direct or indirect disturbance;
- minimise soil erosion and watercourse sedimentation; and
- comply with the *Environmental Protection Act 1994* and avoid or minimise air and noise pollution and public nuisance.

6.2.4 This section intentionally removed from the Code.

6.3 Policy

6.3.1 Road and track construction and maintenance

Construction and maintenance undertaken in connection with timber harvesting operations shall be conducted in accordance with relevant Code standards (Schedules 8 and 9). QPWS acknowledges that, in some environments, application of the Code standards may be inappropriate and/or impractical. Variations to the Code requirements may be considered for approval based on a risk-weighted evaluation.

6.3.2 Joint road management planning

The management of permanent roads and track network (construction, maintenance and usage) included in any joint road management plan (JRMP) must be consistent with the codes procedures and standards.

6.3.3 This section intentionally removed from the Code.

6.3.4 Existing infrastructure

Existing infrastructure must be used wherever practical and safe.

6.3.5 Temporary access

Temporary access should be considered in lieu of permanent construction provided effective drainage, decommissioning and rehabilitation is undertaken.

6.3.6 Road use and restrictions

Road use must be controlled to facilitate safety, limit structural damage or adverse environmental impact, and protect the rights of other users.

Access must:

- comply with restrictions on access in accordance with Schedule 18; and

- comply with requirements for the management of air, noise (Section 16), wastes and hazardous substances (Schedule 17).

7. Harvesting management

Harvesting efficiently, safely and with acceptable levels of impact to the forest

7.1 Objective

The Code aims to ensure that harvesting operations are managed to meet the harvester's need for efficiency, economy and safety, while avoiding or minimising impacts and ensuring the long-term maintenance of the productive and regenerative capacity of the forest, biodiversity and other forest values.

7.2 Principles

7.2.1 Environmental management framework

Harvesting operations must be effectively planned and managed to ensure that operations:

1. conform to the Operational Harvesting Plan (OHP);
2. conform to prescriptions for the protection of flora and fauna and regional ecosystems;
3. conform to the prescriptions for harvesting and regeneration silviculture;
4. conform to the prescriptions for soil and water protection;
5. integrate with other forest uses and use rights;
6. comply with legislative and other obligations;
7. use appropriate equipment and trained operators;
8. use approved practices which are optimally timed and staged in relation to weather and ground conditions;
9. minimise timber harvesting waste;
10. avoid or minimise damage to retained trees;
11. cease operations when conditions are adverse;
12. undertake corrective action where there is unacceptable damage to the residual stand;
13. manage pests, weeds, diseases, wastes and pollution;
14. progressively stabilise disturbance; and
15. are monitored and audited.

7.3 Policy

7.3.1 Combined operations

Wherever possible, DAFF Forest Products must seek to integrate timber sales to optimise utilisation and minimise repeated disturbance. DAFF Forest Products should also consider the integration of timber/timber product sales and/or the sale of protected plants and foliage as per the *Code of Practice for the Taking of Protected Plants*.

7.3.2 Harvesting operations

Harvesting operations must integrate with and facilitate post-harvesting regeneration and development.

7.3.3 Operators

Operators must be trained and competent to meet relevant Code requirements.

7.3.4 Equipment

Equipment must be capable of efficient operation and be appropriate to both the operation and site.

Equipment use must minimise soil disturbance/compaction and avoid or minimise damage to retained trees.

7.3.5 Progressive stabilisation

All soil disturbance caused by harvesting must be progressively stabilised as soon as practical after the completion of a section or track.

7.3.6 This section intentionally removed from the Code

7.3.7 Research and development

QPWS is responsible for research and development of the Code standards to improve environmental outcomes.

DAFF Forest Products is responsible for reviewing and implementing improved harvesting practices while maintaining environmental outcomes equal or higher to that required by the Code.

7.3.8 Processing sites

The establishment of permanent timber and timber product processing infrastructure is not permitted on the QPWS forest estate.

Temporary processing infrastructure may be approved under special circumstances subject to Schedule 14 and are specifically assessed through the OHP process.

7.3.9 Camping sites

Only temporary camping to support the harvesting activity may be permitted provided the camp complies with the requirements of Schedule 14.

7.3.10 Forest protection

Operations must comply with the requirements for:

- nature conservation – Schedule 6;
- cultural heritage – Schedule 7
- landscape protection – Schedule 7;
- watercourse protection – Schedule 3;
- fire management – Core section 2.3.2.3;
- pests and disease – Core section 2.3.2.4;
- waste and toxic materials management – Schedule 17;
- air and noise pollution management – Schedule 16; and
- visitor use – Schedule 7.

7.3.11 Harvesting practices

Unless otherwise approved, operations must conform to requirements listed in:

- Timber Harvesting Practice – Schedule 10;
- Timber Product Harvesting Practice – Schedule 11;
- Sandalwood Harvesting – Schedule 12;
- Forest Road and Track Management – Schedule 8; and
- Timber Road and Track Drainage – Schedule 9.

7.3.12 Operational restrictions

Operations must cease or be restricted when infrastructure, forest values or environmental values are threatened by weather or ground conditions (Schedule 18).

8. Forest regeneration and growth

Ensuring that the ecological integrity of the forest is protected.

8.1 Objective

The objective of a harvesting regime is to ensure the forest can, in time, recover its pre-harvesting species composition, structure and function. This is aided by:

- protecting the ecological integrity of the forest
- maintaining the potential productivity of the forest
- managing disturbance

8.2 Principles

8.2.1 Management framework

Timber harvesting must consider regeneration and growth by ensuring:

- harvesting practice and progression facilitates regeneration;
- harvested areas are regenerated naturally or artificially;
- regeneration is assessed and appropriate corrective action taken where levels are below those required to maintain site productivity; and
- regeneration is protected from damage including damage from uncontrolled wildfire.

8.2.2 Forest productivity

The area of productive forest and the level of productivity must be maintained and, if desirable, increased.

8.2.3 Forest regeneration and development

Effective forest regeneration and development on the QPWS forest estate must be included in harvesting planning and approval.

8.2.4 Silviculture and regeneration

Silvicultural and regeneration practices must take into account:

- the forest type and ecological needs for effective regeneration and optimum productivity;
- the pre-existing forest condition, including the need to correct undesirable change, loss or degradation caused by past use or management;
- maintenance of the genetic resources in native forests;
- the site potential and opportunities to restore or enhance forest productivity or value by appropriate silvicultural treatment;

- habitat tree retention guidelines and the protection and rehabilitation of nature conservation, soil and water values; and
- the need for restriction of or integration with other uses of the area.

8.3 Policy

8.3.1 Maintaining the productivity of the QPWS forest estate

The area and productivity of the forest estate must be maintained and where possible enhanced. The forest must be protected from damage and/or material or serious environmental harm.

8.3.2 Silvicultural regimes

Silvicultural regimes applied must be appropriate to the forest and retain a residual stand consistent with the required outcomes of the Code, including:

- habitat and/or recruitment habitat tree retention;
- basal area retention limits;
- protection of soil, water and other forest values;
- adequate regeneration or capacity for adequate regeneration;
- minimise damage to retained trees;
- long term forest productivity.

8.3.3 Adequacy of regeneration

There is generally an abundance of regeneration in Queensland's native forests following harvesting.

Regeneration is considered adequate when it approximates the characteristics for the pre-harvest stand.

Appropriate remedial action is to be taken where assessment confirms that regeneration is inadequate.

8.3.4 This section intentionally removed from the Code.

9. Compliance, prevention and corrective action

Ensuring compliance is assessed, damage corrected, and Code standards are effective

9.1 Objective

The Code aims to ensure that compliance is assessed to ensure that:

- operations are Code compliant;
- non-compliance is detected, investigated and corrected;
- damage and/or material or serious environmental harm is identified and corrected; and
- the effectiveness of Code standards is assessed.

9.2 Principles

9.2.1 Code compliance

Code compliance is assessed and non-conformance addressed.

9.2.2 Damage

Damage, being any significant loss or degradation of forest soil, water, flora or fauna or other values, is prevented and corrected if it should occur.

9.2.3 Material and serious environmental harm

Material and serious environmental harm, as defined by the *Environmental Protection Act 1994*, is reported, addressed and managed as required by that Act.

9.2.4 Code effectiveness

Effectiveness of Code standards must be monitored and reviewed.

Schedule 1: Timber products

This Code of Practice covers the harvesting of the following timber products (Table 1).

Table 1 - Timber products

Product Group	Product Type	Comment
Round timber	Sawlog	Harvesting may involve felling of standing trees or the taking of round timber from fallen trees provided the tree is not required for habitat or other Code purposes. DAFF Forest Products should ensure that operations are integrated. Compliance in this regard is enhanced by one pass treemarking of all products to be harvested. This helps to facilitate that the requirements of this Code are met including retained habitat and habitat recruitment trees and residual basal area.
	Girders	
	Poles	
	Posts	
	Rails	
	Mining timbers	
	House poles	
	Piles	
	Landscape timbers	
Whole trees/shrubs	Sandalwood	As per Schedule 12.
Cut sections	Hollow wood	Generally taken from fallen trees or as salvage from round timber harvesting, provided the section is not providing active habitat for vertebrate animals. Harvesting involving felling of living standing trees will generally only be considered where this is part of a silvicultural operation and the tree is not required for habitat or other Code purposes.
	Fuel wood	
	Stepping blocks	
Processed	Split posts and rails	Generally taken from fallen trees or as salvage from round timber harvesting. Removal of pieces from standing trees will only be permitted where the health and habitat value of the tree is not adversely affected and where tree stocking indicates that thinning is acceptable.
	Sawn posts	
	Sawn wood	
	Sleepers	
	Split shingles	
Specialty pieces	Didgeridoo blanks	Specialty pieces may be taken from fallen trees or as salvage from round timber harvesting. Removal of pieces from standing trees will only be permitted where the health and habitat value of the tree is not adversely affected and where tree stocking indicates that thinning is acceptable.
	Boomerang blanks	
	Hollow hardwood	
	Boat knees	
	Craft wood	
	Art/ landscape	
	Burls and galls	
	Mulga wood	
	Wood turning	
Timber by-products	Charcoal	Charcoal may be taken from fallen or standing trees.
	Sawdust	
	Gums/resins	Gums/resins only from stumps or logs.
	Bark	Bark may be taken from dead trees. Bark may be taken as a by-product of timber and other timber product harvesting. Bark may be taken from live trees in accordance with Schedule 11.

Schedule 2: Soil assessment

S2.1 Soil assessment must be used to identify soil erosion and compaction hazards, and, through relevant schedules, provide guidance for management, where high erodibility is not accepted. For further guidance, refer to the Native Forest Soil Protection.

S2.2 Sampling – The harvesting area must be sampled to provide a confident assessment of soil types. At minimum, sample upper, mid and lower slopes stratified, as necessary, by geology, topography and forest types. Sampling at representative points must be either by pit, use of freshly scraped, existing side cuts, or auger. Sample depth should be as deep as is practical and allow the subsoil to be examined. At each sample point, clear the surface litter away to expose the mineral soil surface and assess:

(a) Surface condition – From a range of possible surface conditions, note if the surface condition of the mineral soil when dry is hard setting i.e. a compact, apedal surface not easily penetrated by finger.

Table 2 – Soil texture characteristics

Feel	Coherence	Length	Texture Class
Gritty, not sticky	Nil	0-15mm	S sand
Gritty, slightly sticky	Slight	15-25mm	SL sandy loam
Spongy	Good	25-40mm	SCL loam
Smooth	Good	40-50mm	CL clay loam
Light plasticine	Plastic	50-75mm	LC light clay
Strong plasticine	Plastic	75+ mm	C clay

(d) Colour - Determine the soil/horizon colour. For erodibility rating, the soil colour is based on the type horizon, which varies with the texture profile.

- **uniform/ gradational soil** (nil/little texture change with depth) – brightest except A1.
- **duplex soils** (clear/abrupt texture change with depth) – top of B horizon.

Table 3 – Field soil colour descriptions

Colour	Mottles	Description
R - red	Yes/No	Rich/bright, dark red, red brown, reddish brown, light red
Y - yellow	<10% G/D	Dark brown, yellow brown, yellow, light brown
YG yellow + grey	10-50%G/D	Yellow with grey or dark mottles
G - grey	No/Yes	Dark grey, grey brown, pale yellow, pale brown, white
D - dark	No	Dull black, very dark grey

S2.3 Soil erodibility

Soil erodibility may be determined using Table 4 below. The rating is used in slope (Schedule 4),

(b) Topsoil/subsoil boundary – Determine the topsoil/subsoil boundary in the soil profile using colour, texture or other differences. This boundary may be distinct or diffuse.

Once the boundary is determined sample representative examples of top and subsoil. Topsoil samples should be taken below the A1 horizon. Sample subsoil at 30cm if the topsoil is deep or the topsoil/subsoil boundary is not evident.

(c) Texture – Determine the texture of the top and subsoil. Take a small sample and remove stones and roots. Moisten and knead to create a bolus. Add water or soil until the bolus is of uniform consistency and just fails to stick to the fingers. Knead until there is no apparent change in the feel. Note the feel and coherence as it is worked. Using the thumb and forefinger, press out a ribbon and measure the length at which it fractures. Repeat. Using feel and ribbon length, determine the texture (Table 2).

Assess horizon and soil colour when the soil is moist using Table 3.

watercourse (Schedule 3), forest road and track drainage (Schedule 8) and timber harvesting practice (Schedule 10).

Use the soil check method to estimate the erodibility rating (Table 4).

Table 4 – The soil check method

1. Calculate the Base Score Use the texture of the top and subsoil	Subsoil	Topsoil Texture			
	Texture	S/SL	L/CL	LC	C
	S/SL	2	1		
	L/CL	2	1		
	LC	3	2	1	1
	C	4	3	2	2

2. Add points to the base score for factors listed	Surface texture – fine sand, fine sandy loam, loam fine sandy, silty loam, silty clay loam	1
	Surface condition hard setting	Add ½
	Severe restriction to permeability due to strongly duplex soil profile with grey subsoils or hard pan soils	Add 1
	Moderate restriction to permeability due to either gradational or duplex soils with grey subsoils, or strongly duplex soils with yellow grey (YG) subsoils	Add ½
	Depth to permeability restriction <60cm	Add 1

3. Determine the erodibility rating using the total score	Total Score	Erodibility Rating
	up to 2.5	Low
	3 to 4.5	Moderate
	5+	High

The determined rating should be considered to ensure that it is consistent with the general field evidence of erodibility, e.g. surface wash, rilling, gullyng or slumping and undercut road batters. Where the rating is inconsistent, further sampling must be undertaken.

Dispersion – Erodibility rating generally takes into account dispersibility. If field evidence (e.g. soil pipes) suggests highly dispersible subsoils, carry out a test. Place 4-5 peds or small fragments in a small volume of water and observe for 10 minutes. Note the reaction and adjust erodibility rating as appropriate using Table 5.

Table 5 – Field test for soil dispersion and potential erodibility

Reaction	Dispersibility	Erodibility
Total breakup	Very	Very high
Fragments and quite milky	Dispersible	Mod-high
Obvious milkiness	Moderate	Moderate
None/little breakup Or milkiness	Slightly/non	Low-Mod

Erosion hazard – Erodibility refers to the inherent erodibility. Hazard must also consider slope, slope length, cover and erosivity. Table 6 shows erosion hazard in relation to slope.

Table 6 – Erosion hazard

Erodibility Rating	Slope (degrees)			
	< 10	10-<20	20-<30	30+
Low	Low	Moderate	High	Very high
Moderate	Moderate	High	Very high	Very high
High	High	Very high	Very high	Very high

S2.4 Soil compaction

Soil compaction is not generally a major problem in low intensity single tree selection harvesting. However, on certain soil types and under wet conditions, compaction can be a localised problem with adverse effects that may persist for 50 years or more. Compaction may be difficult to visually detect but rutting is a sign of serious compaction.

The Code makes provision for management of compaction in various schedules and particularly operational restrictions. In addition to the soil erodibility rating, the compaction rating must also be assessed and used to guide the application of operational restrictions (Schedule 18). The soil compaction rating can be roughly estimated using Table 7.

Table 7 - Estimating the soil compaction rating

1. Determine the base score	Sand/sandy loam	Score 1
	Loam/clay loam	Score 2
	Light clay/clay	Score 3
2. Add points for	High silt/fine sand	Add 1
	Wet conditions	Add 2
	Soil scalped <25cm	Add 1
	Soil scalped >25cm	Add 2
3. Determine the compaction rating from the total score	Total score	Compaction rating
	1	Low
	2	Moderate
	3	High
	4+	Very high

Where the compaction rating is high, special care should be taken and operational restrictions applied early enough to avoid soil damage.

S2.5 Soil moisture and drainage

Soil characteristics may provide a guide to soil moisture and drainage.

Soils that are wet (nearing field capacity) or saturated must be operated on in accordance with Schedule 18 operational restrictions. For the purposes of operational restrictions wet soils are indicated when a bolus leaves a wet outline on the hand.

A guide to soil drainage can help identify soils that may become waterlogged and subject to serious compaction (Table 8). Areas of soils likely to become waterlogged must be identified and operated on in dry weather.

Excessive = rapidly drains (e.g. sand dune).

Poor = may be subjected to flooding.

Table 8 – Soil drainage and soil texture

Subsoil colour	Subsoil texture	
	S/SL	L/CL/LC/C
Red	Excessive	Good
Yellow	Good	Moderate
Yellow + Grey	Moderate	Poor
Grey	Excessive to poor	Very poor
Dark	NA	Poor

Schedule 3: Watercourse protection

S3.1 General

Watercourses must be protected from any adverse impacts of harvesting to maintain their physical integrity, environmental values and water quality. The protection system provides protection to areas, subject to single tree selection harvesting, against the average annual peak stream flows.

General protection principles

Protection is to be provided by the establishment and management of:

- (i) a watercourse protection zone around the streams, gullies and waterways that make up the watercourse network; and
- (ii) controls on disturbance in the harvesting area.

The aim of this, and other, schedules is to minimise disturbance within the buffer and filter zones. This can also be thought of as acting to maintain the physical integrity and environmental values within the watercourse and buffer and filter zones.

The watercourse protection zone (WPZ) is made up of a:

- **Buffer zone (BZ)** – An area extending beyond the defining bank into the harvest area designated as a no disturbance zone. Management involves complete protection (exclusion) to maintain watercourse stability and environment. The width of this zone varies with watercourse morphology. This is comprised of two components:
 - i. **Setback** – The minimum exclusion distance from the defining bank that is defined by watercourse type (Table 9).
 - ii. **Slump protection** – The minimum setback is extended as necessary, based on slump and other instability, to protect against disturbance or other threats.
- **Filter zone (FZ)** – An area beyond the BZ in which disturbance is conditionally permitted provided the area is maintained such as it both physically supports the BZ and protects water quality by filtering overland flow.

The area outside the WPZ that is available for harvesting, given all other Code requirements are met, is the harvesting area (Diagram 2).

Availability and protection requirements

When determining the availability of each particular tree or effects of a harvesting activity:

- Protection requirements are determined by looking in all directions and using the prescribed protective measures applying to the visible features to provide the highest level of protection.
- When determining the availability of a particular tree, applying the highest level of protection and visible features principles may require a greater buffer than is warranted by the closest watercourse.
- Where a higher classification watercourse meets a lower class of watercourse (transition point), the higher WPZ extends radially into the lower WPZ.
- Avoid any harvesting activities that accelerate, or are likely to accelerate, erosion.

When determining if a particular tree is available for harvesting, determine the protection requirement by:

1. **Classify the watercourse type** – At the assessment point, look both ways along the watercourse. Refer to S3.2 Watercourse classification and classify on the basis of the features providing the highest level of protection.
2. **Consult the minimum protection requirements** for that class of watercourse. Refer to the watercourse protection zone requirements in Table 9.
3. **Consider the particular situation** – Provide additional protection if warranted e.g. bank slump. Refer to the general buffer zone and filter zone conditions.
4. **Apply the determined protection requirement.**

For further guidance consult: Native Forest Watercourse Protection, QPWS background information, May 2002.

S3.2 Watercourse classification

A watercourse can only have one classification type at any point. This classification applies to both sides of the watercourse.

Streams are rivers and creeks with a channel or braided channel and distinct bed and banks. Terraces and lateral flood plains may also be present. Flow may be permanent, semi-permanent, intermittent, or limited to periods after heavy rain. Streams may often exist only as waterholes or a chain of waterholes. In the absence of surface water, the bed and immediate banks will have vegetation characteristic of frequent recharge of groundwater or be locally known water sources.

Gullies are incised "U" or "V" shaped channels, conveying runoff during or immediately after periods of heavy rainfall. Bed and banks are clearly defined with at least one steep bank and has clear evidence of soil erosion/deposition. Gullies may be continuous or discontinuous and be formed as either hillside or valley bottom gullies. Discontinuous hillside gullies may have an outlet fan that may be sensitive to disturbance. Characteristic vegetation may occur on bed and immediate banks.

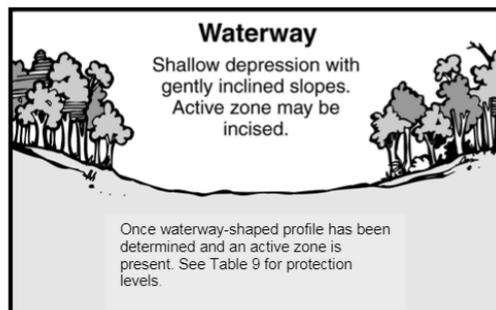
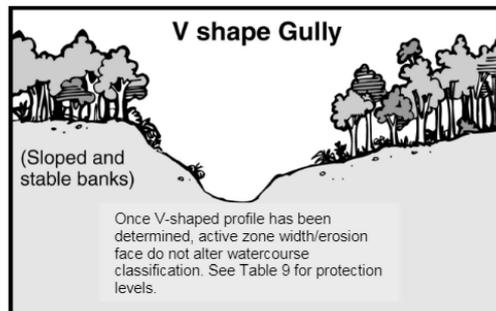
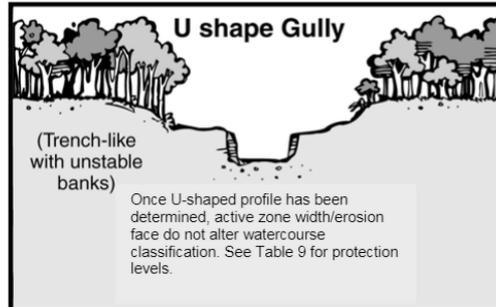
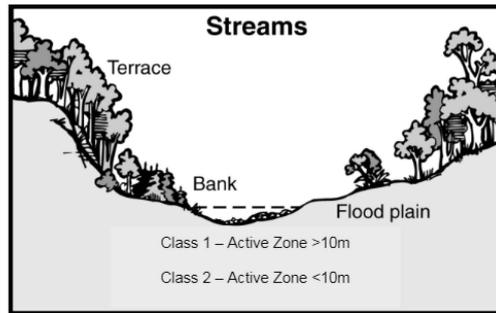
Cross-sectional profile is the major classification method to distinguish between U-shaped and V-shaped gullies.

U-shaped gullies are typically trench-like and may be experiencing undercutting and are typically unstable.

V-shaped gullies are typically more stable as the upper slopes have eroded or settled over time to attain a more stable slope. However, slumping can be present.

Waterways are typically dish shaped, gently inclined, shallow, and open depressions, which are easily discernible to the eye. They have a concave cross section and moderate approach slope. Active zones may be vegetated or slightly incised. These convey water after heavy rainfall but may be seasonally waterlogged with characteristic vegetation indicative of a wetter micro climate.

Diagram 1 – Watercourse types



Water features are natural or artificial waterholes, impoundments, wetlands or springs and soaks. Water features may be associated with watercourses and characterised by one or more of the following:

- the presence of water for more than three months in a normal wet season
- In the absence of surface water, characteristic vegetation indicative of frequent recharge of groundwater or locally known as associated with water features, may be evident
- Soil conditions may show evidence of prolonged water saturation
- Flora and fauna debris may be present, e.g. dead water plants; mussel or crayfish shells, fish skeletons, etc.
- Springs and soaks are areas where water flows from the surface or where the soil is damp as a result of seepage

Refer to S3.3.1 (Wetland protection requirements) for detailed wetland/water feature protection requirements.

Important definitions

Active zone – This is a zone of active erosion or deposition characterised by either:

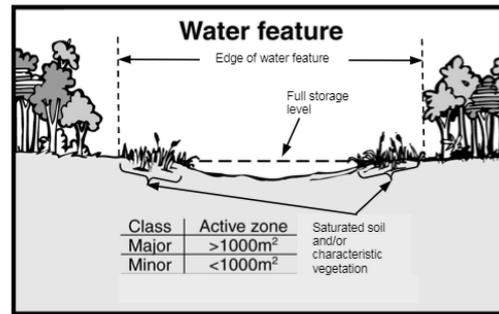
- any erosion face greater than 10cm high; or
- a scour/deposition area greater than 1m in width.

Deposited material may be loose, unconsolidated sand, gravel or water-washed stone. The zone may be obscured by litter or be associated with a significant reduction in surface cover. Width is measured across the deposited material or scour where no erosion face exists.

Erosion face – An erosion face is a steep bare soil slope more or less adjacent to the zone of water flow. Height is measured vertically from the average base level of the watercourse to the top of the erosion face.

Characteristic vegetation – Characteristic vegetation can occur in any watercourse type and typically indicates good subsoil moisture conditions as a result of prolonged subsoil seepage. This vegetation is different from that found on areas adjacent to the bed and banks. For example, watercourse beds may have dead aquatic vegetation, water couch, rushes, sedges and

Diagram 1 Watercourse types - continued



smartweeds, while stream banks may have tea trees, bottlebrushes, forest red gum and river red gum. Watercourse bed vegetation may be sparsely represented in intermittent streams with sandy beds.

S3.3 Watercourse protection zone (WPZ) requirements

Diagram 2 – Watercourse protection zone requirements

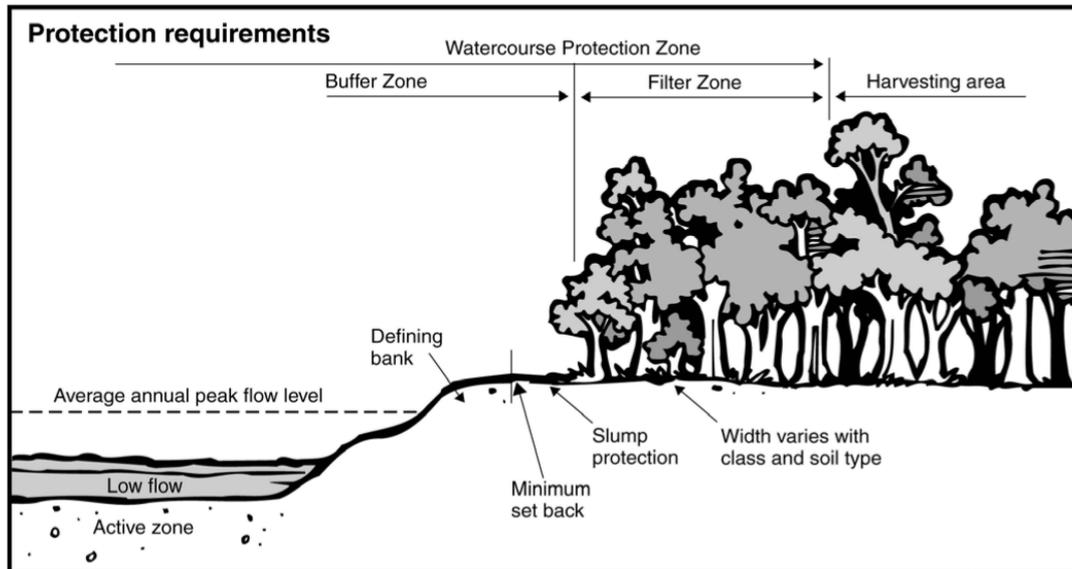


Table 9 – Watercourse protection zone requirements by watercourse type

WATER COURSE TYPE (1) & (2)	WATERCOURSE PROTECTION ZONE (WPZ)		
	BUFFER ZONE Minimum Setback ⁽³⁾ Increase as necessary for the situation.	FILTER ZONE Minimum setback (m) from the Buffer Zone	
		Soil Erodibility Rating	
		5-7	1-4
Stream 1	Set back 5m beyond the defining bank ⁽⁴⁾ plus additional distance for slump protection ^{(5) (6)} . Consideration of additional protection should be given to significant major streams.	30	20
Stream 2		20	15
U Shaped Gully	Set back a minimum of 2m beyond the top of the defining bank ⁽⁴⁾ plus slump ^(5 & 7) or head scarp protection. ⁽⁸⁾	10	5
V Shaped Gully	Set back 1 metre beyond the top of the defining bank ⁽⁴⁾ or, if a slope with no evidence of Average Annual Peak Flow level, 5m from the active zone (erosion face >0.5m) or 3m from the active zone (erosion face <0.5m). Add slump ^(5, 9) or head scarp protection. ⁽⁶⁾	5	5
Waterway	Set back 1 metre (2m ER 5-7) from the active zone or vegetation indicating soil saturation. ⁽¹⁰⁾ Add slump ⁽⁵⁾ or head scarp protection ⁽⁸⁾	5	5
Erosion Area	At minimum determine cause, correct drainage/apply head scarp/slump protection plus filter zone. Seek advice where unsure.	Seek advice	Seek advice
Major Feature	Set back a minimum of 20m from the water feature ⁽¹¹⁾	20	15
Minor Feature	Set back a minimum of 10m from the water feature ⁽¹¹⁾	10	10

Table 9 Notes

- (1) Refer to the Native Forest Watercourse Protection guidelines for more detail on buffer and filter widths and requirements.
- (2) Treat parallel, braided, or adjacent watercourses or erosion fingers separately.
- (3) The setback, the minimum exclusion distance from the defining bank, is determined in this table according to watercourse classification.

In the following Strategic Environmental Areas (SEA):

- The Gulf Rivers Strategic Environmental Area;
- The Cape York Strategic Environmental Area;
- Fraser Island Strategic Environmental Area;
- Hinchinbrook Island Strategic Environmental Area;

the no-logging setback to apply is:

- 50m from the defining bank of a watercourse in a Strategic Environmental Area, or
- 100m from the defining bank of a watercourse in a designated precinct within a Strategic Environmental Area

- (4) The defining bank is:
 - the terrace or bank; or
 - if no bank, the point on the active flood plain that confines the average annual peak flows and is not indicated by any single major flood event (refer Diagram 2).

The peak flow level may be evidenced by benches, laminations, scour or deposition or the interface between annual and perennial vegetation.

- (5) Slumps are a near vertical face coincident with, or separate to, the active zone which is or has been unstable. Protection requires an additional set back equal to 3 times the slump height. For calculation of slump protection, the minimum slump height to be used is one metre and then in increments of half a metre, rounding up.

For banks that are in close proximity, slump protection measures shall be applied to the opposite side, where this exceeds the buffer that would otherwise apply to the bank being assessed.

Close proximity is three times the slump height of the opposite bank plus the setback measured horizontally from the slump face on the opposite side of the watercourse.

- (6) Slope limits may also exclude areas adjacent to the BZ from harvesting.

- (7) In U-shaped gullies the slump height should include slump and erosion face height together.

- (8) Head scarps are the near vertical, unstable face marking the nick point in a gully or waterway. In addition to the appropriate watercourse set back, protect head scarp with an additional set back of at least 5m or three times the scarp height, whichever is greater. The appropriate watercourse filter zone is then added to make the head scarp protection zone. The head scarp protection zone extends both upstream and downstream of the nick point.

Watercourse slump protection requirements are not to be added to the head scarp protection.

See S3.7 for standard conditions.

- (9) Use U-shaped gully set back if bank is unstable.
- (10) Protection is primarily designed for small hillside waterways. Very large waterways, particularly those incorporating stream-type features, must be subject to stream protection levels. A Waterway that does not have an active zone may be treated as a general harvesting area however harvesting debris and machinery disturbance should be minimised in any obvious channel.

- (11) The WPZ is to be measured, as a minimum, from:

- the full storage level of the water feature; or
- the outer edge of the constructed bank/walls for artificial impoundments.

Damp or saturated soil associated with the water feature is considered part of the water feature and the WPZ commences from the outside edge of the damp area. Vegetation characteristic of wet soils may be present.

Additional protection requirements are detailed in Schedule 6.3.2 - Water features.

S3.3.1 Wetland protection

Wetlands are defined as per the Glossary. This is a general definition that includes watercourses, soaks, dams, water holes etc. Schedule 3.2 lists some more specific attributes of wetlands, also called water features in this Code.

Protection types

Wetlands, or water features, have two aspects of protection that must be applied:

- Physical protection (buffer and filter zones as prescribed in Schedule 3); and
- Habitat protection (as prescribed in Schedule 6.3.2).

Both of these protection requirements are applied simultaneously and are measured from the top of the defining bank (S3) or the outer edge of saturated soil/characteristic vegetation (S6.3.2).

Wetland protection requirements

marking trees for removal. Refer to the general buffer zone and filter zone conditions.

1. Classify the watercourse and any wetland/water feature –

- a. Using Diagram 1 in S3.2, classify the watercourse at the assessment point by looking upstream and downstream along both sides of the watercourse. Classify on the basis of the features providing the highest level of protection. A watercourse can only have one classification type at any point and this applies to both sides.
- b. Using Diagram 1 in S3.2, identify any water feature components; the full storage level (if any), the defining bank (if any), the extent of any saturated soil and the extent of characteristic vegetation. Use Diagram 1, S3.2, to classify the wetland/water feature as either a major or minor wetland based on the area of the full storage level, if present, or the area of saturated soil/characteristic vegetation.

2. Consult the minimum protection requirements for the class of watercourse and any wetland/water feature. Refer to the watercourse protection zone requirements listed in Table 9 in S3.3. Also apply the wetland habitat protection requirements from S6.3.2, if required.

3. Apply additional wetland protection in the following situations:

- a. Where the wetland/water feature is located within the defining banks, but is not in the main channel, the S3 and S6.3.2 buffers still need to be applied¹.
- b. A high impact earthworks² buffer of 200m must be applied to the wetland/water feature and/or watercourse³ where these are located in a:
 - i. Great Barrier Reef catchment;
 - ii. Wetland located on a Map of Referrable Wetlands;
 - iii. Wetland Protection Area;

If no high impact earthworks are required, only the required S3 watercourse and S6.3.2 wetland habitat buffers are to apply to other harvesting operations.

4. Consider the particular situation – Provide additional protection when assessing trees for removal if warranted, e.g. bank slump, tree cannot be felled away from the buffer, when

5. Apply the determined protection requirements. Overlap any wetland/water feature protection over the watercourse protection zone.

S3.4 General conditions

Protection must be increased, as necessary, to take account of the particular situation.

S3.5 Buffer zone standard conditions

BZ standard conditions are:

- No tree is to be felled if any part of the tree above ground (bole or buttress) is within or touches the BZ.
- Machines are not permitted in the zone unless at a crossing.
- Roading or snagging is prohibited along the bed of any watercourse.
- New road crossings (across streams or class 1 gully), major snag track crossings and minor snag track crossings on U-shaped gullies must be marked in the field. Crossings must:
 - be located in straight, stable sections with low banks;
 - be aligned at right angles to water flow;
 - be more than 200m from another crossing where terrain permits (and in accordance with the Operating Guidelines);
 - not involve pushing of soil or debris into watercourses or bank disturbance beyond the alignment;
 - be constructed using gravel or corduroy with minimal earth fill. Use a culvert, temporary as necessary, if water is flowing or will flow during use; and
 - have diversion drains on approaches and immediately stabilise and rehabilitate the crossing at completion of use.
- Minor snag tracks by rubber-tyred machines may only cross V-shaped gullies and waterways where the total height of any erosion face associated with the active zone is less than 30cm, and when:
 - Slump is not present outside the active zone, i.e. on the bank;
 - operationally essential;
 - the bed is dry;
 - earthworks are not required;
 - use does not create an erosion channel;
 - the crossing must be moved to another site as soon as a wear track becomes evident.
- Trees are not to be felled into the BZ unless they are done so in accordance with S3.7.
- Trees accidentally felled into the zone must be removed with minimal disturbance to soil or vegetation.
- The burning of accumulations of fuel in the BZ must be avoided.

¹ These types of wetlands/water features have very high conservation values due to their ability to function as refugia between inundation periods.

² Refer to definition of high impact earthworks in S26 of the Sustainable Planning Regulation 2009, page 187.

³ Refer to SPP 4/11, requirements for a HES wetland, Table2, page 9. Also conforms to requirements in Regional Vegetation Management Code for Southeast Queensland Bioregion – version 2, AS T.3.

S3.6 Filter zone standard conditions

FZ standard conditions are:

- Harvesting is conditional to compliance with filter zone conditions.
- Operations are prohibited when soils are wet (nearing field capacity) or saturated.
- Fell trees away from the BZ to minimise soil or understorey disturbance.
- Trees are not to be felled into the FZ unless these can be felled with minimal disturbance to soil surface cover or understorey. Disturbed areas are to be stabilised as necessary.
- Tracked snigging machines (e.g. dozer) are not to operate within the FZ except for the construction of, and/or snigging across, designated crossings.
- Major snig tracks must not enter the filter zone unless at a crossing.
- Rubber-tyred snigging, forwarding and all felling machines must minimise disturbance and use walk-over techniques where possible.
- Harvesting debris which represents a fire hazard to retained trees greater than 10cm dbhob is to be removed and placed at least 2m from the tree.
- Extraction must avoid creation of an erosion channel. This may be assisted by using mechanical harvesting equipment, log-end lifting, minimising log turning and, as appropriate, external winching.
- Actual or potential erosion channels created by extraction are to be stabilised by placement of litter and careful drainage.

3.7 Head scarp protection zone standard conditions

Head scarp protection zone standard conditions are:

- Head scarp protection zones are to be added to the appropriate watercourse setback (i.e. buffer).
- Crossings for new roads and snig tracks (minor and major) must not be located within 10m (up and downstream) of a head scarp protection zone.
- Crossings for existing roads and snig tracks (minor and major) that are located within 10m (up and downstream) of a head scarp protection zone, may be used where continued use will not accelerate erosion.
- No machinery (felling or snigging) is permitted within the head scarp protection zone.
- Trees felled from within the filter zone must be felled to the outside of the head scarp filter zone.

S3.8 Additional tree-felling rules for felling across V-shaped gullies and waterways.

The following prescriptions are additional to those in S3.5 and S3.6, and allow for the legitimate

harvesting of timber and timber products in the vicinity of stable watercourses where all other Code requirements can be met. The intention is always to fully protect the BZ vegetation and the integrity of the bed and banks of the watercourse.

BZ

The following conditions for protection of the BZ may apply:

- Trees are not to be felled across the gully or waterway when the soil is wet (nearing field capacity) or saturated.
- Felling across the gully or waterway is not to occur if a flood or storm is imminent, e.g. if the weather forecast is for storms or heavy rains that is likely to result in seasonal flow.
- Felling is not to occur if such action is likely to trigger accelerated erosion or instability of the bed or banks.
- The felled trees must bridge the active zone.
- The trees must be promptly removed, e.g. within two days.
- Harvesting debris must be removed from the BZ without the need for the machine to enter the zone and the zone is not damaged or an erosion channel created.

FZ

The intention is to ensure that the FZ is left in a condition to fulfill its filter function. This means minimal soil and understorey disturbance and avoidance of compaction or creation of erosion channels in the zone. Felling into the FZ may occur where the conditions for protecting the BZ are met and:

- Any erosion channels are repaired and stabilised
- Trees can only be felled within a FZ if minimal disturbance to the understorey can be achieved
- Harvesting debris which represents a fire hazard to retained trees greater than 10cm dbhob is to be removed and placed at least 2m from the tree.

S3.9 Impacts on the Filter zone from the harvesting area

The intention is to ensure that trees felled from within the harvesting area are harvested and removed in such a way that the FZ is left in a condition that will allow it to fulfill its filter function. This means minimal soil and understorey disturbance and avoidance of compaction or creation of erosion channels in this zone.

Trees growing in the harvesting area that are not available for harvesting because their lean dictates that they cannot be felled away from the FZ, may be felled into the FZ subject to the following conditions:

- There is a natural gap in the FZ vegetation large enough to accommodate the felled tree.
- The tree head does not fall into the BZ.
- Harvesting debris which represents a fire hazard to retained trees greater than 10cm dbhob is to be removed and placed at least 2m from the tree.
- Harvesting debris is removed from the FZ without the need for the machine to enter the BZ and the FZ vegetation is not damaged or an erosion channel created.
- Any erosion channels created in the FZ are repaired and stabilised.

3.10 Harvesting area general conditions

The general harvesting area is to be operated to avoid excessive soil disturbance and artificially concentrating or directing overland flow into the watercourse protection zone (WPZ).

Minimum distances from the WPZ for drainage discharge are:

- landing and snig track drainage 10m
- road drainage 20m
- fueling, fuel storage/waste disposal 40m

Refer also to S9.2 for critical locations.

Cattle tracks and disused roads – Watercourse protection measures do not apply to cattle tracks and disused roads unless they become an active watercourse. Avoid disturbance, cross at right angles and do not snig along cattle tracks and disused roads where possible.

Alluvial fans – Alluvial fans may be sensitive to disturbance. Fans below hillside gullies should be operated cautiously under dry conditions using filter zones or more stringent conditions over the full area.

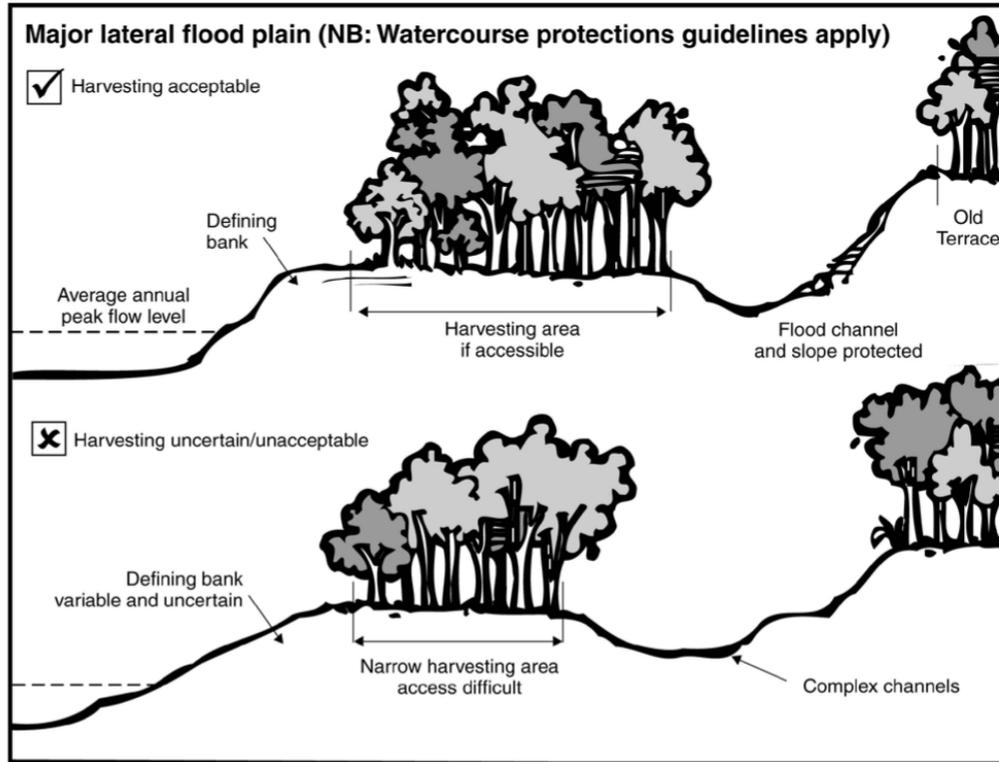
Flood plains – Flood plains are generally subject to watercourse protection requirements. The configuration of these features can be highly variable and harvesting must be carefully planned and considered.

Harvesting is not allowed on narrow lateral flood plains, including when they are enclosed by terrace banks (Diagram 3). Major flood plains or broad lateral flood plains may be complex channelised systems. Watercourse protection requirements must be applied to each of the flood plain features and the remaining area may then be planned for harvesting.

Where harvesting is deemed acceptable:

- plan operations to avoid wet or flood prone periods;
- cease operations before soils become wet or saturated;
- take particular care with crossings to avoid flood scour;
- use walk-over practices and minimise and stabilise any ground disturbance;
- manage debris to avoid turbulence, secondary damage or a fire hazard; and
- avoid activities or outcomes that may accelerate development of declared animal and plant populations.

Diagram 3 – Acceptable harvesting on a major flood plain



Schedule 4: Slope exclusion zones

S4.1 General

Operations are to be excluded from areas that are above the defined slope limits, expressed in terms of a majority slope (Table 10).

Table 10 - Majority slope limits (degrees)

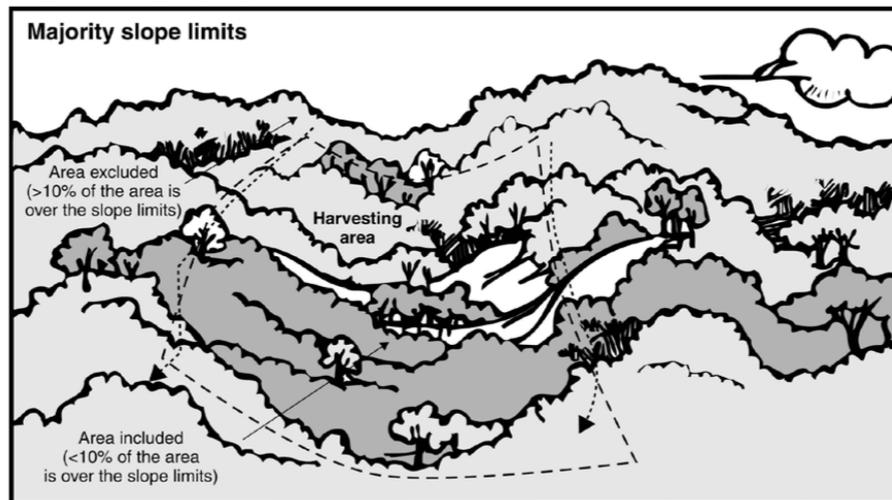
Soil Erodibility Rating	Low	Moderate	High
Majority Slope Limit (Degrees)	30	25	20

S4.2 Procedure

The procedure for slope protection is:

- determine the soil erodibility rating as prescribed in Schedule 2;
- determine the slope classes using a clinometer to measure average slope over representative distances of 20m; and
- apply the majority slope limit to each soil erodibility rating area. Areas are deemed operational if less than 10 percent of the area is outside the slope limit (Diagram 4).

Diagram 4 – Majority slope limits



Schedule 5: Instability exclusion zones

S5.1 General

Harvesting and associated activities must be excluded from areas of obvious past, present or potential instability.

Evidence of instability may be present in the form of exposed slip/slump faces, or suggested by ground cracks, geology or hummocky topography. It is important that these areas are not destabilised physically by removing trees, particularly the larger trees above the unstable area, or by the redirection of road and track drainage into the unstable area.

S5.2 Restrictions

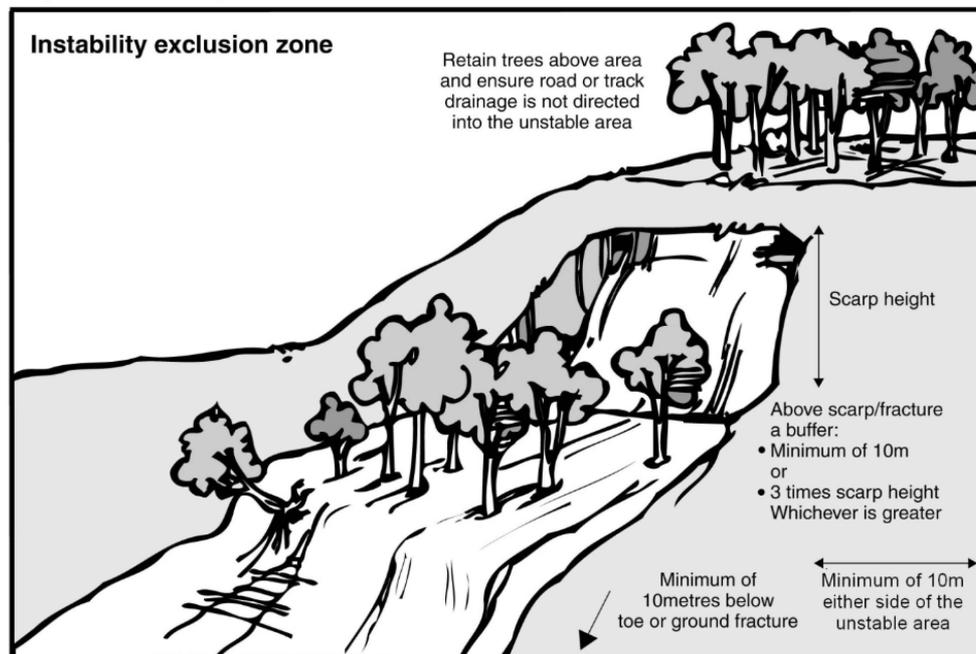
Road construction must avoid areas of instability and ensure that drainage is not directed into unstable areas.

Harvesting must be restricted in and around areas of instability. Large areas of instability must be excluded from the harvesting area. Small areas may be included but subject to restriction. Areas of instability should be judged on the particular circumstances and likely level of interference.

A minimum exclusion zone must provide:

- a distance above the slip face equal to three times the height of the face or 10m, whichever is greater;
- a distance of 10m below the toe of the slip or unstable area (Diagram 5); and
- a minimum distance of 10m either side of the unstable area.

Diagram 5 – Instability exclusion zone



Schedule 6: Nature conservation

S6.1 Species protection

S6.1.1 In addition to section 2.3.2.1, where threatened species (refer Glossary for definitions) are known or are likely to occur and are likely to be impacted on in the course of harvesting operations, protective measures consistent with systems and prescriptions provided by relevant government agencies are to be applied.

S6.2 Regional Ecosystem (RE) protection

S6.2.1 Harvesting is not permitted in 'rainforest' regional ecosystems defined by the Queensland Herbarium. Once regional ecosystem boundaries are established, trees must not be felled into rainforest regional ecosystems. Distinct regional ecosystems are recognised down to one hectare in area.

S6.2.2 Individual rainforest tree species >25cm dbhob in non-rainforest regional ecosystems must be protected from harvesting damage unless there are no alternatives for access, or they present an unacceptable safety risk. This restriction does not apply to natural hoop pine, bunya pine or kauri pine trees or other rainforest species commonly found in the lower stratum of non-rainforest ecosystems.

Standing dead rainforest tree species that are not required for habitat may be salvaged (harvested).

S6.2.3 In the context of the Code, the construction or re-opening of access tracks and/or snig tracks through rainforest regional ecosystems is not permitted unless this is in accordance with Core section 1.3.

S6.2.4 RE Planning

Clearing

In the context of timber harvesting, clearing will be minimised in all REs.

Where it is demonstrated that there are no practical alternatives, limited clearing is permitted for new roads, landings, major snig tracks and camping and processing sites. (See Appendix 2 for a definition of clearing that applies under this Code).

Where there are no economic or practical alternatives, the following clearing limits will apply:

- endangered REs – no clearing as defined in Appendix 2 of the Code;
- of concern REs – clearing to be minimised and in all cases the total area of clearing will be restricted for individual patches or REs in accordance with Table 11 below; and
- not of concern REs – clearing to be minimised.

Where prescribed clearing limits listed in Table 11 for "of concern" REs are likely to be exceeded, or if an endangered RE boundary or type is in dispute, Forest Products will develop an accurate RE map of the area in question at an operational scale as part of the OHP process. This map can be used for seeking OHP approval when required. This action may be undertaken initial OHP preparation or at any time Forest Products becomes aware of an issue during the course of harvesting.

Mapping

The available RE mapping (generally at 1:100,000 scale) will be incorporated into the OHP documentation. Forest Products will obtain the RE mapping from the relevant agency or Queensland Herbarium.

QPWS may request maps from Forest Products on a case-by-case basis for endangered REs where the boundary is changed.

Contiguous areas

When calculating a 'contiguous area', the patch of an individual RE type within the OHP boundary and an adjoining RE of the same type outside the harvesting area but within the adjoining State forest estate will be considered as a whole.

Rainforest REs

Construction or re-opening of roads and snig tracks through rainforest REs is not generally permitted. However QPWS may approve, on a case-by-case basis, the construction or re-opening of roads and snig tracks through rainforest REs where there is no alternative access. QPWS will consider the alternative access options, taking into account net environmental impacts, cost, safety, and practicality.

Table 11: Allowable clearing¹ limits within contiguous “of concern” REs

Area of RE ² (ha)	Maximum Allowable Clearing ³
0 - < 2	Nil ⁴
2 - < 10	0.5 ha
10 - < 20	1 ha
20 - < 40	2 ha
40+	5 % of RE patch

1. See Appendix 2 for definition of clearing that applies under this Code.
2. Of RE occurring as a contiguous area within the State forest.
3. Within a contiguous area.
4. Where harvesting occurs use ‘walkover’ snigging techniques.

S6.2.5 Definition of clearing

For a definition on clearing, refer to Appendix 2.

S6.3 Habitat trees

S6.3.1 General

Habitat trees and recruitment habitat trees are those that are required to be retained for wildlife conservation purposes. The following standard requirements for the retention of habitat and recruitment habitat trees must be applied to all harvesting operations.

Alternative approaches may be permitted where the proposal conforms to the recommendations of the report by the Habitat Tree Technical Advisory Group entitled “Managing Habitat Trees in Queensland Forests”, (April 1998), or provides equal or better environmental outcomes. This includes applying the “Landscape Approach to Habitat Tree Protection and Management” detailed under section Q4b of the report.

S6.3.2 Habitat tree and recruitment habitat tree requirements by forest types

Note: Where referred to in this schedule, “per hectare” habitat tree and recruitment habitat tree requirements apply to each hectare of the harvesting area. This is consistent with retaining the desired spacing of habitat and recruitment habitat trees at a landscape level. A habitat or recruitment habitat tree may be either merchantable or non-merchantable.

Hardwood forests within the greater glider range

A minimum of six live habitat trees and two recruitment habitat trees per hectare will be designated and retained throughout the harvesting area.

Hardwood forests outside the greater glider range

A minimum of four live habitat trees and one recruitment habitat tree per hectare will be designated and retained throughout the harvesting area.

Cypress forests

Where available, a minimum of two live habitat trees and one recruitment tree per hectare will be designated and retained throughout the harvesting area.

Where the number of habitat trees available does not meet the required standards, additional recruitment habitat trees must be selected according to Table 12.

Table 12 - Selection of Habitat and Recruitment Trees

Hardwood forests within the greater glider range		Hardwood forests outside the greater glider range		Cypress forests	
Number of habitat trees available/ha	Number of recruitment habitat trees/ha	Number of habitat trees available/ha	Number of recruitment habitat trees/ha	Number of habitat trees available/ha	Number of recruitment habitat trees/ha
6	2	4	1	2	1
5	4	3	3	1	3
4	5	2	4	0	4
3	7	1	6		
2	8	0	7		
1	10				
0	11				

Where habitat trees occur uniformly on the harvesting area, additional recruitment habitat trees must be retained according to Table 13 where >50 percent of the basal area of the stand (on a per hectare basis) is to be removed. The most appropriate recruitment habitat tree is to be selected using S6.3.4. Where the required numbers of these additional trees are not available in a particular size class, trees must be retained in the size class below at a rate of 1.5 trees for every tree below the required number (or round up if the number is a fraction).

Table 13 - Additional recruitment habitat trees where >50 percent of basal area is removed

Size class (dbh in cm)	Number of additional recruitment habitat trees to be retained per hectare
60 - 70	2
50 - 60	3
40 - 50	4
30 - 40	5
20 - 30	6
10 - 20	9

Water features/Wetlands

All trees greater than 60cm dbh must be retained as habitat trees or recruitment habitat trees in areas designated as water features/wetlands and within a 30m zone around water features (water features are defined in Schedule 3 Watercourse protection, see also definition of Wetland).

S6.3.3 Habitat tree selection criteria

The aim of habitat tree selection is to retain the larger living trees that contain the most hollows

and are likely to persist over several harvest rotations. Selected habitat trees must be dominant or co-dominant trees, with at least one 'hollow' 10cm or greater in diameter. The 'hollow' must be visible and greater than 2m above the ground (Diagram 6).

Habitat trees, should be evenly spaced wherever possible on each hectare.

Where there are more than the required number of habitat trees, the following hierarchy will be used to select habitat trees:

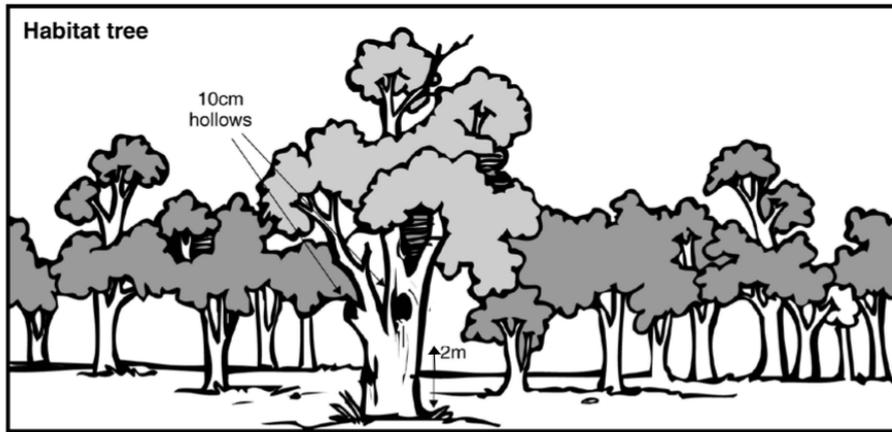
1. **Size** – Habitat trees greater than 80cm dbhob must be selected wherever available, as they have the highest chance of containing large or multiple hollows.

Further selection must be made in the 50-80cm dbhob range.

Smaller hollow-bearing trees, less than 50cm dbhob, are selected only when sufficient larger trees are not available.

2. **Habitat characteristics** – In addition to having a hollow, the presence of mistletoe, epiphytes, fungal bodies, termite nests and 'deformities' that provide habitat.
3. **Species** – Habitat trees must be chosen in proportions which reflect the overall species mix present on the site, unless there are documented special reasons to favour species that are particularly valued by wildlife.

Diagram 6 – Habitat tree



S6.3.4 Recruitment habitat tree selection criteria

The aim of recruitment habitat tree selection is to retain the trees with the greatest potential to become habitat trees in the shortest time. These recruitment habitat trees shall be from a species known to develop hollows earlier, that live a relatively long time (this may include, but is not exclusive to, *Eucalyptus*, *Corymbia* and *Angophora* species) and be as evenly spaced as possible.

Consistent with the above requirements, the following hierarchy of criteria must be used in the selection of recruitment habitat trees:

- Trees which are at least co-dominant from within a range of size classes representative of the stand and with habitat forming characteristics, including damaged or senescing crowns, visible termite nests or other deformities, or, if these are not available;
- Other trees with habitat forming characteristics, including damaged or senescing crowns, visible termite nests or other deformities, or, if these are not available;
- Trees which are at least co-dominant that don't as yet exhibit habitat forming characteristics.

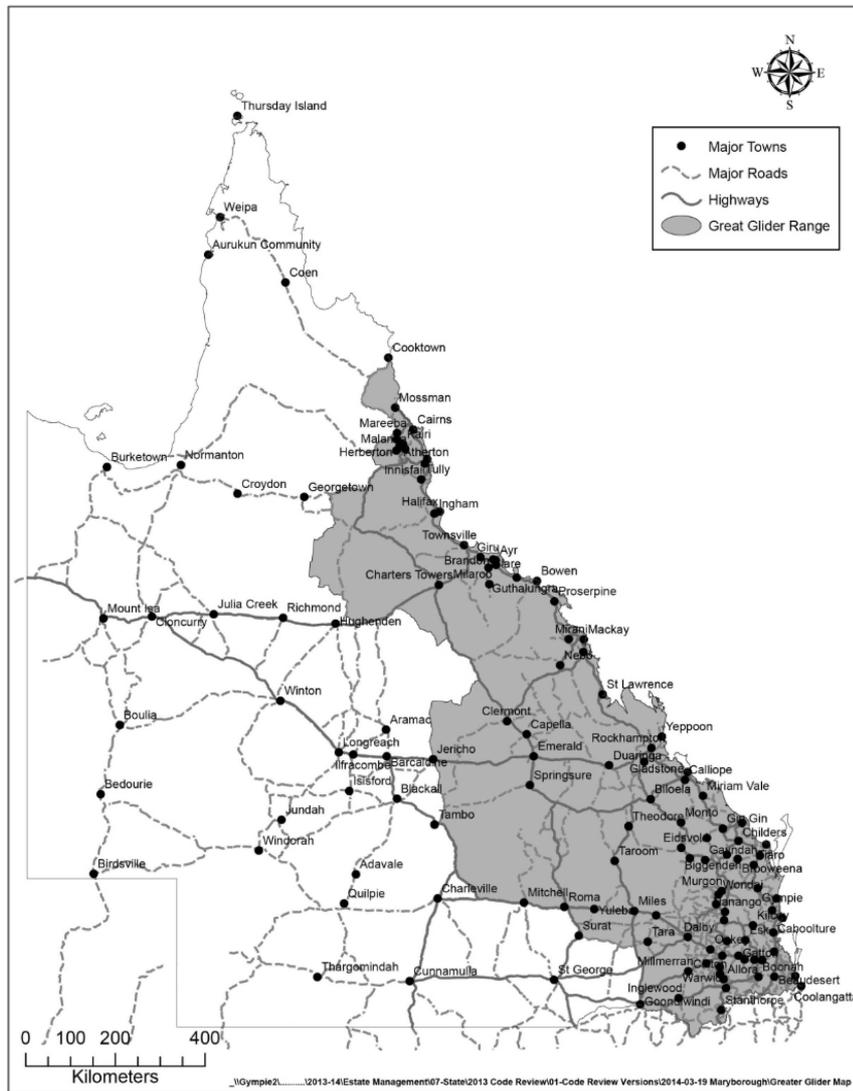
S6.3.5 Inclusion of trees from exclusion zones, other retained trees and standing dead trees

No more than 50 percent of the habitat trees and recruitment habitat trees in any one hectare can be counted from exclusion zones.

Trees retained because they contain active bird nests, other native fauna or termite nests with hollows, and trees retained under SMPs (e.g. yellow bellied glider feed trees), may be counted as habitat or recruitment habitat trees provided they meet the selection criteria.

Standing dead trees and stags with hollows, or deeply fissured or cracked bark, must be retained unless they are a safety or fire hazard. Standing dead trees and stags that contain an active nest or any raptor nest must be retained (see also S11.2).

Map 1 – Predicted range of the greater glider, *Petauroides volans*, in Queensland
 Distribution based on *The Mammals of Australia* (Strahan (ed.) 1995, Wildnet sightings⁴ and the IUCN Red List of Threatened Species - Version 2014.1⁵.



⁴ Department of Science, Information Technology, Innovation and the Arts (2014) WildNet. (Database). Department of Science, Information Technology, Innovation and the Arts, <15/02/2012>

⁵ Lunney, D., Menkhorst, P., Winter, J., Ellis, M., Strahan, R., Oakwood, M., Burnett, S., Denny, M. & Martin, R. 2008. *Petauroides volans*. <www.iucnredlist.org>. Accessed 17 Feb 2012. Map located at <http://maps.iucnredlist.org/map.html?id=40579>.

S6.3.6 Habitat and recruitment habitat tree management

Habitat trees and recruitment habitat trees must be identified, marked or otherwise protected where they may be at risk of harvesting damage or deliberate felling.

To minimise fire damage, felling must not accumulate harvesting debris within 2m of habitat trees and recruitment habitat trees, and felling or snagging must not physically damage the bole of the tree.

Habitat trees and recruitment habitat trees are to be retained in subsequent harvesting operations including sales of firewood, fence posts, landscape materials, poles and silvicultural thinning (for retained tree damage or regeneration issues refer also to S10.3).

S6.4 Feed, shelter and nest trees

S6.4.1 Trees sheltering animals – Trees in which any native fauna species is visible must be protected from harvesting or harvesting damage until the animal moves out of danger of its own accord. Cutters shall inspect trees for the presence of native fauna species.

S6.4.2 Feed trees – Feed trees will be protected in accordance with the relevant SMP.

S6.4.3 Trees with active nests – Trees and shrubs containing active bird nests must not be harvested, damaged or otherwise interfered with during harvesting. Active bird nests are those of native species that contain eggs, sitting birds, nestlings or are in the process of being constructed.

Where there is a possibility that a nest is active, a precautionary approach must be used and the nest must be protected.

Trees with nests of birds of prey (raptors), which are re-used year after year, must be protected whether active or not.

Tree markers and/or cutters shall visually inspect trees for active bird nests and identify those trees requiring protection.

Where the species cannot be identified or is not a species for which an SMP has been prepared, the following harvest exclusion zone will be established around the nest or nest tree:

- For nests greater than 50cm in diameter – a radius of 50m around the nest tree.
- For nests 50cm or less in diameter – equal to the height of the tallest tree in proximity to the nest; and

- For understorey and ground-nesting species – equal to the height of the tallest tree in proximity to the nest.

Schedule 7: Protection of special forest values

S7.1 This section intentionally removed from the Code

S7.2 Cultural heritage

Cultural heritage will be addressed by reference to any applicable cultural heritage management requirements, the *Queensland Heritage Act 1992*, and the Aboriginal and Torres Strait Islander Cultural Heritage Database and Aboriginal and Torres Strait Islander Cultural Heritage Register administered by DATSIMA.

All proposed harvesting areas must be assessed for cultural heritage values and relevant values protected before operations can begin.

Relevant sources of information for protective measures are:

- QPWS Cultural Heritage Management Manual, and
- Aboriginal and Torres Strait Islander Cultural Heritage Database and Aboriginal and Torres Strait Islander Cultural Heritage Register administered by DATSIMA

S7.3 Landscape and visual protection

S7.3.1 General

The objective of this Schedule is to minimise loss or degradation of visual resources, recreation settings and visitor opportunities resulting from timber harvesting operations. In particular, this schedule establishes standards for protecting areas that are identified for landscape protection and/or visitor use.

Where areas are zoned for landscape protection and visitor use, both sets of protection measures must be applied.

S7.3.2 Landscape protection

Feature protection area (FPA) protection measures include:

- Where forest management plans or FPA management plans exist, the management and protection of FPAs must be in accordance with these.
- Where forest management plans or FPA management plans do not exist, timber harvesting must be excluded from gazetted or proposed FPAs; and
- A 20m harvesting exclusion zone must be applied to all gazetted or proposed FPAs.

Visual resource protection area (VRPA) protection measures include:

- Where forest management plans exist, the management and protection of VRPAs must be in accordance with these;
- Where forest management plans do not exist, harvesting operations should range from being temporarily apparent (i.e. apparent for less than 12 months) to not evident. When apparent, the period of impact should not exceed one year from the date of commencement of harvesting of the VRPA. Alterations to the landscape must be minimised and not significantly alter the form, line, colour or texture of the natural landscape.

VRPAs seen primarily in the foreground, (vegetation density: open – 500m, sparse – 100m, dense – 20m) shall be protected by:

- enforcing a 10m non-clearing zone around viewing points, roads and walking tracks;
- limiting canopy reduction to a maximum of 50 percent in any 0.2ha;
- breaking down all harvested tree heads within safety constraints to a height of less than 1m within 30m of formal viewing points, roads and walking tracks;
- applying a machinery exclusion zone of 20m around viewing points, roads and walking tracks;
- promoting the retention and development of large trees within the foreground of viewing points, roads and walking tracks by removing upper diameter cutting limits and retaining the largest diameter live tree, regardless of age or crown score within each hectare of the foreground;
- reducing the visual impact of roads and snig tracks by limiting the length of track visible within safety constraints. This can be achieved by changing direction on a regular (short section or curves) or irregular (in line with the form of the landscape) basis, or by retaining vegetation around those sections of the harvesting area; and
- not positioning landings within the foreground of viewing points, roads and walking tracks.

VRPAs seen primarily in the middle ground (0.5km - 6km), or background (6km to 16km) shall be protected by:

- ensuring harvesting operations are spatially and temporally planned for to reduce the amount of disturbance in the forest area at any time;

- ensure that harvesting area edges and boundaries conform to the natural landform;
- positioning harvesting areas to protect visible skylines; and
- limiting canopy reduction to a maximum of 50 percent on any one hectare site.

S7.4 Protection of visitor areas

Formal visitor node protection measures include:

- Apply a 100m harvest exclusion zone where harvesting adjoins a formal visitor node and around the perimeter of the formal structures (e.g. car parks, shelter sheds, picnic tables etc.).
- Restrict log haulage past formal visitor nodes to outside peak visitor use times; and
- Plan harvesting operations outside the exclusion zones to be visually and audibly inconspicuous at peak use times.

Informal visitor node and formal visitor road and track (including forest drives) protection measures include:

- As for VRPAs seen primarily in the foreground.
- Restrict log haulage along formal visitor roads to outside peak visitor use times.
- Plan harvesting operations to be audibly inevident from visited areas during peak use times.

No specific protection measures are required for informal tracks or trails.

Schedule 8: Forest road and track management

S8.1 General

This schedule sets out the management standards to be applied to the planning, construction and maintenance of forest roads and tracks.

S8.2 Planning

Roads and tracks must be planned to ensure efficient and economic harvesting and haulage practices and with the least overall adverse environmental impact.

Planning must provide a road network of a standard (Table 14) and density that is the minimum necessary to achieve operational efficiency. This must include:

- consultation with interested groups including relevant authorities where access is proposed to join a gazetted road;
- a survey of the proposed road alignment at an intensity appropriate to the road standard to prove the alignment, check watercourse crossing points and identify construction or environmental issues. Soil erodibility (Schedule 2) should be assessed during the survey. Alternatively, where a survey is not conducted, soil erodibility must be accepted as being high; and
- advice and endorsement from an expert where primary or secondary access roads or where structures, instability, drainage design or safety issues are involved.

S8.3 Location

Roads must be located to best optimise:

- protection of forest values and exclusion zones;
- catchment and watercourse protection – minimise:
 - interference with natural drainage systems;
 - where possible, the catchment area above the road; and
 - the number of watercourse crossings.
- road alignment – by minimising the total necessary road length, tortuosity and grade;
- forest management – maintain or enhance forest management;
- landscape values – fitting roads into the landscape and minimise the alteration of natural features to avoid or minimise adverse visual impact;
- minimise earthworks where possible and facilitate drainage by:

- locating the road on naturally drained or easily drainable features such as ridge tops, benches and gentle slopes;
- avoiding areas prone to instability or flooding;
- avoiding the use of box cuts, which are difficult to drain, unless overall impact is less than alternative locations;
- limiting side cutting and avoiding potential instability by restricting construction to side slopes less than 30 degrees; and
- balancing cuts and fills to minimise transport or wastage of fill material.

S8.4 Basic design guidelines

Design standards must be the minimum to achieve the required road function and be capable of carrying the anticipated frequency, type and speed of traffic safely while protecting environmental values. Design standards must be appropriate to site conditions to ensure stability, maintain integrity of fill and cut banks, and provide adequate drainage and sediment control measures. Access class, standards and suggested densities are indicated in Table 14.

Table 14 – Basic design guidelines of access classes

Design parameter	Access class			
	Primary access road	Secondary access road	Minor access road	Temporary track
Life, function, and density	Permanent arterial road serving areas >15,000ha	Permanent haul road serving areas >5000ha	Permanent feeder road serving areas <1000ha	Temporary haul track from landing to roads (1)
Trafficability standard	Two lane, all weather	Single lane, all weather	Single lane, dry weather	Single lane, dry weather
Formation type (2)	A or B	A or B	A,B or C	Minimal D (3)
Pavement surface (4)	Gravel	Gravel Patch gravel	Natural Patch gravel	Natural
Pavement width (4)	6m	4m	4m	<4m
Shoulder width	1.0-1.2m	0.6-1.2m passing bays may be required.		Nil
Radius of curves	Vertical and horizontal radius to must provide haul trucks with safety and visibility at the design travel speed			
Clearing width (5)	1 metre beyond earthworks plus safety considerations			
Optimal grade (6)	7 degrees	7 degrees	9 degrees	8 degrees

Notes for table 14

- (1) **Haul track density** must be appropriate to ensure efficient and economic harvesting and haulage practices. In general, harvesting road access will entail construction of temporary tracks that may serve larger areas, as shown in Table 14.
- (2) **Formation types and design features** are illustrated in Diagram 7.
- (3) **Haul tracks** generally use a flat-bladed formation. These must be located and aligned to involve the absolute minimum in clearing and earthworks to provide for practical use and safety. Avoid box cuts unless absolutely necessary. Formation should avoid creation of an edge berm. Location must use natural features to facilitate natural drainage. Wet spots in the track surface must not be bypassed but be either drained, raised or corded.

- ensure any edge berm is breached at water bar spacings to permit drainage;
- consider the use of inverts or roll-over water bars for cross drainage during use or where the track has to remain trafficable; and
- use water bars only where the track is no longer required.

- (4) **Pavement width and surface** must be matched to road use. Gravel is necessary to ensure traction, avoid rutting and to maintain effective drainage.

Surface drainage must maximise the use of natural drainage and:

- (5) **Clearing width** may be extended to avoid a safety risk. Extend by the minimum necessary to correct the risk or consider alternatives such as restricting traffic to “one way”.
- (6) **Grades** – Steeper grades may be permitted where construction results in less disturbance and can be safely used. Gravel may be needed to access steeper slopes.
- (7) **Drainage** must be in accord with Schedule 9.

S8.5 Design of watercourse crossings

Existing crossings must be used provided they are capable of accommodating the traffic and are stable, safe and pose no environmental threat.

Proposed or upgraded crossings on haul roads must be capable of accommodating the traffic and watercourse flows, and be safe, stable, and not pose an environmental threat. Crossing sites must be identified and located before construction commences.

Crossings must be sited in straight sections of the watercourse where practicable with low and stable bank formations where approaches will cause minimal disturbance (Diagram 8). Align crossings, as close as practical, at right angles to the water flow. Avoid deeply box cut approach slopes and design drainage to divert road water to stable vegetated areas so it can be filtered prior to entry to the watercourse (See Schedule 3).

Design and location must be consistent with watercourse protection (Schedule 3) and the following:

Bridges and culverts are the preferred method of crossing permanent or intermittent watercourses. These must be designed and engineered to have structural integrity and must:

- be sized to cause minimal impedance to flow and, at minimum, contain a 1 in 5 peak flow event and withstand a 1 in 10 peak flow with minimal structural damage including provision for overflow to carry flood flows;
- provide for protection and stability of abutments, bed and adjacent banks;
- prevent any soil or gravel fill on the deck from falling into the watercourse;
- prevent water from ponding on the upstream side of the crossing during normal low-flow events;
- prevent any water from ponding on the bridge; and
- provide for any necessary passage of fish or other aquatic life.

Causeways and fords are suitable for crossings that are used infrequently, where usage occurs during periods of low flow or where regular flooding prevents economic or effective bridge construction. Sites must be naturally stable or engineered to provide function and environmental protection.

The crossing must be installed at the existing bed level height so as not to impede water flow and movement of aquatic species and at the same upstream-down-stream gradient as the watercourse.⁶

Approaches must be gravelled or otherwise stabilised to minimise turbidity in wet crossings.

Temporary crossings must be minimised. Crossings must not involve earth fill but may be gravelled or corduroyed to bed level height. Use a temporary culvert if the crossing will be used when water is flowing, and use would otherwise create a threat to water quality.

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.

⁶ These requirements conform to the requirements of the Code for self-assessable development: temporary waterway barrier works (WWBW02)

Diagram 7 – Road formation types and design features

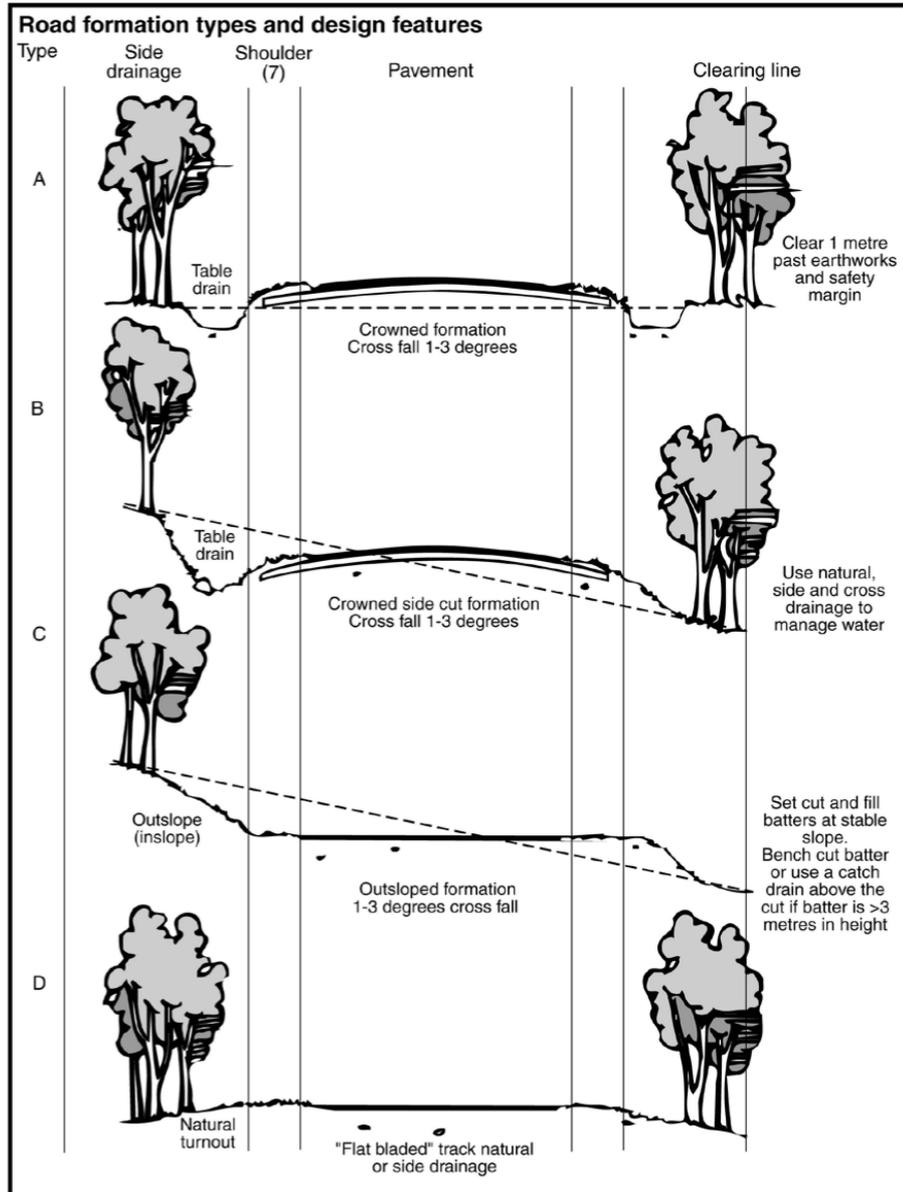
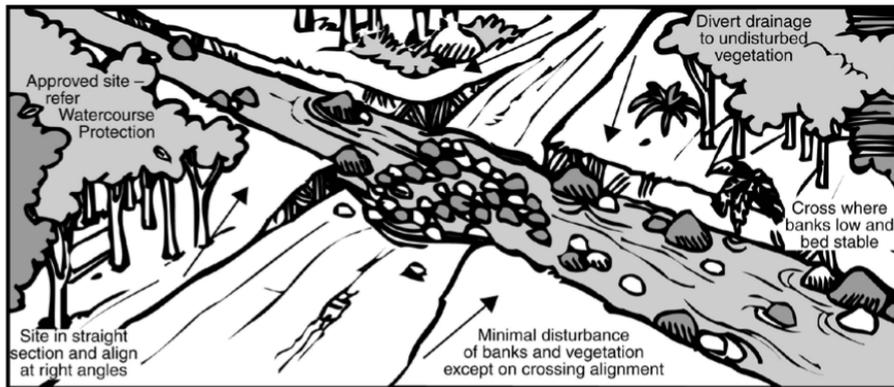


Diagram 8 – Watercourse crossing



S8.6 Construction

Construction methods and standards shall reflect best practice. They must include the following:

- All persons involved in road construction and maintenance must be properly trained in the techniques and precautions required to prevent soil erosion and water pollution.
- Equipment must be selected on the basis of efficiency and the ability to minimise soil disturbance. Excavators are preferred for major earthworks and watercourse crossing construction.
- Waste and hazardous substance management must conform to Schedule 17;
- Pests, weeds and disease management must conform to Schedule 15;
- Construction of primary and secondary access roads must be scheduled for the drier periods of the year to:
 - avoid accelerated soil loss or degradation of water quality;
 - allow for consolidation; and
 - take advantage of adequate soil moisture for soil working and compaction.
- Construction of primary and secondary roads must be undertaken in planned stages to ensure that the area of disturbance is minimised at any one time and then progressively stabilised.
- Clearing, where permitted, must be undertaken in stages to minimise the total area of exposed soil at any one time. Debris should be retained for temporary stabilisation. Width must be the minimum to permit efficient construction, allow the road surface to dry, and to provide an appropriate line of sight. The maximum clearing width may be extended to eliminate any safety hazards.
- Areas cleared beyond the earthworks must retain the maximum possible amount of topsoil/ground cover to maintain stability.
- Trees or other products should be salvaged from the alignment wherever possible.
- Clearing waste (organic, soil or rock) should be used, where possible, to stabilise earth banks. It should not be included in the road fill, pushed into exclusion zones or placed where it will damage the forest.
- Topsoil that is stripped must be stockpiled for use in stabilisation and rehabilitation;
- Earthworks must be kept to a minimum in line with the long-term road stability and efficient future maintenance. Where practical, cuts and fills should be balanced along the road to minimise costs and to use the earth within the road alignment.
- Batters for earthworks must be designed to be no steeper than the in-situ soil stability allows and take into account the dip angle of the rock. Where this is not possible, cut batters must be benched to reduce the exposed vertical face. Batters must be graded to control erosion, aid establishment of vegetation and to minimise visual impact. Batters must be stabilised during and following construction, and before the removal of machinery, by:
 - constructing catch drains above the cut batter;
 - sloping or stepping of batters;
 - providing flumes or other protection on drain outlets on fill banks; and
 - using surface covers or revegetation.

- Quarries and borrow pits should where possible be sited to avoid adverse visual impact and be:
 - minimum in number and size;
 - constructed with stable batters and drained and maintained during use; and
 - stabilised and rehabilitated after use.
- For primary and secondary roads, compaction by other than gravel or timber trucks must be used to provide adequate strength to load bearing sections and prevent rutting and subsequent damage during use. Surface gravel must be smoothed and compacted to create a water-shedding and lasting pavement.
- Roads and tracks are to be provided with adequate drainage in conformity with Schedule 9, to protect the road, avoid soil erosion and minimise watercourse sedimentation. Wherever practical, drainage should be installed in advance of other construction to keep the works as dry as possible. During construction all disturbed areas must be adequately drained or stabilised when there is a reasonable expectation of an extended period of heavy rainfall, storm, cyclone or other event. Drainage and stabilisation measures may include:
 - stockpiling loose materials where they can be protected from erosion;
 - draining the surface using cross fall and controlling surface run off by using natural drainage patterns, table and side drains, culverts, inverts or water bars; and
 - discharging waters on stable areas, undisturbed vegetation or a hardened site/structure and not directly into watercourses or on exposed soil or fill slopes.
- Watercourse crossing construction must be managed to minimise impacts to water quality and disturbance of watercourse bed and banks. Approaches to crossings must provide for drainage diversion on to vegetation and sediment traps so that unfiltered run off cannot flow directly into watercourses. Construction must ensure that:
 - clearing, where required and approved, is confined to the alignment, and trees are felled away from the watercourse;
 - disturbance to bed and banks is minimised;
 - spoil is not pushed into the watercourse;
 - machinery is not used in the watercourse unless essential, and then confined within the alignment. Excavators are preferred;
 - debris and temporary structures are removed unless removal poses a greater risk, and;
 - bed and banks are stabilised after construction.
- Pavement materials and surfacing must provide a stable, load bearing and smooth surface that will provide for overland flow and shed water. Suitable, on-site or imported, materials consisting of a mixture of graded stone and clay binder must be placed and compacted. Thickness depends on material quality, load bearing requirements and the size of the largest particle. As a guide, depth should be approximately 1.5 to 2 times the size of the largest particle to provide a smooth running surface. Patch gravelling should be done as necessary to maintain function and/or avoid road surface damage.
- Signs should be erected as necessary. Signs, where used, should conform to the QPWS Sign Manual and, as appropriate, comply with either the Manual of Uniform Traffic Control Devices (MUTCD) and the Traffic and Road Use Manual (TRUM) and/or TC Signs⁷.

S8.7 Reopening of access

Re-opening of access must restore the road, drainage systems and watercourse crossings to Code standards, including stabilisation requirements. Washouts or sites of potential instability must be stabilised and protected.

S8.8 Temporary closure

Where roads and tracks are temporarily closed, they must be stabilised, drained and left to revegetate to control soil erosion without the need for maintenance.

⁷ The TC signs are a collection of non-standard traffic control (TC) signs that have been "officially approved" (as required by the Transport Operations (Road Use Management Act 1995)). These signs have been designed for specialised use and designed to comply with the guidelines set out in the traffic and road use management (TRUM) manual and the manual for uniform and traffic control devices (MUTCD). These are located at: http://www.tmr.qld.gov.au/~link.aspx?_id=B24AA9D555294A16B9E93B90AB73348B&_z=z.

S8.9 Maintenance

Access roads and tracks must be maintained to ensure a stable and good running surface, effective drainage and safe use. Road surfaces, crossings and drainage systems must be inspected sufficiently to ensure that they are functional, safe and in a stable state. All drains must be inspected thoroughly and repaired before the onset of the wet season and during and after periods of heavy rainfall.

Maintenance techniques must:

- return usable material to the pavement and avoid lowering the road surface in a way that impedes surface drainage or concentrates flow along the road edge;
- restore the road profile and smooth the road surface using compaction to strengthen, seal and preserve pavement life;
- restore drainage systems including any erosion control devices;
- ensure water can freely drain from the surface and is not blocked by vegetation or a berm unless the berm is used as part of the drainage system;
- minimise or avoid disturbance to soils adjacent to the road;
- avoid deposition of spoil or sediment into watercourses;
- manage road-side vegetation to maintain safety and road-edge bank stability;
- employ hazard warning devices while maintenance operations are in progress.

S8.10 Decommissioning

Unless formally advised otherwise, roads that are no longer required for timber extraction and forest management must be stabilised, rehabilitated, permanently closed (where applicable), decommissioned and allowed to regenerate as follows:

- Recovery of materials is permitted provided it does not result in material or serious environmental harm. Removal must not adversely impact on water quality and disturbed areas must be drained and stabilised.
- Watercourse crossings must be removed unless their presence does not pose a threat and/or removal will create greater damage than retention.
- Crossing materials used for temporary access must be removed.
- Bed and bank contours must be reinstated and stabilised.
- Approaches must be drained and stabilised.
- Where beneficial in controlling accelerated erosion, road surfaces must be levelled to avoid concentrations of water on or along the surface. Provide pronounced outslope, water bars or other cross drainage structures and prepare surface to stabilise it against erosion, spread debris and encourage revegetation, naturally or artificially, without the need for maintenance.
- Where barriers are to be installed to prevent access to permanently closed roads, they must be placed in a safe and practical location. These roads are to be identified in the OHP.

Schedule 9: Forest road and track drainage

S9.1 General

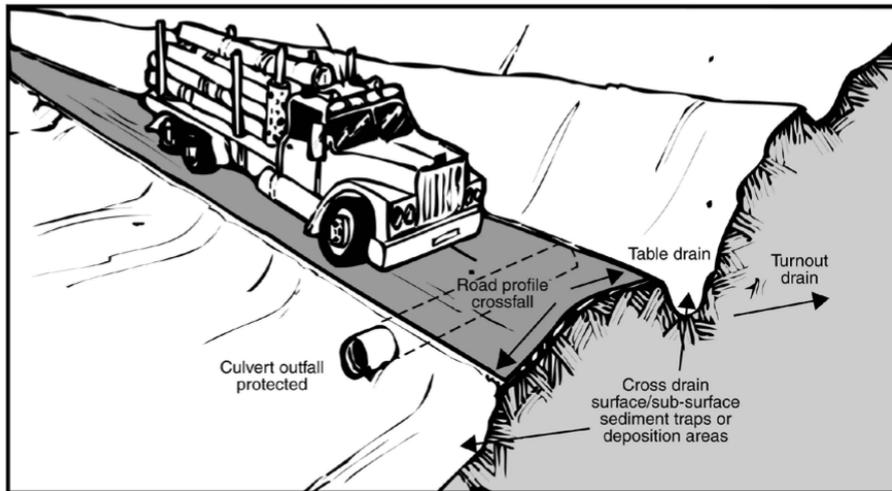
Roads and tracks must be provided with an effective drainage system, to meet normal rainfall events, and to maintain the load bearing capacity of the pavement, minimise soil erosion from either the pavement or drains, and minimise sedimentation of watercourses. Without accelerating soil erosion, an effective drainage system will:

- stop water from adjacent areas from flowing on to, or saturating, the pavement;
- shed surface water from the pavement; and
- collect surface and subsurface waters and divert this away from the road.

Drainage systems will consist of various combinations of:

- catch drains to intercept and divert water from batters or the road;
- a road profile, crowned, outsloped or insloped, that sheds water from the surface;
- a drain network that takes shed and intercepted water away from the roadway and may include a system of table, turnout and cross drains;
- breaches where berms prevent water shedding from the road; and
- sediment traps or vegetated areas where water will decelerate and deposit sediment (Diagram 9).

Diagram 9 – The basic road drainage system for A, B and C type formations.



S9.2 Basic principles

All timber roads, tracks or snig tracks must use natural drainage where present, otherwise appropriate drainage must be constructed and maintained in an effective state during and after the completion of use. This can be achieved by applying the following:

- Locate drains at **critical locations** such as:
 - significant changes in slope or direction (a change of two grades of slope, as per Table 15);
 - points of concentration of overland flow (refer also S3.8); and
 - 10m before any watercourse crossing or junction with another track or landing, or at the closest practical point where water can be diverted (refer also S10.6).
- Drainage systems must provide protection for normal rainfall events. Variations to Table 15 may be appropriate in situations where the drainage system design is not sufficiently robust to accommodate normal flow events without damage, or this will result in less overall environmental impact.
- Location and outflow from drains must be carefully planned to avoid:
 - causing accelerated erosion of adjacent land or watercourses because of inappropriate redirection of concentrated and increased water flow and velocity;
 - accelerated erosion of unprotected fill banks.
- Drain profile must be consistent with soil type and the avoidance of erosion. Flat bottomed drains should be used where erodibility is high.

- Drains susceptible to scour because of soil type, grade, water volume or velocity must be suitably armoured using vegetation, rock or other materials.
- Drainage design should ensure flow without scour (as per S9.3).
- Drainage, where required, is constructed and spaced in accordance with Table 15.
- Construct additional drains, where required, in addition to spacing requirements.

Table 15⁽¹⁾ – Guide to cross and turnout drain spacing (metres)⁽⁵⁾

Grade ⁽⁴⁾	Cross drain offset	Soil erodibility rating ⁽²⁾ by regions ⁽³⁾								
		Low			Moderate			High		
Degrees	Degrees	C	SC	W	C	SC	W	C	SC	W
<3	Up to 30	150	175	200	110	145	175	60	70	100
3-5.9	Up to 30	110	140	160	70	100	120	40	50	60
6-7.9	Up to 20	80	100	120	50	65	75	30	35	40
8-10.9	Up to 20	50	60	75	35	40	50	20	20	25
11-14.9	Up to 10	30	35	40	20	25	30	15	20	20
15+	Up to 5	20	20	20	15	15	15	15	15	15

Table 15 Notes

- (1) Table 15 is designed to provide effective drainage requirements. However, specific conditions should be taken into account to ensure normal rainfall events can be effectively managed.
- (2) If erodibility is unknown seek expert advice or use high erodibility.
- (3) C = Coastal region; SC = Sub-coastal region; W = Western region – see Diagram 10 – Soil Erodibility Regions.
- (4) Spacings for other combinations of grades can be determined from the full spacing table in Native Forest Soil Protection.
- (5) Drain spacing and critical locations can be met from any drainage type or combination.

- Drainage must discharge on to stable areas of undisturbed vegetation, a stable site, into debris or an energy dissipating structure and not directly into watercourses or onto exposed soil or fill slopes. Exposed soil or fill banks must be appropriately protected by

vegetation, debris, flumes or other erosion control structures.

- Drainage, at other than at a watercourse crossing, must not be discharged within the distance from WPZ specified in Schedule 3 - Watercourse protection:
 - landing and snig track drainage - 10m
 - road drainage - 20m
- Discharge should aim to deposit suspended sediment before runoff enters a watercourse.
- Outlets should disperse water flow to lower velocity. Sediment traps or devices should be provided where necessary.

S9.3 Drainage elements

S9.3.1 Catch drains or diversion banks –

Catch drains and diversion banks are drains placed above cut batters to divert overland flow away from the road. Such drains should be gently graded and protected against scouring.

They should be installed where:

- water may flow onto the road; and/or
- unacceptable erosion of the road cutting surface is likely.

S9.3.2 Road profile – Road pavements should be shaped to shed surface water to either both or one side of the road. The profile may involve a crowned formation, be outsloped or insloped. The crossfall grade should be in the order of 1 to 3 degrees to shed water without causing erosion of the surface. The profile should be maintained by grading and compaction and ensure that edge berms or shoulder vegetation does not impede the shedding of water or cause longitudinal scour of the road surface.

On flat bladed-tracks, maximum use should be made of natural cross fall or drainage. The surface should be maintained to assist cross drainage.

Berms along the edge of the track should be breached at the set drainage spacing intervals to allow water to drain from the road where suitable discharge conditions are available.

Where suitable discharge is not available alternatives should be applied and documented.

S9.3.3 Table drains – Table drains are drains at the side of and parallel to the road to catch and convey runoff water. Table drains must:

- have a flat bottomed, 'v'-shaped or dished profile;
- be built, where possible, at least 300mm below the level of the top of the formation at the outer edge of the shoulder;
- set, where possible, at a gradient of 1 to 3 degrees to guarantee flow without scour. Where steeper grades or erodible soils are unavoidable, consideration should be given to providing a flat profile, vegetating or lining the drain to prevent scour; and
- where table drains pass through box cutting and cannot be drained by turnout drains, steps must be placed at drainage spacing intervals to reduce drain gradient and dissipate water flow energy safely.

S9.3.4 Turnout drains – Turnout drains divert water from table drains away from the road. They must be built to ensure that:

- in the absence of natural drainage, drains are spaced in accordance with Table 15;
- the table drain is blocked at its junction with the turnout drain to ensure water does not bypass the turnout drain;
- drain outflows have a fall of 1 to 3 degrees, with a maximum 5 degrees, using a curved alignment as necessary, to keep the flow to a non-erosive velocity;
- drains have a 'v' shaped or flat bottomed profile. Flat bottomed profiles should be used where soils are erodible. Drain outflow must disperse water on to stable ground or vegetation; and
- drains do not directly enter watercourse protection zones but are diverted into surrounding vegetation in accordance with distances specified under watercourse protection in Schedule 3 and 9.2.

Where higher grades are unavoidable, the drain should be suitably protected against scour.

S9.3.5 Cross drains – Cross drains must allow surface or table drain water to pass under or across the road pavement. Options include culverts, inverts and cross banks. In the absence of natural drainage, these must be built to ensure:

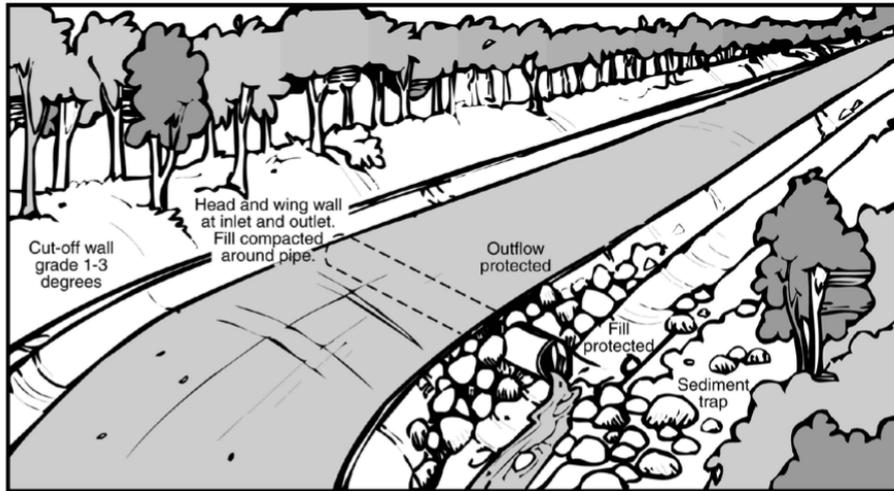
- cross drains are spaced in accordance with Table 15;
- water does not bypass the drain;
- cross drain offset angle relative to the road direction as per Table 15;
- cross drain outflows (tail) have a fall of 1 to 3 degrees, with a maximum 5 degrees, using a curved alignment as necessary, to keep the flow to a non-erosive velocity;
- inverts and cross banks have a 'v' shaped or flat bottomed profile. Flat bottomed profiles should be used where soils are erodible.
- drain outflow must disperse water on to stable ground or vegetation; and
- cross drains do not directly enter watercourse protection zones but are diverted into surrounding vegetation in accordance with distances specified under watercourse protection in Schedules 3 and 9.2.

Culverts - Culverts are pipe or box structures that allow water to be channelled under the road from one side to the other.

In addition to the requirements for cross drains, the construction of culverts should ensure that:

- any pipes or box culverts are installed to manufacturer specifications with attention to depth of fill (See also Schedule 8.2);
- pipes must be set to have a fall of 1 to 3 degrees, be surrounded by compacted fill and have a cutoff wall to prevent erosion under the pipes (Diagram 11);
- culvert inlets and outlets are adequately protected to minimise erosion from flow entering or discharging from the drain. Head and wing walls must be constructed with concrete, logs or stone pitching. Outflows must be provided with a scour pad of concrete, stone or gabions;
- where culverts flow out over fill, adequate protection in the form of a flume, drop or hardened energy dissipating structure must be provided to ensure that water does not erode the fill; and
- culverts have sediment traps using a sump or structure, e.g. logs or rock, to trap and slow water and permit settlement of sediment.

Diagram 11 – Typical pipe culvert



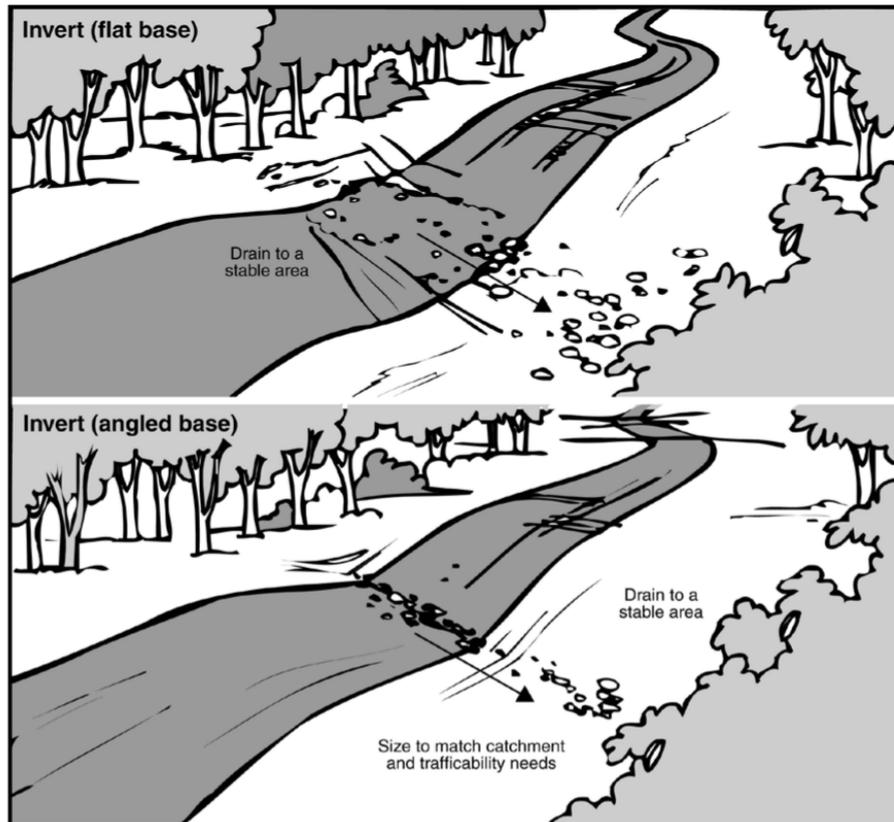
Inverts – Inverts are trafficable depressions in the road surface that intercept surface water and convey it across the road (Diagram 12). They are most suitable on lower grades (slopes).

Inverts are built by excavating material from the road to form the drain. In some cases this material may be spread on the road surface down slope of the drain itself.

In addition to the requirements for cross drains, the construction of inverts should ensure that:

- size is adequate to match flow requirements; and
- the base of the depression is protected with rock if the wetness of the substrate makes this necessary.

Diagram 12 - Inverts

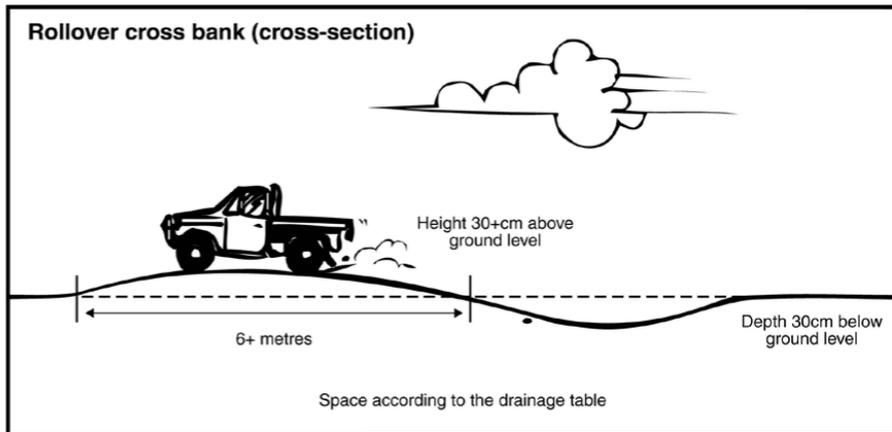


Cross banks – Cross banks are banks placed across the road surface to direct water across the road surface and reduce erosion by minimising the concentration of water along the road pavement and reducing runoff velocity.

In addition to the requirements for cross drains (S9.3.5):

- (i) **Rollover cross banks** are used where the road or track is intended to be trafficable. They are constructed by excavation and/or deposition of material to create a long and gently sloped cross bank (Diagram 13). Excavation should not expose erodible subsoils.

Diagram 13 – Rollover cross bank example



- (ii) **Water bars** ('whoa boys') are steep cross banks that are used on roads and tracks that are not required to be easily trafficable. They are primarily erosion control structures best used to stabilise surfaces on the completion of use.

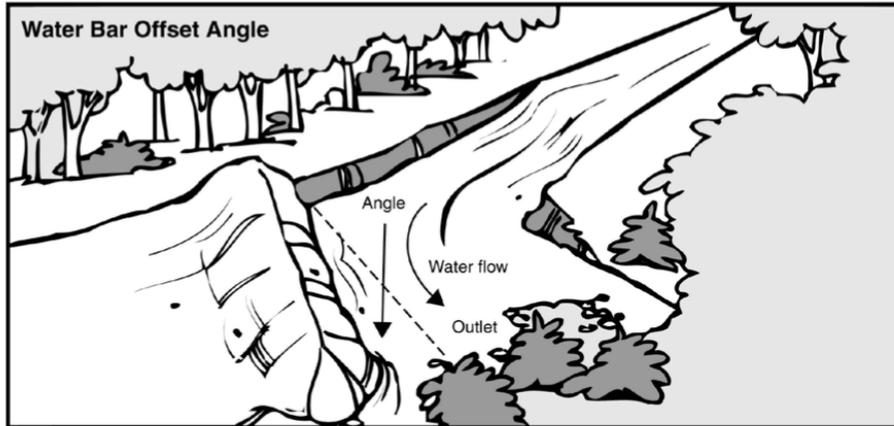
Diagram 14 – Water bar example



Water bars operate by slowing and diverting water from tracks to a stable outlet without water returning to the track down slope (Diagram 14).

Water bars may be angled. From a line at right angles to the track's alignment, offset the water bar to the angle indicated in Table 15 to allow flow, without scour, towards the outlet (Diagram 15).

Diagram 15 – Water bar offset angle



Water bars are generally constructed by excavating a flat-bottomed ditch using a shallow cut to avoid exposing erodible subsoils. On stable soils this is excavated from the up slope side of the mound. On unstable soils the excavation can be on the down hill side or, alternatively, import soil to avoid excavation. Construction can involve a push along the road to excavate and build the mound before sweeping an outlet.

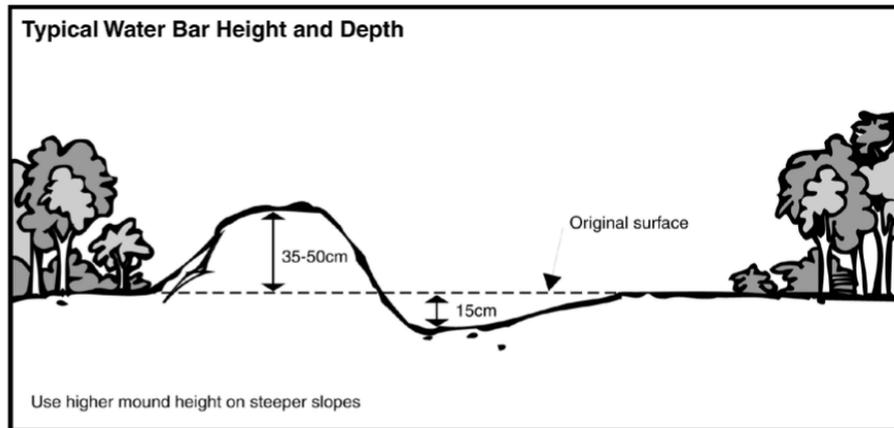
Alternatively, a preferred practice is to sweep the outlet towards the road and deposit the spoil on the road surface before sweeping and cutting along the road to complete the mound.

The water bar should have an unconsolidated height of up to 50cm above the track surface (Diagram 16) to allow for an effective barrier after

settling. Mound height must be matched to the soil type, terrain and management need to maintain effectiveness as follows:

- smaller mounds are acceptable where:
 - soils naturally pack or consolidate well and on low slope situations; or
 - they assist natural drainage;
- larger mounds (exceeding 50cm) may be required where:
 - the soil is loose and will not readily consolidate; or
 - slopes are steeper; or
 - more intensive use requires a higher water bar.

Diagram 16 – Example of a typical water bar height and depth



Mounds are best compacted during construction by walking the machine over the unconsolidated earth.

Ensure that water will flow to the outlet, that the outlet is stable and disperses water to vegetated ground, and that outflow will not return to the track downslope.

Where water bars are used for road closure, tree heads and/or other obstacles should be pulled over the top of the mound where there is a risk of cattle trampling.

Note: Where water bars are used to control points of concentration of overland flow, the water bar must not be constructed in or disturb the water-crossing point. A mound must be built down-slope of the crossing point to ensure water cannot flow down the road.

S9.4 Silt traps

Silt traps must be provided on turnout and cross drains where vegetated outlets are not available and suitable. The standard and permanency of such traps should reflect the road class with more elaborate and permanent structures or devices being placed on the major classes of roads (A, B and C type formations).

The options include:

- Inlet sump – a sump can be provided on the inlet of culverts to catch sediment. This must be periodically cleaned to keep it operative.
- Outlet device – the aim is provide a structure or device that will temporarily catch and retard water causing sediment to deposit. The options include:
 - rock piles;
 - timber barrier;
 - mesh sediment fence; and
 - straw bales or debris.

For unformed roads it may be appropriate to use natural drainage and use vegetated areas as silt traps.

S9.5 Stabilisation of washouts

Washouts on roads are a source of significant sediment and can cause the road to become unsafe or impassable. It is fundamentally important that corrective action is taken as early as possible to reduce both the adverse impact and the scale and cost of corrective action.

Minor washouts can often be simply corrected by compacted earthen fill and appropriately drained.

Where major washouts cannot be circumvented by existing alternative access, the following principles should be applied:

- lining or armouring the head to stop headward advance; and
- lining or armouring the base of the washout below the head to prevent the washout base from deepening and causing further collapse.

Where proposed remedial works vary from the above, expert advice must be sought.

New road construction to circumvent washouts must be approved.

Remediation may be achieved by:

- Investigating the cause of the washout and seeking to correct this rather than try to armour the washout face. Usually this will involve redirection of the source of the water above the washout. This may involve a diversion drain or the installation of more cross drainage. After dealing with the cause of the washout the road or track surface must be reinstated.
- Correcting the drainage problem as described above, then protecting the washout head from further gully action.

For further advice and guidance consult IECA 2008, *Best Practice Erosion and Sediment Control*. (International Erosion Control Association (Australasia), Picton, NSW).

Schedule 10: Timber harvesting practice

S10.1 General

The schedule sets out the minimum management requirements for timber harvesting using ground based-extraction techniques.

based on an analysis of safety, efficiency and environmental risk in the particular circumstances, including anticipated weather and ground conditions that prevail.

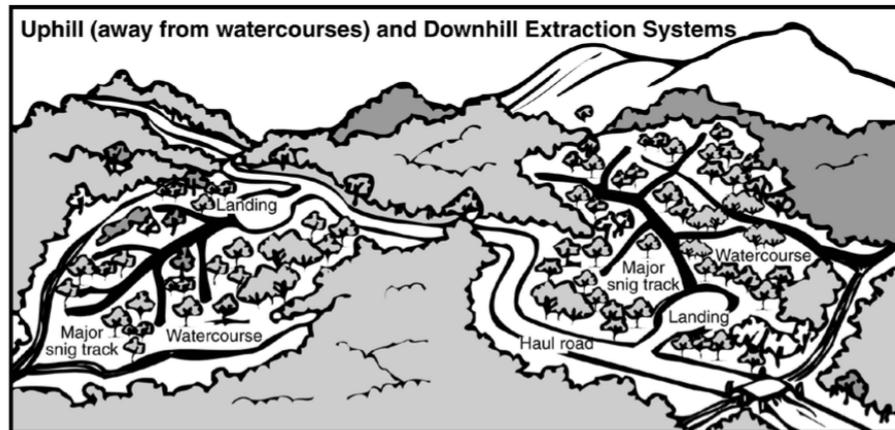
S10.2 Planning

Harvesting must be planned to be safe and efficient with minimum loss of productive area and acceptable environmental impacts.

Equipment - All equipment used in all harvesting operations including felling, snigging, loading and hauling, must have an effective spark arresting exhaust system.

Harvesting approach – The extraction system must use uphill snigging unless downhill snigging is the only safe, practical and least impact option (Diagram 17). The approach adopted must be

Diagram 17 – Uphill and downhill extraction



Total impact – Planning must optimise efficiency and minimise total impact by balancing the impact of snig track length against landing numbers and locations and haulage road/track length and haulage.

- minimise the total area removed from production as a result of disturbance on landings (S10.6), and major and minor snig tracks (S10.4); and
- minimise the number of watercourse crossings and locate them where they have the least environmental impact (Schedule 3).

Planning must seek to:

- use existing snig tracks, landings and roads where practical, relevant to machinery used and where consistent with Code standards;

S10.3 Felling and crosscutting

Felling may be carried out by using either a chainsaw or by a tree-felling machine. Felling must only be carried out by accredited operators.

Felling practices must control the manner in which trees are felled to facilitate:

- recovery by keeping the stump height as low as practical to maximise merchantable volume and to avoid stem breakage during felling, while giving due regard to safety;
- extraction by integrating with and assisting the snigging operation to minimise the extent of snig tracks and/or the amount of mineral soil exposure or compaction including tracked machine felling;
- biodiversity protection by avoiding damage or disturbance to exclusion areas or species, special management zones and habitat trees, (refer also S6.3.6);
- watercourse protection by complying with the watercourse protection requirements - Schedule 3; and
- forest productivity by minimising direct damage to retained crop or regeneration and by not accumulating excessive debris around the base of identified retained or habitat trees (refer also S6.3.6).

S10.4 Snig tracks

Snig tracks must be designed and located to optimise safety and efficiency and to minimise loss of productive area, earthworks and soil disturbance. The snig track network must consist of the minimum necessary length and intensity of major and minor tracks. Major and minor snig tracks must be located and constructed according to specifications detailed in Table 16.

Table 16 – Major and Minor Snig Track Specifications

Aspect	Major Snig Track	Minor Snig Track
Function	Arterial route serving an area and subject to multiple passes (>10), substantial use impact and likely to be required for future harvesting	Feeder route serving major snig tracks and subject to limited passes (<10), minor use impact and not likely to be required for future harvesting
Survey	Best identified and/or marked prior to the commencement of harvesting.	Best identified after trees are felled
Location	Best on ridge or spur line where drainage can be provided. Avoid exclusion areas and observe watercourse protection guidelines Uphill snigging where practicable.	Best on ridge or spur line to provide an optimal path from stump to major track. Avoid exclusion areas and observe watercourse protection. Uphill snigging where practicable.
Width	Width not to exceed 4m	Width not to exceed 4m
Alignment	Must provide for: <ul style="list-style-type: none"> minimal necessary length; radius of curves that minimise damage to retained trees; periodic changes in direction to deflect water from the track; and natural cross drainage. 	Must provide for; <ul style="list-style-type: none"> minimal necessary length; radius of curves that minimise damage to retained crop trees; periodic changes in direction to deflect water from the track; and natural cross drainage.
Grade (Refer Table 10 S4.1 for slope limits.)	Grade must be the minimum necessary for safe working and minimum impact.	Grade must be the minimum necessary for safe working and minimum impact.
Watercourse crossings	Minimise the necessary number. Major crossings must be located as per Schedule 3. Provide temporary culverts if water is flowing	Minimise the necessary number. Major crossings must be located as per Schedule 3. Provide temporary culverts if water is flowing
Clearing	Minimum to achieve function. Minimise pushing and protect retained trees.	Minimum to achieve function. Fell or trample only - no pushing. Protect retained trees.
Earthworks and formation	Formation may be required Earthworks must be the minimum for safety and efficiency. Side cuts minimised. No side cutting where side slopes exceed 25 degrees. Box cuts to be avoided if possible.	Formation is not generally required. Use walk-over practice where possible. Side cuts only as required for safety. Box cuts prohibited.
Track surface	Retain the maximum level of surface vegetation and debris consistent with safety and function. Consider cording susceptible portions of the tracks.	Absolute minimum removal of surface vegetation, litter or topsoil by using walk-over practices.
Drainage	Provide natural or cross fall drainage <ul style="list-style-type: none"> Use natural cross fall or Provide a cross fall 1-3 degrees Construct drainage where natural or crossfall drainage is not in accordance with Schedule 9 Table 15 spacings. 	Use and maintain natural drainage with surface vegetation/litter protection. Side cuts must be outsloped 1-3 degrees. Construct drainage where natural or crossfall drainage is not in accordance with Schedule 9 Table 15 spacings.

S10.5 Snigging

Snigging machinery must be matched to the harvesting task and forest conditions. Preferred equipment includes:

- crawler tractors equipped with wide tracks and integral arch winches;
- rubber-tyred skidders, equipped with wide tyres and a grapple or winch;
- excavator-based harvesters; and
- forwarders.

Because skidders generally cause less soil disturbance, they are preferred on slopes below 19 degrees particularly where erodibility is high. Crawler tractors should be used on steeper slopes for safety reasons.

All snigging equipment must:

- be capable of lifting one end of the log clear of the ground while snigging; and
- where equipped with a blade, have a blade type that is appropriate to the task.

Machine operators must be trained and competent in machine use and snigging practice.

Snigging practice must optimise efficiency and minimise soil disturbance and water pollution. Snigging must minimise disturbance to remaining vegetation except where ground disturbance is silviculturally necessary.

The snigging approach must be systematic to minimise the number and duration of tracks in use, and where possible, progress the snigging face in an uphill section so that the harvested areas are fully stabilised and drained before areas above are disturbed. Uphill snigging must be used where practicable (see S10.2).

Machines must be operated to minimise the area disturbed, the intensity of soil disturbance, damage to designated retained trees and essential regeneration. Operators of snigging machines must:

- control speed;
- use walk-over techniques wherever possible to maximise ground cover retention and minimise soil disturbance and mineral soil exposure;
- keep the blade raised while travelling;
- use reversing, log lifting or other techniques to minimise unnecessary ground disturbance including "tracked machine screwing";
- use winches, where appropriate, to pull logs from stumps where this will reduce track length or soil disturbance;
- periodically alter the running track to minimise rutting or disturbance;

- not snig along the bed of any watercourse;
- not snig along any cattle pad likely to concentrate water flow;
- comply with the watercourse protection measures (Schedule 3); and
- comply with operational restrictions (Schedule 18).

Snig track drainage must be effectively maintained during snigging by surface smoothing and berm removal.

Also apply temporary stabilisation measures to disturbed areas when:

- machinery is removed from sites or operations that have ceased for more than two weeks;
- there is a likelihood of an extended or high intensity rainfall event; and/or
- there is an occurrence or likelihood of soil loss due to snigging (refer also S10.8).

On completion, tracks must be naturally or artificially stabilised and drained to avoid accelerated soil erosion, and/or degradation of water quality. Stabilise and, as necessary, drain snig tracks within two weeks of completion of track use.

Other requirements include:

- Temporary watercourse crossings are to be removed and rehabilitated;
- Track surfaces are best smoothed to restore overland flow and covered with as much debris as is possible;
- Where practical and where it will not exacerbate damage or disturbance, edge berms, ruts or incisions should be smoothed to avoid confinement or acceleration of water along the track without increasing the track width;
- Place as much debris as is practical on the track surface to provide surface cover;
- Where seriously rutted (ruts exceed 30cm in depth and continue for 10m or more) restore the track profile by backfilling or the placement of harvesting debris;

- Construct cross drains only where necessary. Systematically consider progressive sections of the track over the distance specified for cross drainage spacing. At each potential drain location, cross drains must only be constructed if:
 - The track surface is likely to erode because surface cutting, scalping or disturbance has exposed or loosened the soil over the spacing distance and existing debris, vegetation or living roots systems will not provide adequate surface cover and binding.
 - Water will not drain naturally from the track within the specified distance because of the:
 - * absence of natural cross drainage;
 - * absence of constructed cross fall;
 - * absence of changes in track direction that will effectively deflect water; and
 - * presence of berms or ruts that will concentrate and confine water to the track.

Cross drainage will generally take the form of water bars but can also use inverts or other suitable structures. These must be constructed in accordance with Schedule 9 Forest Road and Track Drainage.

Use of debris may be permitted in lieu of water bars where this is abundant and provided the density, placement and ground contact will achieve a result equivalent to a water bar.

S10.6 Landings

Harvest planning must ensure the best environmental and visual outcomes arising from the construction of the required landings and associated roading.

Size and spacing

The size and number of landings must:

- provide for efficient and economic harvesting and haulage practices
- provide for the safe and efficient storage, processing and loading of logs;
- provide for the quantity, length and type of products being handled;
- be balanced to minimise the total area of clearing, including associated roading.

The relationship between landing size and distance between landings should be guided by the spacings given in Table 17.

Table 17 – The relationship between landing size and distance between landings

Maximum	Minimum Distance
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Landing Size (m ²)	between Landings (m)
600	200
900	300
1000	350
1200	400
1500	500
1800	600

Where Forest Products proposes alternatives to Table 17 to achieve better environmental outcomes, approval from QPWS is required.

Location

Landing sites must be located and used under the following conditions:

- Road sides can be used for log loading where this is safe, practical, can be drained and will cause less damage than the construction of a landing. Use must maintain road function and drainage.
- Existing landings must be used where this will result in less overall environmental impact than the construction of new landings.
- New landings must only be constructed where essential and be located to optimise resource access and snig and haul distances.
- Landings are best located:
 - on stable, easily drained ridges or slopes not exceeding six degrees;
 - outside areas excluded from harvesting with drainage the prescribed distance from Watercourse Protection Zones (Schedule 3); and
 - so that snig tracks can approach landings from below or provide for diversion drainage where snig tracks must approach from above.

Construction

Landing construction must ensure that:

- landings are constructed in dry weather when soils are not wet or saturated;
- clearing is confined to the landing area;
- debris is stacked, dispersed or disposed of:
 - without damage to trees marked or otherwise identified for retention within the allowable boundary area; or
 - to prevent a fire hazard for retained trees;
- topsoil disturbance is minimised;
- where topsoil is pushed up with debris, it must be positioned to allow machine access for respreading on completion of use;
- earthworks are a minimum to that necessary to achieve a practical working area and avoid entry of soil or debris into exclusion areas;
- cut and fill batters are set at a stable angle and protected with debris; and

- runoff is managed by optimising natural drainage, and/or by constructing cross fall or diversion drainage.

Use

Operation of the landing must manage logs and debris to minimise damage to all trees marked or otherwise identified for retention.

Damage to retained stems within the landing area shall not be considered as damage provided that the cleared area is smaller than the permissible landing size.

Landings must not be bladed off to keep them operational.

Excess bark must be used in track or landing stabilisation.

Stabilisation on completion of use

All landings must be stabilised within two weeks of completion of use by:

- removing all rubbish or waste materials;
- providing surface drainage to prevent ponding or soil erosion including necessary surface smoothing, cross fall drainage, removal of berms or construction of diversion drains;
- constructing water bars on tracks, where necessary, to divert water flowing onto or from the landing into surrounding vegetation; care should be taken to ensure that the drains do not divert water back onto the landing at some other point (refer also S9.2);
- spreading debris and associated topsoil mounds arising from construction of the landing, and debris from processing; and
- spreading any stockpiled topsoil evenly over the disturbed area.

S10.7 Loading

Loading of timber products must only occur at landings and must use equipment and techniques that are safe and minimise environmental impact.

Wheel or tracked machines equipped with forks or a grapple are preferred for loading. Swivel loaders are preferred. Loading with a dozer and constructed earth ramps should be discouraged.

Loading management must:

- maintain road access for essential traffic;
- avoid machinery impacts outside the landing area;
- conform to operational restrictions in Schedule 18;
- maintain an effective level of area stability and drainage,
- manage debris to minimise a fire hazard; and
- stabilise and drain the area immediately upon cessation or completion of use.

S10.8 Haulage

Haulage of timber must be safe and environmentally responsible.

Haulage must comply with operational restrictions in Schedule 18.

Road drainage must be:

- maintained in an effective state during use and any damage caused by the haulage operation must be repaired immediately;
- temporarily stabilised when:
 - machinery is removed from the site; or
 - extended or high intensity rainfall is likely; or
 - accelerated soil loss due to wet weather has occurred or is likely to occur;
- restored and stabilised within two weeks of completion of use (refer also S10.5).

Schedule 11: Timber product harvesting practice

S11.1 General

Wherever possible, harvesting of products other than round timbers must occur with, or in close association with, timber harvesting. This is to enhance silvicultural treatment and/or avoid reopening of areas with undesirable secondary soil disturbance, compaction or damage to regeneration.

All saleable timber products should be systematically harvested in fully integrated operations, leaving the area to regenerate and develop until the next harvesting cycle.

Re-entry into timber harvested areas must not occur during periods critical to the establishment of regeneration.

S11.2 General conditions

Harvesting operations must:

- be from outside exclusion zones;
- not include habitat trees or habitat recruitment trees (refer also S6.3.3, S6.3.4, S6.3.5);
- not include standing or fallen trees that are obviously an active habitat, breeding site or shelter for birds or mammals (refer to S6.4);
- disperse harvesting wastes from operations within the general area to minimise the fire hazard and interference with other users; and
- maintain or restore all pre-existing drainage and soil stabilisation measures, consistent with Schedule 9.

S11.3 Specific product conditions

Speciality pieces may be harvested from standing or fallen trees provided the health or habitat value of the parent tree is not affected.

Harvesting of fallen timber for any purpose must retain a minimum of 10 percent of material on site. This may be increased where species' conservation requirements apply.

Charcoal can be taken from fallen and standing trees.

Bark may be taken from dead trees. Harvesting bark from live trees, e.g. tea tree, requires that:

- no plant is cut down or mutilated;
- the minimum diameter of the tree is 15cm at breast height;
- bark is not harvested from more than one third of the target species growing in the area in any one operation. Subsequent harvesting from the same area may only occur when removed bark has been replaced; and
- the cambium layer is not exposed or damaged during harvesting.

Sandalwood must be harvested in accordance with Schedule 12.

Schedule 12: Sandalwood harvesting

Sandalwood, *Santalum lanceolatum*, shrubs may be harvested subject to the following conditions.

S12.1 Operational access

Operational access must:

- use existing tracks wherever possible. Tracks must be stabilised and drained in a manner consistent with the Code;
- for off-road access, use walk-over practices, trample rather than push vegetation and avoid disturbance of the soil surface; and,
- ensure watercourse crossings are consistent with Schedule 3.

S12.2 Selective harvesting

Selective harvesting must:

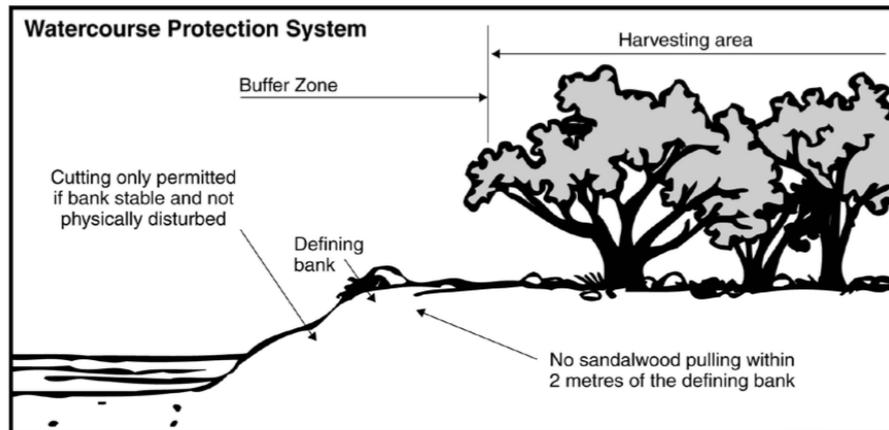
- be restricted to slopes less than 25 degrees;
- use rubber-tyred machines;
- only harvest live sandalwood where the diameter at breast height exceeds 12cm and cutting of primary branches indicates that heartwood constitutes 50 percent or more of the branch diameter;
- collect/gather any dead sandalwood
- utilise all commercially viable material available from harvested shrubs, including roots, stumps, boles and branches;

- avoid or minimise damage to retained vegetation;
- be by pulling except where this poses a significant risk of soil erosion or isn't economically viable;
- be consistent with watercourse protection guidelines.

Sandalwood may be harvested within watercourse protection buffer zones provided:

- machinery does not enter the buffer zone other than on a pre-existing track;
- sandalwood are not pulled closer than 2m from a defining bank (Diagram 18);
- sandalwood stems within 2m of the defining bank, or below the defining bank, may be harvested by cutting provided the bank is not unstable, 'u'-shaped, physically damaged by harvesting or will become destabilised by harvesting; and;
- where stems are removed closer than 2m from the defining bank the host tree must not be damaged.

Diagram 18 – Sandalwood watercourse protection system



S12.3 Selective harvesting in specific Strategic Environmental Areas (SEA)

In the following Strategic Environmental Areas (SEA):

- The Gulf Rivers Strategic Environmental Area;
- The Cape York Strategic Environmental Area;
- Fraser Island Strategic Environmental Area;
- Hinchinbrook Island Strategic Environmental Area;

harvesting is to comply with the following:

- For harvesting of sandalwood in a designated precinct within a Strategic Environmental Area:
 - no harvesting within 5m of the defining bank of a stream or lake;
 - only cutting is permitted (i.e. no pulling) between 5m and 45m from the defining bank of a stream or lake;
 - pulling is permitted between 45m and 95m from the defining bank of a stream or lake, provided a minimum spacing of 10m is retained between harvested trees.
- For harvesting of sandalwood in a Strategic Environmental Area:
 - no harvesting within 5m of the defining bank of a watercourse;
 - pulling is permitted between 5m and 95m from the defining bank of a watercourse, provided a minimum spacing of 10m is retained between harvested trees.

Schedule 13: Harvesting and regeneration silviculture

Harvesting and regeneration silviculture requirements have been incorporated into Core 8.3.2.

Schedule 14: Camping and processing sites

S14.1 General conditions

Timber harvesting camping and processing sites must be appropriately located and minimise adverse impact to the forest.

S14.2 Specific requirements

In addition to the general conditions, the following are also to apply.

Conform to OHP requirements

Camping and/or processing sites must:

- be located:
 - in an area with good natural drainage;
 - not within a WPZ ; and
 - not within the visual range of a publicly frequented road.
- have a clearly defined period of occupancy for processing sites;
- have drainage that is maintained in accordance with the requirements for landings under Schedule 10.

Protect habitat

Camping and/or processing sites must:

- avoid or otherwise provide protection for any RE or threatened species as required;
- minimise clearing and damage to trees or forest vegetation;
- must not involve the insertion of spikes, nails bolts or similar into standing trees;

Meet operational requirements

Processing sites must be located to:

- ensure snig distances to temporary processing infrastructure are a maximum of 500m;
- ensure there is no truck haulage to temporary processing infrastructure (temporary mills);
- ensure processing wastes are progressively removed from the processing site and

redistributed throughout the forest or otherwise disposed of;

- provide minimal necessary access

Meet safety and hygiene requirements

Camping and/or processing sites must:

- have adequate fire protection including a bare earth fire break no greater than one blade width;
- have a waste disposal system that guarantees that wastes are collected, contained in appropriate bins and then disposed of properly;
- provide for the proper storage and management of fuels, oils or hazardous substances in accordance with Schedule 17.

Meet good site management practices

Users of camping and/or processing sites must:

- use caravans or temporary structures that are visually acceptable and do not diminish forest values or otherwise conflict with forest management;
- not bury rubbish (see Schedule 17)
- locate lavatory, sullage and waste water facilities at least 40m away from any WPZ and in a location and soil type that will not contaminate surface or subsurface waters;
- maintain the site in a clean, tidy and fire safe condition.

S14.3 Site decommissioning

Site decommissioning must ensure:

- structures and rubbish are removed;
- timber wastes are dispersed to assist rehabilitation and to avoid a fire hazard;
- natural drainage is restored and necessary soil erosion control measures are provided; and
- any additional requirements are met.

Schedule 15: Pests and disease management

S15.1 General

Pests and diseases have the potential to cause significant adverse economic, environmental and social impacts on State lands.

Pests and diseases can spread naturally by wind, water or animals but also by human activities such as the movement of vehicles and equipment used by visitors, contractors and employees.

Reproductive material can also be carried from one area to another on shoes and clothing. Materials such as soil, mulch or gravel also have the potential to spread pest plant and pathogen reproductive material.

Legislation relating to pests, weeds and disease management are specified in Core section 2.3.2.4.

The movement of machinery presents a significant contamination risk as there are many nooks and crevices where reproductive material can be lodged out of sight. If this is dislodged when a machine is next used, the new area can become contaminated.

All persons entering State forest areas should take reasonable steps to reduce the risk of spreading pests through the movement of vehicles, plant, equipment, boats, persons, livestock and materials.

DAFF Forest Products are to ensure, on a risk assessed basis, that machinery entering the harvest area is free from contamination.

S15.2 Harvesting management

Where possible, harvesting operations should be conducted in areas of the harvesting area where there are no known pests or weeds first, and then move operations into infested areas.

Inspection and mapping of known infestations is to occur prior to harvesting commencing. Pest infestations identified during harvesting are to be

managed according to these principles and progressively mapped on the harvest file.

S15.3 Prevention of spread

Harvesting operations are to be managed to restrict the further spread of any pest or disease infestation.

Control measures must be consistent with the relevant legislation.

The use of chemical control products must be in accordance with the manufacturer's specifications.

S15.4 Clean-down facilities

All machinery used in an infested area and likely to be contaminated with pest or disease reproductive material is to be cleaned prior to exiting the infested area or at a designated clean-down site.

Designated clean-down sites on the harvesting area are to be used to assist with future monitoring.

Care should be taken when deciding the location of clean-down sites to reduce risk of spread and for ease of monitoring and control. All clean-down sites are to be located at least 50m from any watercourse to prevent contaminated runoff from entering watercourses.

S15.5 Monitoring

Harvesting operations within the sale area and associated haul routes will be monitored for pest weed spread as required.

Schedule 16: Air and noise pollution management

Timber harvesting and associated activities must be managed to prevent or minimise unreasonable interference with any environmental or social values as caused by smoke, dust, odour, noise or light.

The potential for air pollution and noise interference must be considered during planning where this is likely. Strategies may include but are not restricted to:

- restricting operations to defined weather conditions;
- restricting the use of equipment and machinery during defined periods of time;
- using buffers and setbacks;
- orientating equipment to direct noise away from sensitive places;
- use of specially muffled equipment or other noise attenuation methods appropriate to an activity or type of equipment;
- positioning operations away from sensitive places;
- temporary restrictions on other forest users; and
- road watering or treatment to control a dust hazard near to sensitive places.

Schedule 17: Waste and hazardous materials management

S17.1 General

All persons involved in timber harvesting, including associated roading works, are responsible for waste and hazardous materials management for activities under their control.

S17.2 Waste materials management

To minimise the risk of land and water pollution, visual or other degradation from wastes generated during operations, harvesting and road works areas are to be kept as waste-free as practical. The following must apply:

- waste management must conform to the *Environmental Protection Act 1994*;
- all wastes including paper, packets, boxes drums, machine parts, wire ropes or other materials, are to be continuously collected, contained in bins or other suitable receptacles and removed from the forest to an authorised disposal site;
- wastes must not be stored within 40m of any WPZ;
- no waste is to be buried in the forest; and
- all waste should be removed regularly and must be removed upon completion of the sale.

S17.3 Toxic or hazardous substance management

The use of toxic or hazardous substances must be minimised wherever possible. Such materials proposed to be used, including materials such as herbicides, pesticides and fertilisers, must be documented in the OHP.

Toxic or hazardous substances must be secured, stored, used and disposed of according to label instructions and relevant legislation to ensure health and safety and the protection of forest values.

In all cases:

- emergency and preparedness response procedures must be available on site and implemented for all classes of toxic or hazardous substances used. These procedures must be done in accordance with the Safety Data Sheet prepared by the manufacturer, which must also be available on site;
- fuel trailers and storage, filling or clean-down areas must be located in a secure, fire safe location at least 50m from a WPZ;

- on-site storage of toxic chemicals in drums is not favoured. Where absolutely necessary, the storage area must be bunded to contain any leakage or spillage and to prevent it from contaminating the surrounding soil or from entering any watercourse or water drainage system. The bunded area should 110 percent of the capacity of the all vessels stored within the bund. Additional volume should be allowed to account for rainfall events and fire control operations;
- pesticides must be used according to the manufacturer's directions and conform to the *Agricultural Chemicals Distribution Control Act 1966* including the obtaining of necessary licenses or permits;
- machinery and equipment must be maintained to manufacturers specifications so that leaks are minimised; and
- waste toxic and hazardous substances must be handled in accordance with S17.1.

S17.4 Spills and leaks

In the event of a toxic or hazardous substance spill or leak the standard below will apply.

General

For all spills and leaks:

- any toxic or hazardous substance must be contained as soon as practicable. Clean up procedures must be promptly implemented according to emergency and preparedness response procedures, and any wastes generated during the clean-up must be disposed of according to manufacturer's guidelines and waste management requirements; and
- measures must be implemented to ensure the event does not occur again.

Spills and leaks greater than 20 litres in a single incident

Department of Environment and Heritage Protection must be informed as per the notification requirements of the *Environmental Protection Act 1994*.

Spills and leaks less than 20 litres in a single incident

Where there is the potential for material or serious environmental harm to occur, e.g. 15 litres of a pesticide spills into a stream that feeds the local water supply, Department of Environment and Heritage Protection must be informed as per the notification requirements of the *Environmental Protection Act 1994*.

Schedule 18: Operational restrictions

Operations must cease or be restricted for safety reasons or when infrastructure, forest values or environmental values are threatened by weather or ground conditions.

S18.1 Felling

Felling must cease where wind strength prevents safe or accurate directional felling or when ground conditions are unsafe.

S18.2 Snigging

Snigging in a harvesting section or area must cease when:

- soils are excessively wet or saturated;
- water is flowing down a track for more than 20m;
- 'dry' watercourse crossings are flowing and a temporary culvert has not been installed;
- continued use would result in rutting deeper than 15cm below the original land profile ;
 - affecting more than 30m or 10 percent of the track length whichever is less; and/or
 - adversely impacting drainage or water quality.
- continued use would require mud/soil to be bladed off, deeper than 15cm below the original land profile;
 - affecting more than 30m or 10 percent of the track length whichever is less; and/or
 - lowering the track to the extent that effective rehabilitation back to or near the original profile is prevented; and/or
 - adversely impacting drainage or water quality.

Any blading off on snig tracks must be a last resort and will require extra works to stabilise, including use of vegetation, replacing bladed off materials *in situ* or from other sources.

In all situations, effective rehabilitation must be guaranteed.

S18.3 Loading

Loading at landings or roadsides must cease when surface runoff is occurring or when water is ponded on the section being worked on and usage will result in excessive soil disturbance and adverse impact.

S18.4 Road construction and maintenance

Roading construction and maintenance operations must cease when surface water is flowing on the road works.

S18.5 Haulage or heavy machinery

Use of unsealed forest roads must cease when it is unsafe or road damage occurs or is likely to occur.

Wet conditions

Road use must cease when:

- trucks cannot move unassisted along the road; or
- the road is excessively wet, water is ponded, or water is flowing on the surface of the road, such that:
 - rutting greater than 15cm in depth below the road profile occurs over a distance of greater than 20m, and/or
 - the road surface drainage or water quality is adversely affected; and/or
 - any damage will render the road unusable

Any damage caused under wet conditions must be repaired prior to further use of the road. Use of roads is prohibited if the operator cannot guarantee timely restoration.

Operator's vehicles or trucks caught by a sudden intense rainfall event, may leave the forest if it is safe and necessary to do so.

In some conditions, a loaded vehicle may need assistance to start moving. Once moving it should be capable of proceeding unassisted. In some circumstances it may be more effective to tow the vehicle out rather than to attempt to drive out.

Dry conditions

Road use for timber haulage must cease when:

- deep bulldust develops on the surface of the road, and continued use will render the road unusable, however:
 - trucks may be assisted to move along the road;
 - any damage caused under dry conditions must be repaired as soon as conditions permit;
 - ongoing use may occur where there is a lesser environmental risk, rather than providing an alternate route that will rapidly become similarly affected. This must be documented.

S18.6 Harvesting operations

Occasionally it may be required to shift harvesting operations to another area for wet weather or other unplanned reasons. This is acceptable provided:

- conditions at the new site will not result in similar damage;
- affected sections of snig tracks, road or landings are not rerouted; and
- vacated areas are stabilised as soon as practical.

Appendix 1: Acronyms and abbreviations

BA	basal area
BZ	buffer zone
cm	centimetres
C	Coastal
dbhob	diameter at breast height over bark (measured at 1.3m above ground level)
ER	erodibility rating
ESFM	ecologically sustainable forest management
FPA	feature protection area/s
FZ	filter zone
ha	hectare/s
JRMP	joint road management plan/s
m	metre/s
m²	square metre/s
m³	cubic metre/s
MOU	memorandum of understanding
MUID	management unit identifier
N/A	not applicable
NFPS	National Forest Policy Statement 1992
DAFF Forest Products	Forest Products is the State Government's business group responsible for the commercial management of State owned native forests and is part of the Department of Agriculture, Fisheries and Forestry. Previously known as DERM Forest Products, NRW Forest Products, DPI Forestry, Queensland Forest Service or Department of Forestry.
OHP	operational harvesting plan/s
QPWS	Department of National Parks, Recreation, Sport and Racing, Queensland Parks and Wildlife Service
RE	regional ecosystem/s
SC	sub-coastal
SMP	species management profile/s
t	tonne/s
VRPA	visual resource protection area/s
W	western areas
WPZ	watercourse protection zone

Appendix 2: Glossary of terms

Term	Definition
Accredited operator	An operator with accreditation in industry standards for the operation being undertaken.
Active zone	This is a zone of active erosion or deposition characterised by either: <ul style="list-style-type: none"> any erosion face greater than 10cm high; or a scour/deposition area greater than 1m. Deposited material may be loose, unconsolidated sand, gravel or water-washed stone. The zone may be obscured by litter or associated with a significant reduction in surface cover. Width is measured between erosion faces where these exist, or across the deposited material where no erosion face exists.
Aspect	An element of forest activity that may interact with the environment (e.g. roading).
Average annual peak flow	The long-term average of the peak, or highest, annual watercourse flows. This is calculated by averaging the highest annual peaks over a suitably long period. The average annual peak flow tends to be modified only slightly by an annual very high or very low peak, i.e. this tends to be a very stable level regardless of short term variations.
Batters	An earth slope formed during road or landing construction either by placing of fill material or by cutting into the natural hillside.
Berm	A heap or mound of soil associated with the sweeping of material towards the edge of the road or track and which prevents runoff from draining from the road surface.
Best practice	Management to achieve ongoing minimisation of an activity's environmental harm through cost effective measures assessed against the measures currently used nationally and internationally.
Biodiversity	"The variety of all life forms – the plants, animals and micro-organisms – the genes they constitute, and the ecosystems they inhabit" (<i>National Forest Policy Statement 1992</i>). Includes flora and fauna.
Blading off	The removal of surface soil from a snig track or road in wet or dry conditions in order to expose a drier and or firmer surface for use by machinery.
Box cut	Where construction of a road or track results in cutting through a section of land exposing a cut soil face on either side.
Buffer or buffer zone (BZ)	The buffer is comprised of the minimum setback past the defining bank for the watercourse type plus any slump protection or head scarp protection required. Apply whichever is the greater of the slump or head scarp protection. The buffer is comprised of the land and riparian vegetation, if any, which is to remain undisturbed during and following forest harvesting operations.
Bulldust	Powdery soil material caused by machinery pulverising the soil surface (common in western regions).
Bund, bunding, bund wall	An embankment or wall, which may form part or all of the perimeter of a storage area, designed to contain and prevent the spread of dangerous substances being stored or processed. ⁵
Catch drain	A drain constructed across the slope to catch overland flow and divert it to other areas.
Causeway	A low level, man-made stream/watercourse crossing constructed of concrete or logs, allowing vehicles to cross in periods of low water flow.

⁵ AS 2507—1998 The storage and handling of agricultural and veterinary chemicals, 1.4.8. Also AS4452-1997, 1.5.5

Term	Definition
Characteristic vegetation	<p>Vegetation that indicates good subsoil moisture conditions that probably occur as a result of prolonged subsoil seepage and is different from that found on areas adjacent to the bed and banks, for example:</p> <ul style="list-style-type: none"> • Stream bed – dead aquatic vegetation, water couch, rushes, sedges, smartweeds; • Stream bank – tea trees, bottlebrushes, forest red gum, river red gum, yapunyah. <p>In intermittent streams and creeks with sandy beds, such stream bed vegetation may be only sparsely represented. Vegetation is only one characteristic and should be used in conjunction with a wider view of watercourse structure and processes (see Schedule 3). It should be noted that vegetation is influenced by geology as well as water availability and past and present management practices.</p>
Chemicals	Rodenticides, insecticides, fungicides, herbicides.
Clean-down, clean-down site (also called 'wash-down')	The clean-down of vehicles and equipment is undertaken to stop the spread of pest weed seeds and vegetative material and contaminants. Various clean-down methods and types of equipment can be used to remove any carried weed seeds and/or vegetative material potentially capable of spreading pest weeds.
Clearing	<p>Note: Clearing in the context of this Code does not have the same meaning as the term "clearing" under the <i>Vegetation Management Act 1999</i>.</p> <p>Clearing includes the removal of standing woody vegetation for the construction of roads, (permanent or temporary), landings, major snig tracks and camping and processing areas.</p> <p>Clearing does not include the removal of standing woody vegetation from existing, overgrown roads, tracks, major snig tracks and landings etc provided the woody vegetation to be removed consists entirely of:</p> <p>(a) native tree species regenerating following any previous clearing disturbance :</p> <ul style="list-style-type: none"> • that have not achieved 10m in height; or • when there is less than 20 years since the last disturbance. <p>or</p> <p>(b) introduced or pest species.</p> <p>Clearing does not include the removal of standing woody vegetation associated with the construction or reopening of minor snig tracks.</p>
Competent person	A person who has competently completed training in the Code to a satisfactory level.
Cross drainage	The use of various structures, including culverts, inverts, debris, rollovers and water bars ('whoa boys') to carry water from one side of a road to the other.
Crown	The formation of a road surface to a convex shape from which water will drain freely.
Cultural heritage (feature or place)	A place or object that has significance for past, present or future generations for aesthetic, anthropological, archaeological, historical, scientific, spiritual, societal, technological or customary values, including those sites or features listed under either the <i>Queensland Heritage Act 1992</i> , the <i>Aboriginal Cultural Heritage Act 2003</i> , the <i>Torres Strait Islander Cultural Heritage Act 2003</i> or the <i>Australian Heritage Commission Act 1975</i> .
Culvert	A pipe, arch or box structure covered with soil or other material and lying below the road surface, used to carry water from one side of the road to the other.
DAFF Forest Products	Forest Products is a business group of the Department of Agriculture, Fisheries and Forestry. Previously known as Forest Products, DPI-Forestry, NRW Forest Products or Department of Forestry.
Damage	Any significant loss or degradation of forest soil, water, flora or fauna or other values as a consequence of forest harvesting operations.

Term	Definition
Defined channel	A depression or incised area whether eroded or not, where the line and boundaries of the surface runoff in normal seasons are easily identified by eye from topographic features.
Deformity, Habitat tree	Tree features/defects including deeply fissured bark, fire scars, small hollows, burls with cavities and other irregularities or damage that are able to provide habitat.
Directional felling	Felling in a predetermined and desired direction by utilisation of skilful felling techniques, which may include the use of aids such as wedges and jacks.
Disease/s	See definition for Pest/s.
Dominant tree, co-dominant tree	Dominant tree – The largest girth trees within a stand, having a crown within or above the general canopy of the forest. Co-dominant tree – Larger girth trees within a stand, with a crown within the general canopy of the forest.
Earthworks	Mechanical soil movement as part of road, landing or snig track construction.
Ecologically sustainable forest management (ESFM)	The terms Ecologically Sustainable Forest Management (ESFM) and Sustainable Forest Management are based on the principles of ecologically sustainable development and for the purpose of this Code these terms are synonymous. Ecological Sustainable Development is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. Objectives are: <ul style="list-style-type: none"> • To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations; • To provide equity within and between generations; • To protect biological diversity and maintain essential ecological processes and life support systems. In particular with regard to the requirements of the <i>National Forest Policy Statement 1992</i> for sustainable forest use: <ul style="list-style-type: none"> • Maintaining the ecological processes within forests (the formation of soil, energy flows and the carbon, nutrient and water cycles); • Maintaining the biological diversity of forests; and • Optimising the benefits to the community from all uses of forests within ecological constraints.
Environmental harm	Where a timber harvesting activity has any adverse effect, or potentially adverse effect, (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.
Environmental nuisance	Unreasonable interference or likely interference with an environmental value.
Environmental threat	The potential to cause unlawful environmental harm.
Environmental value	A quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or <ul style="list-style-type: none"> • Another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.
Environmentally responsible	Taking all reasonable steps to safeguard the environment against harm as a result of operational activity.
Erosion face	A steep bare soil slope more or less adjacent to the zone of water flow. Height is measured vertically from the average base level of the watercourse to the top of the erosion face.

Term	Definition
Exclusion zone	Areas delineated in the Code or in harvesting plans where harvesting or other activities are excluded. These include: <ul style="list-style-type: none"> • Watercourse protection zones, • Cultural heritage protection buffers, • Areas with slopes greater than the allowable limits, • Rare or threatened species protection buffers, and; • Vegetation alongside designated roads.
Feature protection area	Where the visual resource has either: outstanding natural scenery; spectacular biological or geological features; unique or unusual qualities; or significant, stimulating or aesthetic sensory qualities.
Fill bank	A bank comprising soil deposited during earthworks.
Filter zone	The filter zone is an additional area extending from the buffer zone where harvesting disturbance is to be minimised. The filter zone is an area abutting the buffer zone where forest harvesting disturbance is limited to log extraction points only.
Foreground	The immediate landscape/viewscape seen from a specific point or place. –The distance of the foreground is dependent on the density of vegetation viewed parallel to the ground: <p>A. No vegetation, foreground = 500m</p> <p>B. Sparse vegetation (e.g. open woodland), foreground = 100m</p> <p>C. Dense vegetation (e.g. dense rainforest understorey), foreground = 20m</p>
Forest products	As defined in the <i>Forestry Act 1959</i> , means all vegetable growth and material of vegetable origin whether living or dead and whether standing or fallen, including timber and includes: <ul style="list-style-type: none"> • Honey • All forms of indigenous animal life • Any nest, bower, shelter or structure of any form of indigenous animal life, • Fossil remains, and • Relics, • Quarry material
Forest entitlement area	A designated part of the land contained in a Grazing Homestead Free-holding lease, Deed of Grant or other instrument of title subsequently issued over land formerly held as a grazing selection, where the forest products remain the property of the State as defined under the <i>Lands Act 1994</i> .
Forest productivity	The capacity of a forest to provide timber, minor forest products and other environmental values including carbon sequestration.
Forest value	An intrinsic feature of the forest environment that may include forest products, environmental values, landscape, recreation, community or cultural benefits.
Ford	A stable natural surface, usually of stone or gravel, which allows a vehicle to cross a watercourse.
Formal visitor node	A point/location (e.g. picnic site, camping ground) at which people gather to undertake specific, planned activities using properly designed and constructed facilities (e.g. graded walking track, road).
Geomorphology, or geomorphologic	The study of, or concern with, the form of the ground surface and the processes which shape it. ⁹

⁹ Kearey, P., 1996 *The new Penguin dictionary of geology*. Penguin Books. Page 127.

Term	Definition
Groups or interested groups	In general, interested groups are taken to be a person, group, organization, member or system that effects, or can be affected by the application of, this Code. Such interested groups might consider that they have an "interest" in the operation and/or review of the Code. ¹⁰ Interested groups may include relevant Government Agencies, forest workers, timber industry groups, recreation groups, conservation groups and the visiting public.
Habitat tree	Is a dominant or co-dominant living tree selected to be retained in a harvesting area because it has at least one visible hollow over 10cm in diameter and be 2m or more above the ground. Preference is for tree species that are known to develop hollows early and live a relatively long time (this may include, but is not exclusive to, <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Angophora</i> species).
Harvesting	Activities associated with roading, felling, snigging, loading and hauling of forest products from a forest area.
Harvesting area	The area, not including exclusion zones, indicated in a harvesting plan available for harvesting.
Harvesting debris	A piece of woody debris from harvesting activity, greater than 10cm in diameter and longer than 1 metre
Harvesting machinery	Wheeled or tracked equipment used in ground based harvesting operations.
Hazardous substances	See Toxic or Hazardous Substances
Head scarp	A near vertical, unstable and near semi-circular face marking a nick point in a gully or waterway (see slump face for diagram).
Hollow, habitat tree	A hollow is a cavity in a habitat tree that may be used for nests, roosts or dens by hollow-dependent fauna. This Code defines that a hollow must be 10cm or greater along the opening's smallest axis. In the past, routine surveys of hollow-bearing trees in Queensland forests have generally used 10cm as a minimum size criterion. This minimum size of 10cm is also used to reduce the chance of selecting insufficient hollow depth. For further information, refer to Lamb, D., Lyon, R., Smith, A. Wilkinson, G., 1998, <i>Managing habitat trees in Queensland forests: a report by the Habitat Tree Technical Committee to the Queensland Department of Natural Resources, Forest Resources</i> .
Informal visitor node	A point/location (e.g. cliff, lake) at which people gather to undertake specific activities (e.g. rock climbing, nature study) in an unplanned, self-reliant and/or unguided manner.
Instability	Evidence of instability may be present in the form of exposed slip/slump faces, or suggested by ground cracks, geology or hummocky topography. (See Schedule 5)
Landing	An area, constructed or natural, where timber or minor forest products are stockpiled and loaded onto a truck
Landscape value	Areas or features that are significantly aesthetically pleasing for reason of the variety, uniqueness or naturalism of the landform, vegetation, water form or areas of high public usage.
Management plan	A plan dealing with strategic and/or operational issues of land use management prepared for specified regional or local areas, integrating environmental and commercial objectives.

¹⁰ This definition is based on that given by http://en.wikipedia.org/wiki/Interested_group, accessed on 03/04/2012.

Term	Definition
Material environmental harm	Environmental harm (other than nuisance) that: <ul style="list-style-type: none"> (a) is not trivial or negligible in nature, extent or context; or (b) causes actual or potential loss or damage to property of an amount of, or amounts totalling, more than the threshold amount (see the Environmental Protection Act 1994 (EP Act), threshold amount) for but less than the maximum amount (see the EP Act for maximum amount); or (c) that results in costs of more than the threshold amount but less than the maximum amount being incurred in taking appropriate action to: <ul style="list-style-type: none"> (i) prevent or minimise the harm; and (ii) rehabilitate or restore the environment to its condition before the harm.
MUID	Management unit identifier.
Multiple use management	The management of diverse forest uses and values, covering wood and other forest products, as well as conservation of the forest environment, water catchment and soil protection, wildlife habitat, landscape, wilderness, genetic resources and diversity, recreation, scientific study and education.
National Forest Policy Statement 1992 (NFPS)	The policy and agreement between the Commonwealth and State Governments setting out the vision, goals and approaches to forest management in Australia.
Natural heritage	A natural or physical feature that has significance for the present generation or past of future generations which may be listed under either the <i>Queensland Heritage Act 1992</i> , the <i>Cultural Record (Landscape Queensland and Queensland Estate) Act 1987</i> , or the <i>Australian Heritage Commission Act 1975</i> .
Native forest	As described in the NFPS, any locally indigenous forest community, the dominant species of which are trees, and containing throughout its growth the complement of native trees and habitats normally associated with that forest type, or having the potential to develop these characteristics. It includes forest with these characteristics that have been regenerated with human assistance following disturbance. It excludes plantation of native species and previously logged native forest that has been regenerated with non-endemic species.
Nick point	The point at which there is a sharp change in gradient.
Operational harvesting plan (OHP)	A plan prepared for the guidance of field operations during harvesting.
Outslope	Formation of a road surface to provide fall over its width so that the surface is sloped to shed water to the downhill side.
Peak use times	Include Easter, Christmas Eve to New Years Day and may include school holidays and Sunday afternoons, depending on local conditions.
Permanent processing infrastructure	Permanent processing infrastructure is that which is fixed using fixing mechanisms that do not allow it to be moved within 1 or 2 days and is subject to the appropriate approvals. (This may include a sawmill or other processing infrastructure such as shade structures, machinery, equipment and harvesting residues).
Permeability	The readiness with which soil or rock allows water, air, or plant roots to penetrate or pass through.
Pest/s	Pest means any animal, plant, parasite or disease causing organism (such as bacteria, virus or fungus) capable of causing adverse impacts to environmental, economic or social values, whether or not it is declared and listed in the <i>Land Protection (Pest and Stock Route Management) Regulation 2003</i> . ¹¹
Rainfall event, Normal	In this Code, a normal, or expected, rainfall event is taken to cover up to a 1 in 5 year event. This refers to both rainfall intensity and/or peak flow.

¹¹ Definition from *Operational policy - Management of pests on QPWS managed areas*.

Term	Definition
Rainforest	Rainforest regional ecosystems are communities ranging from semi-evergreen vine thickets to complex mesophyll vine forests. Emergent <i>Eucalypts</i> , <i>Lophostemon</i> and <i>Syncarpia</i> species are infrequent or absent. Ground cover vegetation is normally sparse and grasses are usually absent. Ferns, palms and mosses are common. This definition is applied at a scale of 1:50,000. This maps down to 1 Ha, so an area of rainforest smaller than 1 Ha would be defined as part of the surrounding RE. These broad vegetation groups are defined by REDD as groups 1 to 7 at 1:2M scale.
Recruitment habitat tree	A living tree selected to be retained in a harvesting area as it is considered to have the greatest potential to become a habitat tree in the shortest possible time. The trees are generally dominant or co-dominant with habitat forming characteristics including damaged or senescing crowns, visible termite nests or other deformities in species known to develop hollows.
Regeneration	The renewal of a forest by natural or artificial means or the trees brought into existence through those means.
Rehabilitation	The restoration of an area of land, road, track or landing to a stable condition.
Retained trees	All trees regardless of species, age or size, prescribed for retention on a harvesting area to address specified forest management objectives.
Rutting	Soil disturbance caused by the sinking of wheels or tracks below the soil surface. Serious rutting is defined as that being more than 30cm in depth by 10m in length (see S10.5). Operational restrictions may apply if rutting is deeper than 15cm (see S18.2).
Saturated	When soils are fully flooded/saturated so that surface water will pool/flow.
Serious environmental harm	Environmental harm (other than nuisance) that: <ul style="list-style-type: none"> (a) causes actual or potential harm to environmental values that is irreversible, of a high impact or widespread, or; (b) causes actual or potential harm to environmental values of an area of high conservation value or special significance, or; (c) causes actual or potential loss or damage to property of an amount of, or amounts totalling, more than the threshold amount (see EP Act for threshold amount), or; (d) results in costs of more than the threshold amount being incurred in taking appropriate action to- <ul style="list-style-type: none"> (i) prevent or minimise the harm, and; (ii) rehabilitate or restore the environment to its condition before the harm.
Side cut	Where construction of a road, landing or track across a slope results in the exposure of a soil face on the uphill side and deposition of spoil on the down hill side.
Side drain	A drain which diverts water from a table drain into a stable area.
Silviculture	The theory and practice of managing forest establishment, composition and growth to achieve specified objectives.
Slump or slump face	Slumps are near vertical face above the active zone which is or has been unstable. Slumping involves mass movement and collapse of a section of bank. Banks containing large proportions of poorly drained fine sediment such as clay, silt or fine sand tends to collapse by slumping. A slump can occur with or without undercutting.
Snigging	The movement of logs, either wholly or partly supported on the ground, from the point of felling to the landing.
Snig track	A track along which snigging equipment travels with log.
Snig track, Major	Arterial route serving an area and subject to multiple passes (>10), substantial use impact and likely to be required for future harvesting. Will persist for some time.
Snig track, Minor	Feeder route serving major snig tracks and subject to limited passes (<10), minor use impact and not likely to be required for future harvesting. Will not be evident in the short term.

Term	Definition
Soil erosion	The wearing away of the land by running water, rainfall, wind or a geological agent at a rate accelerated due to forest activities.
Soil compaction	Includes rutting, puddling and displacement and is caused by soil particles being compressed. The resultant increase in density and the reduction in permeability may have a serious long term effect on forest productivity.
Soil disturbance	Exposure of mineral soil and its loosening to a depth of 10cm or more such that the risk of surface runoff is increased.
Soil instability	The actual or potential mass movement through such actions as landslides, earthflows and slumps.
Species management profile (SMP)	A document prepared by QPWS, which provides information and protective measures for relevant EVNT species.
Spoil	Excess soil, rock, or other material excavated during harvesting operations.
Stabilise	To undertake works which prevent deterioration in soil or water quality. Includes vegetative, structural or mechanical measures designed to prevent or control accelerated erosion.
Stable	Where the watercourse bed and/or banks tend to no or minimal change over time. Processes of stream channel scour, and/or deposition, constantly occur in a natural stable channel, but over time, if this leads to degradation or aggradation, respectively, then the stream would not be stable ¹² . The concept of dynamic equilibrium refers to this steady state situation, where inflows are balanced by outflows.
Stand	A contiguous group of trees sufficiently uniform in age-class distribution, composition and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit. ¹³
State forest	Land set apart and declared as a State forest under the <i>Forestry Act 1959</i> for permanent reservation and management for the sustainable use of forest resources.
Table drain	A drain parallel to and at the side of the road.
Temporary processing infrastructure	Temporary processing infrastructure is not fixed to the extent that it can be easily relocated within one or two days. (This may include a sawmill or other processing infrastructure such as shade structures, machinery, equipment and harvesting residues).
Temporary track	A timber extraction road constructed specifically for use during the harvesting operations and closed at the completion of harvesting. It is generally a short length of road leading from a permanent timber extraction road to a landing or series of landings.
Threatened Species	Includes Endangered, Vulnerable and Near Threatened (EVNT) species defined under the <i>Nature Conservation Act 1992</i> and Critically Endangered, Endangered and Vulnerable (CEEV) species under the <i>Environmental Protection and Biodiversity Conservation Act</i> .
Timber	As defined in the <i>Forestry Act 1959</i> , includes the trunk, branches, stumps and roots of trees, whether standing or not, and all wood, whether or not the same is cut up, sawn, hewn, split or otherwise fashioned.
Timber production/harvesting	The growing and harvesting of forest products from native forests.
Timber reserve	Land set apart and declared as a timber reserve under the <i>Forestry Act 1959</i> .

¹² Rosgen, D.L., A stream channel stability assessment methodology.
http://www.wildlandhydrology.com/assets/CHANNEL_STABILITY_.pdf Accessed: 13/05/2011

¹³ Definition taken from The Australian Forestry Standard, AS4708 – 2007, p16.

Term	Definition
Toxic OR Hazardous Substances	A toxic or hazardous contaminant means a contaminant, other than an item of explosive ordnance, that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of— (a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or (b) its physical, chemical or infectious characteristics. ¹⁴
Unstable	Where the watercourse bed and/or banks tend strongly to change. Changes may be seen in vertical stability, lateral stability, channel stability (scour/deposition), channel pattern, watercourse profile features, channel dimension ratios and watercourse evolution. These listed visible indicators of instability tend to be in order from short term to long term.
Visual resource protection area	Areas where the visual resource, or scenic, value is high.
Wash-down, wash-down site	See Clean-down.
Washout	A washout refers to the erosion of a relatively soft surface, such as a roadbed, by a sudden gush of water from a downpour or floods. It also refers to a channel produced by such erosion. ¹⁵
Waste	As defined by the <i>Environmental Protection Act 1994</i> ; Waste includes anything that is: (a) left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or (b) surplus to the industry, commercial, domestic or other activity generating the waste. Waste can be a gas, liquid, solid or energy, or a combination of any of them. A thing can be waste whether or not it is of value.
Water bars ('whoa boys')	Are primarily erosion control structures best used to stabilise surfaces on the completion of use. Generally, they are an earth bank constructed across a road or track to divert surface water runoff.
Watercourse	A defined channel which receives and conducts overland water flow for some periods in most years.
Watercourse crossing	A watercourse crossing is a temporary or permanent crossing, and any associated permanent or temporary structures that are required, to provide access over or through a watercourse or water body. Crossings include, but are not limited to, bed level crossings, culvert crossings and bridges. Any erosion protection or sedimentation management structures are also considered as part of the watercourse crossing.
Watercourse protection zone	An area of specified width surrounding or adjacent to drainage features or water features where harvesting is restricted and/or soil disturbance is minimised, through the exclusion of harvesting machinery. See Buffer zone and Filter zone.

¹⁴ Definition taken from the *Environmental Protection Act 1994*

¹⁵ <http://www.thefreedictionary.com/washout>

Term	Definition
Water feature	<p>Water features are natural or artificial waterholes, impoundments, wetlands (see also wetlands definition) or springs and soaks. Water features may be associated with watercourses and characterised by one or more of the following:</p> <ul style="list-style-type: none"> • the presence of water for more than three months in a normal wet season • In the absence of surface water, characteristic vegetation indicative of frequent recharge of groundwater or locally known as associated with water features, may be evident. • Soil conditions may show evidence of prolonged water saturation. • Flora and fauna debris may be present, e.g. dead water plants; mussel, crab or crayfish shells, fish skeletons, etc. • Springs and soaks are areas where water flows from the surface or where the soil is damp as a result of seepage <p>Water holes, or a chain of water holes, within the main channel of a stream are not considered to be water features.</p>
Water quality	Characteristics of water including turbidity (muddiness), nutrient status, salinity, clarity, chemical content and biological activity.
Weed	A troublesome plant growing out of place that may be causing harm to a crop or the environment. A weed may be declared under the <i>Land Protection (Pests and Stock Route Management) Act 2002</i> and require control effort. It may be a Weed of National Significance (WONS) under the National Weeds Strategy (A national approach for weed management in Australia, Department of the Environment and Water Resources, 2007) or it may be listed in a Local Government Area Pest Management Plan.
Wet	Soil at or above field capacity. Soil bolus leaves a wet outline on hand when squeezed.
Wetland	<p>Areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 metres. To be a wetland the area must have one or more of the following attributes:¹⁶</p> <ol style="list-style-type: none"> at least periodically the land supports plants and animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle. the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper levels. the substratum is not soil and is saturated with water, or covered by shallow water at some time. <p>Also referred to as a water feature in this Code.</p>
Whoa boy	See water bar.

¹⁶ This definition of Wetland taken from The *Queensland Wetland Buffer Guideline*, page 32, (<http://wetlandinfo.ehp.qld.gov.au/resources/static/pdf/resources/reports/buffer-guide/wetland-buffer-guideline-14-04-13.pdf>). See also *Managing native forest practice: A self-assessable vegetation clearing code*, p. 11, http://www.dnrm.qld.gov.au/_data/assets/pdf_file/0005/111587/native-forest-practice-clearing-code.pdf